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LOW FREQUENCY DIELECTRIC PROPERTIES OF WIDE BAND-GAP SEMICONDUC--ETC(U)
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NO. 77

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(6) "Low Frequency Dielectric Properties of Wide Band-Gap Semiconductors"

(21) Report on (9) Research rept.

A Trident Scholar Project Report

(10) by

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ABSTRACT

The complex dielectric constant has been measured for single crystal CdS and CdSe, and amorphous As_2S_3, As_2Se_3, and ZnSe at five audio frequencies (10^2-10^4 Hz) over the temperature range 4.2-300K at 1 atmosphere and over the pressure range 1-3000 atmospheres at temperatures from 260-320K. Anomalies are noted in the temperature variation of the real part of the dielectric constant for the As glasses. One anomaly is attributable to a Debye-type impurity while the other remains unexplained. The volume independent temperature derivative and temperature independent volume derivative of the real part of the dielectric constant are calculated for each material. These are used in conjunction with the Clausius-Mossotti equation to evaluate the various contributions to the pressure and temperature derivatives of the dielectric constant. For CdS, the Lyddane-Sachs-Teller relation is found to hold and the Szigeti effective charge is calculated. Finally, the possible use of these materials as a pressure transducer is discussed.

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14 May 1976
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I. Introduction

The complex dielectric constant, ε^*, and its variation with temperature, pressure, and frequency contains important information concerning the constitution of solids. This is because the real part of the dielectric constant, ε', is a direct measure of the ability of the charged entities within the solid to polarize in an applied electric field. This manifests itself in the capacitance of the material, which in fact may be used to define the real part of the dielectric constant from:

$$\varepsilon' = \frac{C}{C_0} \tag{1}$$

where C_0 is the vacuum capacitance of a given set of electrodes and C is the capacitance of the electrodes, when all the space between them is filled with the material. Capacitance is of course defined as:

$$C \equiv \frac{q}{V} \tag{2}$$

where q is the charge on the electrodes and V the potential between them.

The imaginary part of the dielectric constant, ε'', on the other hand, is a measure of the conductive properties of the material. It is defined by the conductance, G, (reciprocal of the resistance), divided by the applied frequency, ω, times the capacitance where:

$$\varepsilon'' = \frac{G}{\omega C} \tag{3}$$

From this a dielectric conductivity of the material, σ, can be calculated from:

$$\sigma = \omega\varepsilon_0\varepsilon'' \qquad (4)$$

where ε_0 is the permittivity of free space.
In the case of free charges, this conductivity is subject to the standard interpretation as a measure of the ability of the charges to move through a solid. However, in the case of bound charges, it is a measure of the phase lag between the applied field and the induced polarization. These two effects may be separated by varying the frequency of the applied field.

The effects of pressure on ε^* are interesting because it reflects how all of the aforementioned responses vary with a change in the volume of the sample. The variation of ε^* with temperature contains further information, since in addition to showing volume effects due to thermal expansion, it also shows pure temperature effects.

Information on ε^*, and in particular ε', also has applied interest for a capacitive high pressure gauge[1], where the change in ε' (and hence the capacitance) is used to monitor hydrostatic pressure. If further developed, this gauge would be of use to the Navy. The limitation of this pressure gauge at the present time, is the large temperature coefficient that exists in all known substances compared to the pressure coefficient. Consequently, a search is underway for a material with

a high pressure coefficient to temperature coefficient ratio. Thus all the materials studied in the present work were choosen with this in mind.

The first materials studied in the present work, single crystal CdS and CdSe, had additional motivation in that Dr. Benjamin Segall, of Case Western Reserve University, is interested in the values of ε' of the Cd crystals, for use in the calculation of exciton spectra. Also, the Cd crystals are technologically interesting since they are photoconductors, that is, their resistance changes as light shines on them.

The interest in the second group of materials studied in the present work, amorphous As_2S_3 and As_2Se_3, was stimulated by the Solid State Applications Group at the Naval Research Lab. In addition to their interest in the fundamental properties of these amorphous semiconductors[2], they are studying them for use as laser windows, since they transmit light quite well, far out into the infrared region.[3]

Finally ZnSe was chosen because the constituent element Se is common to two other compounds being studied and since it too is being considered for use as an infrared laser window.

Room temperature values of ε^* already exist for all of these materials, but as is usually the case for dielectric properties, the existing results are in poor agreement. In this present study the complex dielectric constant, ε^*, was measured in two independent ways. Besides establishing reliable

results for ε^*, this work indicates probable reasons for some of the discrepancies between other works.

For the Cd compounds, data exists at a few temperatures other than room. Present values for the As compounds and ZnSe are for room temperature only.

In the present work ε^* is determined for all five compounds over the temperature range 4.2 - 300°K. ε^* is also determined over the pressure range 0 - 3000 atmospheres, for the temperature range 260 - 320°K. This represents the first pressure studies of the dielectric properties for any of these materials.

II. Experiment and Data Reduction

A. Samples

Since both Cd compounds have the wurtzite structure, they have two independent dielectric constants. Consequently two different samples of each are necessary for the complete determination of the dielectric properties of these materials. In each case, discs were obtained with optic axis parallel (a-plate) and perpendicular (c-plate) to the face of the crystal. The c-plates were 25.4 mm in diameter and 1.5 mm thick, while the a-plates were about 20 mm in diameter and about 1mm thick. These crystals were obtained from the Cleveland Crystals Corporation. The As_2S_3 and As_2Se_3 samples were bought from the Servofrax and Unique Optical companies. All of the samples were 25.4 mm in diameter and 1.5 mm thick. The ZnSe was also obtained from Cleveland Crystals, but it was made by the Raytheon Corporation using the chemical vapor deposition, CVD, method. It is the same size as the As samples.

B. 300°K, 1000 Hz Dielectric Constant Measurements

1. Geometrical Technique

The first method of determining the 300°K, 1000 Hz dielectric constant of all the samples is the standard geometrical technique.

This method utilizes the equation for the capacitance of a parallel plate capacitor of

$$C = \frac{\varepsilon' \varepsilon_0 A}{d} \qquad (5)$$

where A is the area of the plates, and d is the plate separation.

In this method, electrodes are evaporated onto the face of the sample and the area, A, sample thickness, d, and capacitance, C, are measured. What makes the present application of the geometrical technique better than previous work, is the elimination of the fringing field around the edges of the sample, by using the three terminal technique of measurement. This is done by insulating the center portion of the crystal face from the edge during the evaporation phase and then measuring the capacitance of this center portion only. The insulation is accomplished using a tiny ring of steel centered on the sample and held in place by a magnet. This keeps the vaporizing aluminum from plating the entire sample face, and thus insulates the center portion.

In this study the measuring device is a General Radio 1615 Capacitance Bridge which has been modified to give meaningful results for both C and $\frac{G}{\omega}$ at levels of less than 1 part per million, ppm, at the five audio frequencies of 10^2, $10^{2.5}$, 10^3, $10^{3.5}$, and 10^4 Hz. The biggest advantage of the modifications besides the accuracy, is single knob switching between frequencies. This bridge is a one of a kind, state of the art

system that was designed and built by Dr. Carl Andeen, of CWRU. It is presently on loan to the Naval Academy. Working on a Wheatstone's bridge principle, the bridge measures the capacitance of the sample and ε' can be calculated from equation (5) once A and d have been measured.

2. Method of Substitution

Even with all of the modifications of the geometrical technique as described above, it is still only capable of an accuracy of about 0.5% at best. Furthermore, there are additional ambiguities associated with the sample-electrode interface, particularly in the case of the As compounds. Consequently, an electrodeless technique, the method of substitution,[4] was applied to these materials. This method, also known as the two fluid technique , briefly stated is as follows. If a fixed electrode, parallel plate capacitor of area A and plate separation d is used to measure five capacitances:

$$C_1 = \frac{\varepsilon_0 \varepsilon_s' A}{d} \tag{5a}$$

ε_s' is the static dielectric constant of the first fluid;

$$C_2 = \frac{\varepsilon_0 \varepsilon_s' \varepsilon_s^s A}{\varepsilon_s^s d + (\varepsilon_s' - \varepsilon_s^s)t} \tag{5b}$$

ε_s^s is static dielectric constant of the sample which has been inserted into the cell displacing part of the fluid and t, the

sample thickness;

$$C_3 = \frac{\varepsilon_0 \varepsilon_S{}^2 A}{d} \tag{5c}$$

ε_s^2 is the static dielectric constant of the second fluid;

$$C_4 = \frac{\varepsilon_0 \varepsilon_S^2 \varepsilon_S^S}{\varepsilon_S^S d + (\varepsilon_S{}^2 - \varepsilon_S^S)t} \tag{5d}$$

where the sample has again been inserted into the cell and;

$$C_5 = \frac{\varepsilon_0 A}{d} \tag{5e}$$

where the cell has been evacuated, a little algebra leads to the following equation for the static dielectric constant of the sample:

$$\varepsilon_S^S = \frac{C_1 \ (1 + C_3/C_2 - C_3/C_1 - C_3/C_4)}{C_5 \ (C_1/C_2 - C_3/C_4)} \tag{6}$$

The value of the static dielectric constant of the sample, is then determined only from ratios of measured capacitances, which can be known extermely well via three terminal methods described before. The apparatus used in making these measurements is described in detail elsewhere.[1,4,5]

This technique could not be applied to the Cd compounds since the cell is not enclosed, and the varying light intensity in the room where the measurements are made would affect the results.

The results of the dielectric constant measurements are listed in Tables I and II, along with the results of other workers.

C. Variable Temperature Measurements

For the second part of the work, the samples were put in a Cryogenics Associates CT-14, temperature controlled cryostat. C and $\frac{G}{\omega}$ were then measured for the five set frequencies at 45 temperature points in the range 4.2-300°K. This involved taking 3600 data points that were used for calculation.

The data was then reduced as follows. The first step was to obtain values of ε'' at 300°K and 1000 Hz for all the materials using equation (3). These results are shown in Table II.

Next, the ε' and ε'' for the other measured frequencies at 300°K were found. This was done assuming that the relative change in capacitance is equal to the relative change in dielectric constant. These results are shown in Table III.

The real part of the dielectric constant at temperatures other than 300°K at all frequencies was determined from:

$$\frac{\varepsilon'_T}{\varepsilon'_{300}} = \frac{C_T}{C_{300}} - \int_{300}^{T} \alpha_p dT \qquad (7)$$

where α_p is the isobaric linear thermal expansion coefficient. Since an analytic expression of $\alpha_p(T)$ does not exist, a numerical integration of the available data was carried out using the rectangular rule with 10°K increments. Since the Cd crystals, are anisotropic, the effective α_p used to correct the dielectric constant for thermal expansion will change depending on the orientation of the crystal. The effective α_p used for each sample are tabulated in Appendix II.

The imaginary part of the dielectric constant was then determined at all temperatures and frequencies from:

$$\frac{\varepsilon''_T}{\varepsilon''_{300}} = \frac{G_T}{G_{300}} - \int_{300}^{T} \alpha_p dT \qquad (8)$$

The conductivity, σ, was also found using Equation (4).

All of this data manipulation was done with the computer using the program SCORED. The program and the results of running it are included in Appendix III.

D. Variable Pressure Measurements

The final portion of my study was that of the pressure dependence of ε^*. The samples were then put into a pressure bomb which was simultaneously attached to a high pressure pump and a highly accurate capacitive pressure gauge capable of measuring changes in pressure to 1 part per million.[1] The pump was developed by Enerpac, a division of Applied Power Industries. The bomb was immersed in an ethylene glycol solution temperature bath, that was controlled in temperature by a Neslab Instruments, Inc. RTE-8 circulating bath and a Brownwill Scientific Corporation heater. The pressure was varied from 1 to 3000 atmospheres over a concurrent temperature range of 260-320°K. The collection of 6300 data points showing pressure dependence as a function of temperature was thus accomplished.

The pressure data was then reduced as follows. The first

step was to obtain 1 atmosphere values of ε' and ε'', for all the temperatures at which data was taken. This was done by assuming that the values of Tables II and III were good for 300°K and 1 atmosphere. Next the computer program SCOREDP, listed in Appendix IV, was run, which finds ε' and ε'' at 1 atmosphere for all temperatures using the α_p listed for each material in Appendix II.

Once temperature corrected, 1 atmosphere dielectric constants were arrived at, the real part of the dielectric constant at each pressure was found from:

$$\frac{\varepsilon'_p}{\varepsilon'_{1\ Atm}} = \frac{C_p}{C_{1\ Atm}} + \int_1^p \chi_T dp \qquad (9)$$

where χ_T is the isothermal compressibility and p is the pressure at which the capacitance was measured.

Similarly the imaginary part of the dielectric constant can be found from:

$$\frac{\varepsilon''_p}{\varepsilon''_{1\ Atm}} = \frac{G_p}{G_{1\ Atm}} + \int_1^p \chi_T dp \qquad (10)$$

In each case the integral was solved analytically since it was assumed that:

$$\chi_T = \chi_T^{1\ Atm} + \left(\frac{\partial \chi}{\partial p}\right)_T p \qquad (11)$$

Consequently

$$\int_1^p \chi_T dp = \chi_T^{1\ \text{Atm}} + \left(\frac{\partial \chi}{\partial p}\right)_T \frac{p^2}{2} \qquad (12)$$

The main problem, then, was to find acceptable values of χ_T and $(\partial \chi_T / \partial p)$ for all the materials. Complicating this is the fact that χ_T changes with temperature. Again the anisotropy of the Cd compounds had to be taken into account. The isothermal compressibilities used to reduce the data, along with the temperature and pressure derivatives of χ_T, where they exist, are tabulated in Appendix V.

The computer program written to use equations (9) and (10) to reduce the measured values of C and $\frac{G}{\omega}$ is called PRESSRED. It is listed in Appendix VI, along with the values of ε' and ε'' obtained from running it.

III Discussion of Results

A. 300°K, 1000 Hz Dielectric Constants

Table I shows the results of the two techniques used for measuring ε' for As_2S_3 and As_2Se_3. The first point of interest is that for As_2S_3, two distinct values of ε' were found. It is known,[6] that the 1973 and 1975 samples contain 1000 ppm of Se, while the 1971 sample is quite pure. (This difference is optically apparent since the old sample is red while the newer samples are amber.) Consequently, the rather large decrease in ε' for the newer samples is attributed to the presence of the Se. While at first sight the decrease in ε' upon the addition of impurities seems strange, it is not, since the density of the samples could actually decrease. No data is available to check this possibility. Furthermore, a decrease in ε' could also occur if the added Se increases the effective force constants governing the infrared contribution to the dielectric constant. The quantitative aspects of these possibilities will become more apparent after the discussion of Szigeti effective charges which will appear later in this paper.

Also evident from Table I is the good agreement between the values of ε' as measured by the two techniques. This implies that no spurious polarization effects take place due

to the aluminum electrodes plated on the samples. This is in contradiction to what is usually thought for these systems. Furthermore, the aluminum electrodes were removed and replaced with gold ones. Once again the results for ε' were in good agreement with those found by the electrodeless technique.

Finally, the results for other workers are tabulated in Table I for comparison. The rather wide range of values for As compounds is shown. The present work gives at least one explanation of these discrepancies since it has been shown that ε' is strongly dependent upon impurity concentration.

For the Cd compounds and ZnSe, the results are in good agreement with the work of Berlincourt, et. al.[7] who quote 300°K values of ε' for $CdS_{\perp}$, $CdS_{//}$, $CdSe_{\perp}$, $CdSe_{//}$, and ZnSe as 9.35, 10.33, 9.70, 10.65, and 9.1. They probably used the geometrical techniques, although they were not specific. Interesting to note is the comparison of ε' for ZnSe. Berlincourt, et.al. studied single crystal ZnSe and the sample in this study was amorphous ZnSe prepared by the Chemical vapor deposition technique. The agreement however is within .2%.

In order to compare the present values for CdS with the work of Barker and Summers,[8] a correction for the piezoelectricity of the Cd compounds must be made.

The present work measured the "unclamped" dielectric constant since the frequencies at which the measurements were

made are below that of the resonant frequency of the crystals. Barker and Summers on the other hand, worked in the infrared region, and consequently measured the "clamped" dielectric constant.

Using the basic relations in Cady,[9] the correction to ε' was derived as:

$$\varepsilon'_{\perp} = (\varepsilon'_{\perp})_{\text{clamped}} + \frac{e_{15}d_{15}}{\varepsilon_0} \qquad (13)$$

where e_{15} and d_{15} are the piezoelectric coefficients in standard notation. Using the data from Berlincourt, et. al., the corrections for $CdS_{\perp}$ and $CdSe_{\perp}$ were found to be .332 and .164. Consequently the 300°K values of $(\varepsilon')_{\text{clamped}}$ as obtained in the present work are 8.748 and 9.286, the first which can be compared with Barker and Summers' value of 8.7 for CdS .

The correction for the electric field parallel to the c-axis was found to be:

$$\varepsilon'_{//} = (\varepsilon'_{//})_{\text{clamped}} + \frac{2e_{31}d_{31} + e_{33}d_{33}}{\varepsilon_0} \qquad (14)$$

Again with data from Berlincourt, et. al., the correction factors for $CdS_{//}$ and $CdSe_{//}$ were found to be .798 and .448 respectively, yielding $(\varepsilon')_{\text{clamped}}$ of 9.272 and 9.941 for this study. The first of these values can then be compared with 9.25 as obtained by Barker and Summers for ε' of CdS .

B. Isobaric Temperature Effects

A plot of ε' vs. T for the Cd compounds is shown in Figure I. It is noted that as T(°K) goes to zero, $(\partial\varepsilon'/\partial T)$ also goes to zero as required by the Third Law of Thermodynamics.

For the pure sample of As_2S_3 a plot of ε' vs. T is shown in Figure II reveals a bump around 20°K. Since no corresponding anomalous effects are seen in the conductivity at low temperatures, as graphed in Figure III, this result is quite interesting, but unexplained. This low temperature maximum is probably an intrinsic property of amorphous chalcogenide glass since a similar low temperature maximum is also observed in As_2Se_3 as shown in Figure IV.

Also of interest in Figure IV, is the bump at approximately 200°K. This bump however, has an associated maximum in the conductivity as seen in the plot of ε'' vs. T for As_2Se_3 in Figure V. The shape of the peak makes it identifiable as a Debye-type dipole with a relaxation time, τ, given by an Arrhenius equation of the form:

$$\tau = \tau_0 \exp (E/KT) \qquad (15)$$

In other words, some sort of dipolar impurity exists in the sample. The dipole may either be of the permanent type, such as a water molecule or an interstitial charge compensator

which is able to move between equivalent sites. In either case, E in Equation (15), represents the height of the energy barrier for reorientation, called the activation energy. τ_0 represents the frequency with which the impurity dipole approaches the reorientation barrier, and is called the reciprocal frequency factor. K is the Boltzmann's constant.

Furthermore, ε' and ε'' are given by the Debye equations:

$$\varepsilon' = \varepsilon'_H + A\,[T\,(1+\omega^2\tau^2)\,]^{-1} \qquad (16a)$$

and

$$\varepsilon'' = A\omega\tau\,[T\,(1+\omega^2\tau^2)\,]^{-1} \qquad (16b)$$

where ε'_H is the high frequency limit of the dielectric constant, i.e., the dielectric constant at frequencies where the dipole makes a negligible contribution . A represents the strength of the dipole and is given by:

$$A = \frac{Np^2}{3\varepsilon_0 K} \qquad (17)$$

where N is the dipole concentration and p is the dipole moment.[10] These equations reproduce the observed results since Equation (16b) for ε'' peaks at approximately where $\omega\tau = 1$. In Figure V, τ is the variable since it is strongly temperature dependent and the peak occurs where τ equals the reciprocal of the applied frequency. In addition, ε' shows a gradual rise as temperature decreases until just before $\omega\tau = 1$, after which there is a sharp decrease in the contribution of the dipole to ε'. This is the

point where ε' approaches ε'_H.

Thus, by measuring ε'' as a function of temperature, the position of the maximum may be found by a best fit to the data. If this is done for several frequencies, E and τ_0 can also be found by a best fit to:

$$\ell n\ \omega_{applied} = \frac{-E}{K\ T_{max}} - \ell n\ \tau_0 \qquad (17)$$

which follows from $\omega\tau = 1$. These fits were done using the computer programs found in Appendix VII. Values of .285 eV and 3.2×10^{-12} sec were found for E and τ_0 respectively. These values are on the order of magnitude of values observed for the movement of interstitial fluorides in CaF_2, for example.

The existence of a well defined dipole in a glass is quite interesting. It may well be evidence of extended local order for the glass.

Another interesting aspect of the plots of ε'' vs. T for the amorphous materials, is that σ is found to be linear in the region near room temperature. This is in agreement with a model of the conductivity in glassy materials, put forth by Pollak and Pike.[11]

Other workers have observed that near room temperature, conductivity vs. frequency follows a relationship of the form:

$$\sigma = \omega^s \qquad (18)$$

where $s \simeq 1$. As the plot in Figure VI shows, $s \simeq 1$ for As_2S_3,

but is about 0.6 in the case of As_2Se_3. This is not due to the dipolar impurity since this would drive the frequency dependence the other way, but whether this discrepancy is indirectly related to the impurity is not known at the present time.

Next, the temperature derivative, $(\partial\varepsilon'/\partial T)_p$ at 300°K was found using the temperature data of Appendix III. The data nearest room temperature was fit to a quadratic equation of the form:

$$\varepsilon' = \varepsilon_0' + aT + bT^2 \tag{19}$$

using the computer program SCOPOL.

The coefficients a and b are listed in Appendix VIII along with a copy of the program SCOPOL.

The temperature derivatives at 300°K were then calculated from

$$\left(\frac{\partial\varepsilon'}{\partial T}\right)_p = a + 600\ b \tag{19a}$$

and the results of these calculations along with the logarithmic derivatives are tabulated in Table IV.

C. Isothermal Pressure Effects

The pressure derivative, $(\partial\varepsilon'/\partial p)_T$ was also found at various temperatures ranging from 260 - 320°K, using the computer program SCOPOL. Once again, the data were fit to a quadratic equation of the form:

$$\varepsilon' = \varepsilon_{1\ Atm}' + ap + bp^2 \tag{20}$$

The pressure derivative at zero pressure is then:

$$\left(\frac{\partial \varepsilon'}{\partial p}\right)_T = a \qquad (20a)$$

The 300°K values of the logarithmic pressure derivative are listed in Table IV. The computer printouts of the quadratic fit to the pressure data are found in Appendix IX.

An interesting effect of pressure on the σ of $CdS_{//}$ was found. As the pressure was increased, σ increased dramatically at several frequencies. Thus, it appears that pressure has an effect simular to light in this material. It will be of interest to study this effect further.

Also of interest with the Cd compounds, was the manner in which $(\partial\varepsilon'/\partial p)_T$ varied with temperature. The pressure derivative, rose with temperature to approximately 300°K and then fell off as the temperature was increased further. This effect may be associated with the piezoelectricity of the material. Once again, this effect needs to be investigated further.

D. Isochoric Temperature Effects and Isothermal Volume Effects

Using simple thermodynamics, two quantities can now be found from $\left(\frac{\partial \varepsilon'}{\partial p}\right)_T$ and $\left(\frac{\partial \varepsilon'}{\partial T}\right)_p$ which cannot be measured directly. They are the volume independent temperature derivative, $(\partial\varepsilon'/\partial T)_v$, and the temperature independent volume derivative, $v(\partial\varepsilon'/\partial v)_T$. These are tabulated in Table IV. These results are used in the next section.

E. Clausius - Mossotti Equation:

Microscopically the dielectric constant of a material is usually treated in terms of the polarizability, α_m, defined by

$$\vec{P} \equiv \alpha_m \vec{E} \tag{21}$$

where P is the polarization, and E the electric field applied to the material. The relation that relates ε' and α_m is the Clausius - Mossotti equation:

$$\frac{\varepsilon'-1}{\varepsilon'+2} = AN\,\alpha_m \tag{22}$$

where A is a quantity related to the crystal structure and N is the molecular density. As a first approximation, A is assumed to be a constant. It is expected that for the crystals studied in this work, this assumption will not introduce any serious errors.[12]

Differentiation of Equation (22) with respect to temperature gives:

$$\frac{1}{(\varepsilon'-1)\,(\varepsilon'+2)} = \frac{-1}{3v}\left(\frac{\partial v}{\partial T}\right)_p + \frac{1}{3\alpha_m}\left(\frac{\partial \alpha_m}{\partial v}\right)_T\left(\frac{\partial v}{\partial T}\right)_p + \frac{1}{3\alpha_m}\left(\frac{\partial \alpha_m}{\partial T}\right)_v \tag{22a}$$

$$= A + B + C$$

Three factors can therefore be distinguished as contributing to the temperature dependence of the dielectric constant.

They are:

A: The decrease in the number of polarizable particles per unit volume as the temperature increases. This is a direct effect of the volumic expansion, β, where $\beta = 3\alpha_p$.

B: An increase in the polarizability of a constant number of particles due to the increase in the available volume as temperature increases.

C: The dependence of polarizability on temperature, the volume remaining constant.[13] The values of A,B, and C have been calculated for the materials studied and are found in Table V.

It is of interest to note that for the As compounds the change in volume of the samples is the dominant term while in the other materials, the change in polarizability with temperature is contributed to almost equally by all three terms.

Differentiation of Equation (22) with respect to pressure yields:

$$\frac{1}{(\epsilon'-1)\ (\epsilon'+2)} \left(\frac{\partial \epsilon'}{\partial p}\right)_T = \chi_T - \chi_T \left(\frac{\partial \ell n_m}{\partial \ell n v}\right)_T \qquad (22b)$$

Thus, two factors are responsible for the pressure dependence of the dielectric constant.

They are:

E: The increase in number of polarizable particles per unit volume as the pressure increases; a direct result of isothermal compressibility, χ_T; and

F: The decrease in polarizability of a constant number of particles as the available volume decreases as a result of the rising pressure.

These values have been calculated and are found in Table VI. The most interesting result of these calculations is that $(\partial \ell n \alpha_m / \partial \ell n v)_T$ is approximately 1.0 for the Cd compounds and ZnSe. This leads to the conclusion that the polarizability is directly proportional to the volume.

This analysis can be pushed further since the microscopic polarizability is the summation of an electrical (optical) contribution, $\alpha_{e\ell}$, and an infrared (ionic) contribution, α_{ir}, so that:

$$\alpha_m = \alpha_{e\ell} + \alpha_{ir} \tag{23}$$

$\alpha_{e\ell}$ is related to the high frequency dielectric constant ε_∞, where:

$$\varepsilon_\infty = n^2 \tag{24}$$

and n is the refractive index at long wavelengths. By the

Clausius - Mossotti equation:

$$\frac{\varepsilon_\infty - 1}{\varepsilon_\infty + 2} = \frac{n^2 - 1}{n^2 + 2} = \frac{4\pi\alpha_{e\ell}}{3v} \tag{25}$$

This is of the same form as Equation (22) so by Equation (23) it follows that:

$$\left(\frac{\partial \ell n \alpha_m}{\partial \ell n v}\right)_T = \frac{\alpha_{e\ell}}{\alpha}\left(\frac{\partial \ell n \alpha_{e\ell}}{\partial v}\right)_T + \frac{\alpha_{ir}}{\alpha}\left(\frac{\partial \ell n \alpha_{ir}}{\partial v}\right)_T \tag{26}$$

and

$$\left(\frac{\partial \ell n \alpha_m}{\partial T}\right)_v = \frac{\alpha_{e\ell}}{\alpha}\left(\frac{\partial \ell n \alpha_{e\ell}}{\partial T}\right)_v + \frac{\alpha_{ir}}{\alpha}\left(\frac{\partial \ell n \alpha_{ir}}{\partial T}\right)_v \tag{27}$$

To evaluate Equations (26) and (27), the pressure and temperature dependence of n are needed. The pressure dependence of n for CdS, both $\perp$ and $/\!/$ was reported by Vedam and Davis.[12] The temperature dependence was calculated from values of ε_∞ given by Barker and Summers.[8] These values along with ε_∞ are found in Table VII.

The quantities $\left(\frac{\partial \ell n \alpha_{e\ell}}{\partial \ell n v}\right)_T$ and $\left(\frac{\partial \ell n \alpha_{e\ell}}{\partial T}\right)_v$ are then determined from equations (26) and (27), by appropriate substitution. The various contributions can then be easily determined and are given in Table VIII.

Interestingly enough, the relative contributions in the volume dependence are about the same for both orientations, while for the temperature dependence this is not the case.

F. Lyddane - Sachs - Teller Equation

A well known relationship between the high and low frequency dielectric constants, ε_∞ and ε', is the Lyddane-Sachs - Teller equation:

$$\frac{\varepsilon'}{\varepsilon_\infty} = \left(\frac{\omega_{LO}}{\omega_{TO}}\right)^2 \qquad (28)$$

where ω_{LO} and ω_{TO} are the frequencies of the longitudinal and transverse optic phonons respectively, and ε_∞ is the index of refraction, squared. Using values for ω_{LO} and ω_{TO} of 303.6 and 234.7 for $CdS_\perp$, and 306.9 and 234.7 for $CdS_{//}$,[14] all in units of cm^{-1}, the ratio on the right hand side of Equation (28) was found to be 1.673 and 1.600 respectively. Using values of 5.235 and 5.239 for ε_∞,[15] the left hand side of Equation (28) becomes 1.677 and 1.558 respectively for $CdS_\perp$ and $CdS_{//}$, where the low temperature results of the present work have been used for ε'. (The unclamped dielectric constant is appropriate for use, but since values for the piezoelectric coefficients do not exist below room temperature, the correction was therefore assumed not to change with temperature.) Consequently, the Lyddane - Sachs - Teller relation is found to hold within the limits of experimental error for CdS. This settles a controversy which has been in the literature for several years.

G. Szigeti Effective Charge

The data collected in the preceding section allows the calculation of another quantity of fundamental interest for CdS, the Szigeti effective charge, e*. This quantity is defined through the equation:[16]

$$\varepsilon' - \varepsilon_\infty = \frac{\varepsilon_\infty+2}{3} \frac{(Ze^*)^2 \, 4\pi N}{\omega_{TO}^2 \, \bar{M}} \qquad (29)$$

where Z is the valence and $\bar{M}$ is the reduced mass per ion pair. e* is a measure of the deviation of a given ion from a full ionic charge and is thus a measure of the effects of overlap between ions or of the amount of homopolar bonding. Using a value of ε_∞ calculated from the Lyddane-Sachs-Teller relation, along with other values quoted in the previous section, values of $e^*_\perp = .458$ and $e^*_{/\!/} = .451$ are found. Thus, the Cd and S ions act as though they have less than half of a full ionic charge. This is consistent with the usual view that CdS is not very ionic.

H. Applications

Finally, a few words should be said about the possible application of these materials as the transducer element in a capacitive high pressure guage.[1] The Cd compounds and ZnSe do not look particularly interesting since they have rather

high temperature coefficients of capacitance and low pressure coefficients. The As compounds, on the other hand, have one of the highest ratios of pressure coefficient to temperature coefficient of any material studied to date. For example, they are an order of magnitude better than CaF_2 which is currently in use in the prototype gauge. In addition, no hysteresis has been observed in these materials. These facts combined with their excellent mechanical properties makes the As compounds prime candidates for pressure transducers.

IV Summary and Conclusions

The main results and conclusions of the present work can be summarized as follows:

1. Reliable values of the complex dielectric constant have been established over the temperature range 4.2-300K at 1 atmosphere and at pressures up to 3000 atmospheres over the temperature range 260-320K for crystalline CdS and CdSe and amorphous ZnSe, As_2S_3, and As_2Se_3.

2. Metallic electrodes on As_2S_3 and As_2Se_3 show no spurious polarization or conductivity effects as is usually thought.

3. An interesting low temperature maximum in the real part of the dielectric constant has been discovered in the As compounds.

4. Evidence of extended local order in As_2Se_3 has been found.

5. The conductivity of the As compounds varies linearly with temperature near room temperature in agreement with recent theories for these materials.

6. A rather strong increase in the conductivity with pressure has been observed in $CdS_{//}$.

7. For the Cd crystals and ZnSe, the polarizability is found to be proportional to volume at room temperature.

8. The Lyddane-Sachs-Teller relation is found to hold

for CdS settling a current controversy.

9. The Szigeti effective charge has been found to be 0.458 and 0.451 for $CdS_{\perp}$ and $CdS_{//}$ respectively, in agreement with the usual view that these materials are not very ionic.

10. The As compounds appear to be suitable for use as the transducer element in a capacitive high pressure guage since they show no hysteresis and have one of the highest pressure coefficient to temperature coefficient ratios of any material studied to date.

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TABLE I: 300°K, 1000 Hz values of the dielectric constants determined by the two experimental techniques and found in the literature.

As_2S_3	Two-Fluid Technique	Geometrical Technique	Other Workers
Servo Corporation	(Electrodeless)	(Al Electrodes)	
(1971)"pure"	7.9093	7.93	8.1[a] 7.53[b] 8.9[c]
(1973) 1000 ppm Selenium	7.4581 7.4588	7.46 7.49	
(1975) "	7.4592	7.47	
Unique Optical	7.4473	7.42	
As_2Se_3	9.379	9.41	9.7[c] 8.94[d]

[a]W. Wolf, Military Handbook of Infra-red Technology, Washington: U.S. Government Printing Office (1965).

[b]M. Onomichi, T. Arai, and K. Kudo, J. Non-Cry. Solids (Neth), 6, 362 (1971).

[c]L. Zlatkin and Y. Markov, Phys. Status Solidi, 4, 391 (1971).

[d]Y. Ohmachi, J. Opt. Soc. of America, 63, 5, 630 (1973).

TABLE II: 300°K, 1000 Hz values of ε' and ε'' for all the materials studied. The units on ε'' are 10^{-5}.

Material	ε'	ε''
$CdSe_{\perp}$	9.45	663.5
$CdSe_{//}$	10.39	302
$CdS_{\perp}$	9.08	4719
$CdS_{//}$	10.07	147
ZnSe	9.12	13276
As_2S_3	7.9095	144
As_2S_3	7.4595	194
As_2Se_3	9.379	4435

TABLE III: 300°K, multifrequency values of ε' and ε'' for all the materials studied. The units on ε'' are 10^{-5}.

Material		10^2Hz	$10^{2.5}$Hz	$10^{3.5}$Hz	10^4Hz
$CdSe_{\perp}$	ε'	9.45455	9.45161	9.44809	9.44704
	ε''	4107	1505	382	303
$CdSe_{//}$	ε'	10.3919	10.3902	10.3828	10.3835
	ε''	1429	590	206	103
$CdS_{\perp}$	ε'	9.13910	9.10938	9.05473	9.03576
	ε''	14587	7264	3401	2639
$CdS_{//}$	ε'	10.0710	10.0696	10.0609	10.0710
	ε''	230	179	130	604
ZnSe	ε'	9.18182	9.14761	9.11026	9.10476
	ε''	80105	39387	4725	1844
As_2S_3	ε'	7.91151	7.91051	7.90849	7.90759
	ε''	141	142	144	126
As_2S_3	ε'	7.46223	7.46092	7.45812	7.45668
	ε''	170	186	198	206
As_2Se_3	ε'	9.46692	9.41548	9.35533	9.34058
	ε''	9963	6665	2855	1795

TABLE IV: 300°K, 1000 Hz values of ε', along with the temperature, pressure, volume independent temperature, and temperature independent volume derivatives.

Material	ε'	$\frac{1}{\varepsilon'}\left(\frac{\partial\varepsilon'}{\partial T}\right)_p$	$\frac{1}{\varepsilon'}\left(\frac{\partial\varepsilon'}{\partial p}\right)_T$	$\frac{1}{\varepsilon'}\left(\frac{\partial\varepsilon'}{\partial T}\right)_V$	$\frac{V}{\varepsilon'}\left(\frac{\partial\varepsilon'}{\partial V}\right)_T$
	(unitless)	(10^{-5}/K°)	(10^{-10}/pa)	(10^{-5}/K°)	(unitless)
$CdSe_{\perp}$	9.45	21.09	-.1806	20.6	.322
$CdSe_{//}$	10.39	24.25	-.1330	23.9	.237
$CdS_{\perp}$	9.08	40.55	-.1337	40.1	.282
$CdS_{//}$	10.07	23.03	-.0142	23.0	.0233
ZnSe	9.12	22.63	-.2035	21.7	.404
As_2S_3	7.9095	5.497	1.348	19.0	-1.84
As_2S_3	7.4584	4.291	1.401	18.3	-1.91
As Se	9.379	17.25	1.806	33.8	-2.57

TABLE V: Various contributions to the temperature dependence of the static dielectric constant calculated from equations

Crystal	ε'	$K^* \left(\frac{\partial \ell n \varepsilon'}{\partial T}\right)$ = $-\beta + \beta \left(\frac{\partial \ell n \alpha}{\partial V} m\right)_T + \left(\frac{\partial \ell n \alpha}{\partial T} m\right)_V$ (all in units of $10^{-5}/°K$).						
$CdSe_{\perp}$	9.45	20.59	=	-14.04	+	14.48	+	20.15
$CdSe_{//}$	10.39	21.66	=	-14.04	+	14.34	+	21.36
$CdS_{\perp}$	9.08	41.12	=	-14.63	+	15.05	+	40.70
$CdS_{//}$	10.07	21.18	=	-14.63	+	14.66	+	21.15
ZnSe	9.12	22.86	=	-23.40	+	24.35	+	21.91
As_2S_3	7.9095	6.3	=	-73.2	+	57.6	+	21.9
As_2S_3	7.4584	5.2	=	-73.2	+	56.1	+	22.3
As Se	9.379	16.9	=	-64.5	+	48.2	+	33.2

$$K^* = \frac{1}{(\varepsilon'-1)\ (\varepsilon'+2)}$$

TABLE VI: Various contributions to the pressure dependence of the dielectric constant calculated from equation

Crystal	ε'	$K^* \left(\frac{\partial \ell n \varepsilon'}{\partial p}\right)_T = \chi_T - \chi_T \left(\frac{\partial \ell n \alpha}{\partial \ell n V}\right)_T$ all in units of 10^{-11}/pa					$\left(\frac{\partial \ell n \alpha}{\partial \ell n V}\right)_T$ unitless
$CdSe_{\perp}$	9.45	-0.17	=	5.61	-	5.78	1.03
$CdSe_{//}$	10.39	-0.12	=	5.61	-	5.73	1.02
$CdS_{\perp}$	9.08	-0.13	=	4.89	-	5.02	1.03
$CdS_{//}$	10.07	-0.01	=	4.89	-	4.90	1.00
ZnSe	9.12	-0.21	=	5.04	-	5.25	1.04
As_2S_3	7.9095	1.56	=	7.32	-	5.76	.787
As_2S_3	7.4584	1.71	=	7.32	-	5.61	.766
As_2Se_3	9.379	1.78	=	7.04	-	5.26	.747

$$K^* = \frac{1}{(\varepsilon'-1)\ (\varepsilon'+2)}$$

TABLE VII: Values of the refractive index, n, and the high frequency dielectric constant, ε_∞, and their pressure and temperature derivatives at 300°K.

Crystal	n	ε_∞ [a]	$\frac{1}{\varepsilon_\infty}\left(\frac{\partial \varepsilon_\infty}{\partial p}\right)_T$ [b] (10^{-10}/pa)	$\frac{1}{\varepsilon'}\left(\frac{\partial \varepsilon_\infty}{\partial T}\right)$ [c] (10^{-5}/K°)
$CdS_\perp$	2.288	5.235	-.1206	14.38
$CdS_{//}$	2.289	5.239	-.1197	14.37

[a] A. Barker and C. Summers, J. Appl. Phys., 41, 8, 3552 (1970).

[b] K. Vedam and T. Davis, Phys. Rev., 181, 3, 1196 (1969).

[c] Calculated from Ref. a.

TABLE VIII: Caption (see caption)

Part A:

Crystal	$\frac{\alpha_{e\ell}}{\alpha_m}$	$\frac{\alpha_{ir}}{\alpha_m}$	$\left(\frac{\partial \ell n \alpha_m}{\partial \ell n V}\right)_T$	=	$\frac{\alpha_{e\ell}}{\alpha}\left(\frac{\partial \ell n \alpha_{e\ell}}{\partial \ell n V}\right)_T$	+	$\frac{\alpha_{ir}}{\alpha}\left(\frac{\partial \ell n \alpha_{ir}}{\partial \ell n V}\right)_T$
$CdS_{\perp}$	.803	.197	1.03	=	.84	+	.19
$CdS_{//}$	.779	.221	1.00	=	.81	+	.19

Part B: (all terms in units of $10^{-5}/K°$)

Crystal	$\left(\frac{\partial \ell n \alpha_m}{\partial T}\right)_V$	=	$\frac{\alpha_{e\ell}}{\alpha_m}\left(\frac{\partial \ell n \alpha_{e\ell}}{\partial T}\right)_V$	+	$\frac{\alpha_{ir}}{\alpha_m}\left(\frac{\partial \ell n \alpha_{ir}}{\partial T}\right)_V$
$CdS_{\perp}$	40.7	=	19.2	+	21.5
$CdS_{//}$	21.15	=	18.6	+	2.55

Caption: The separation of the total polarizability α_m and its logarithmic volume and temperature derivatives into their electronic and lattice contributions at 300°K.

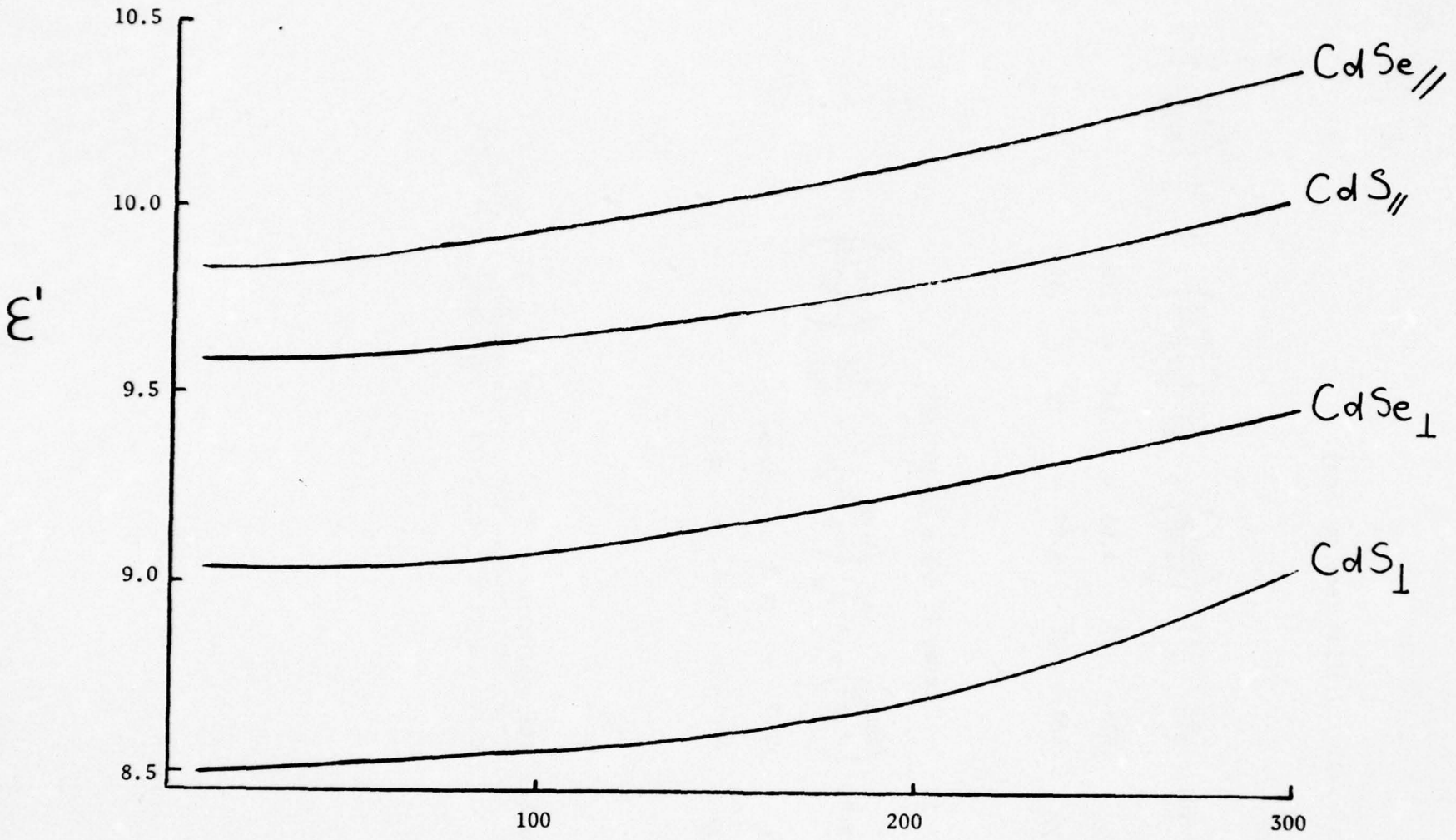


Figure I

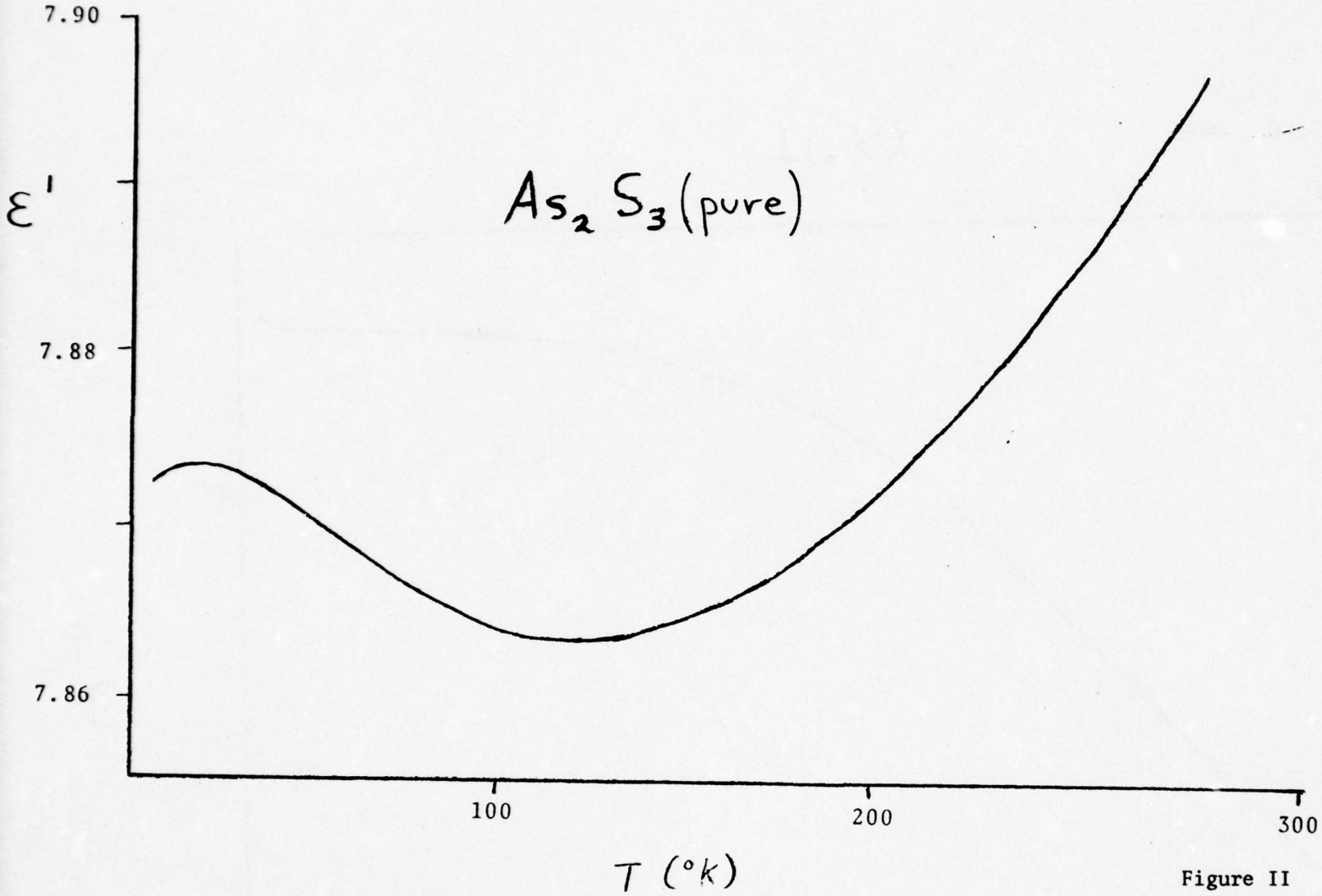


Figure II

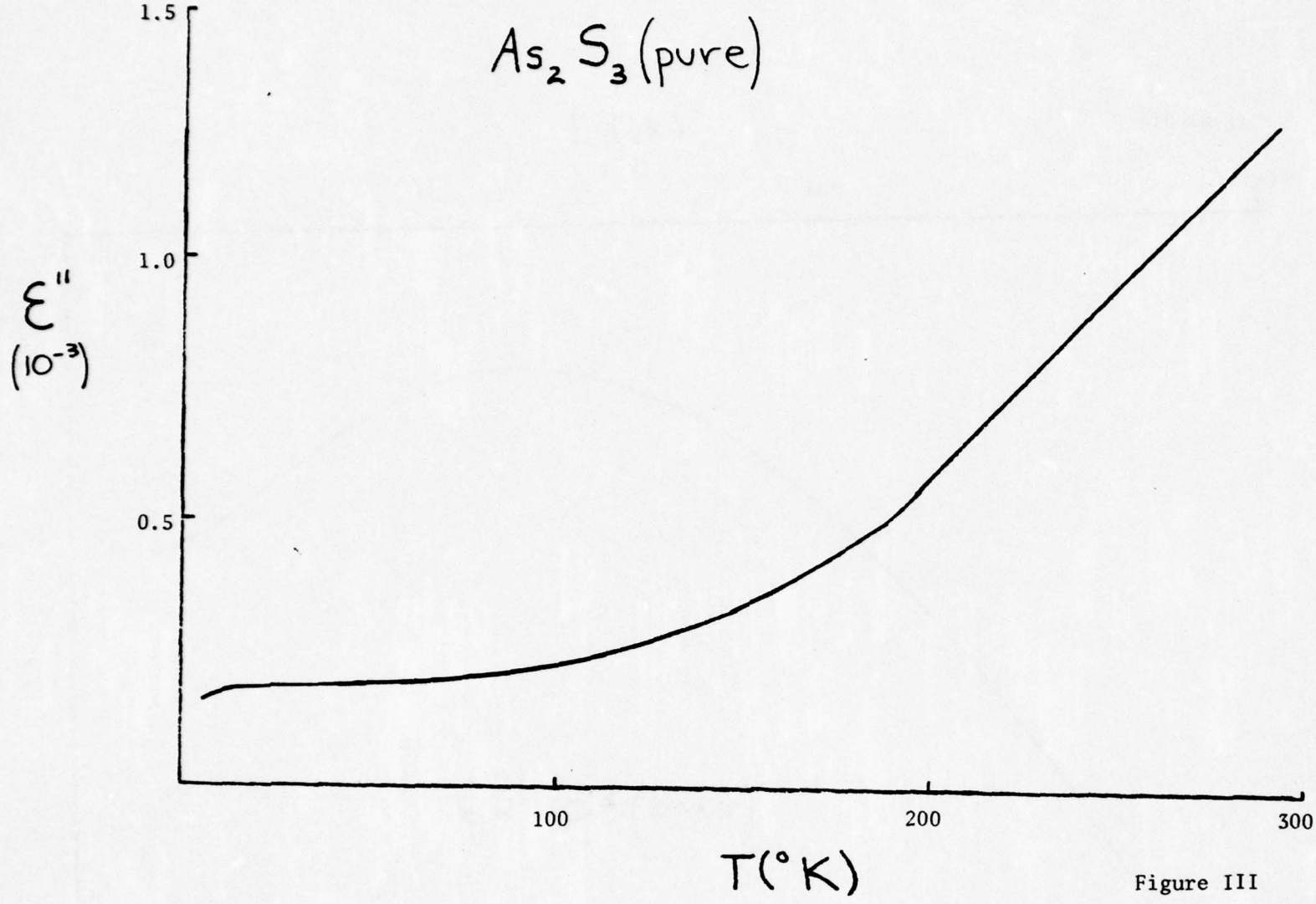


Figure III

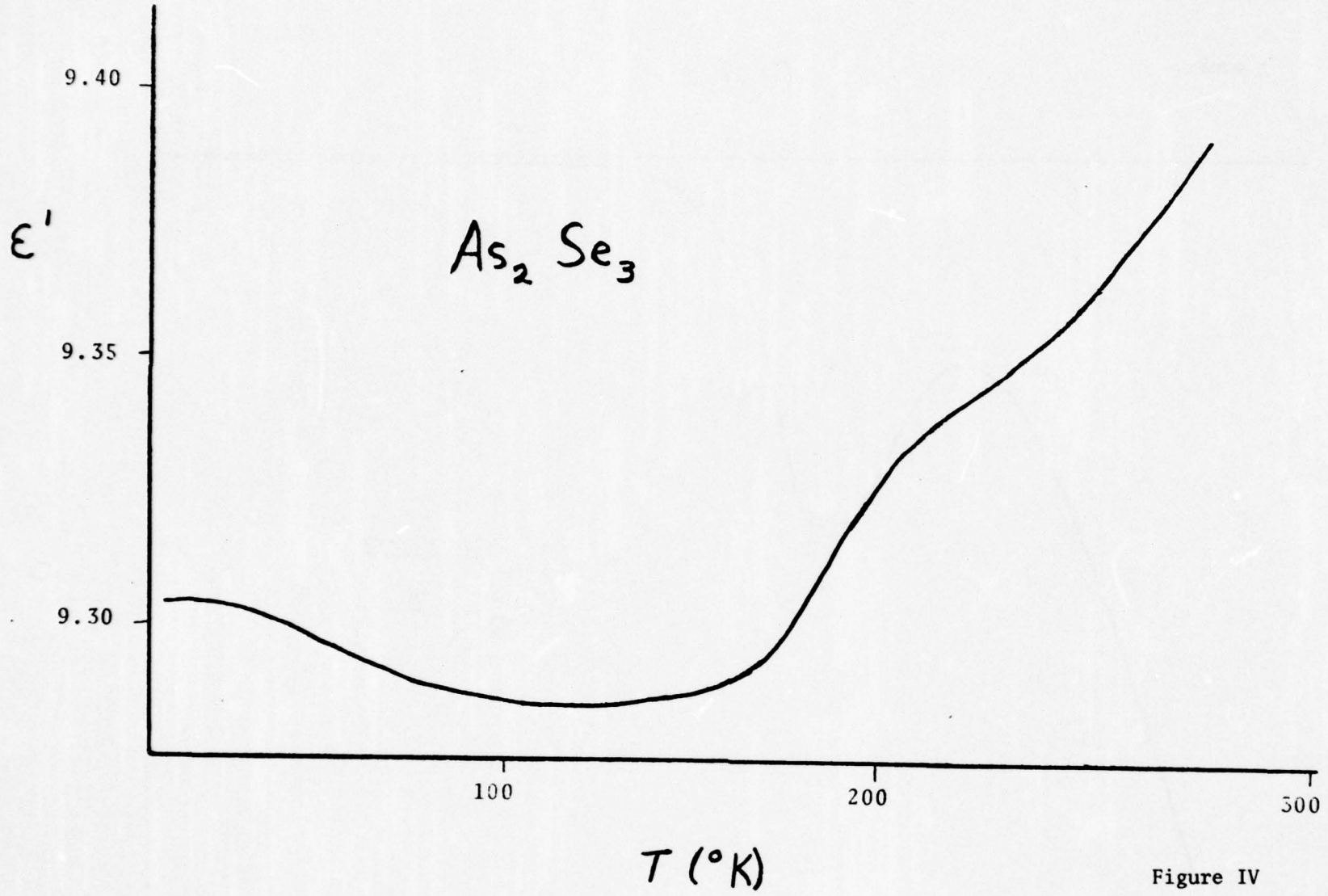


Figure IV

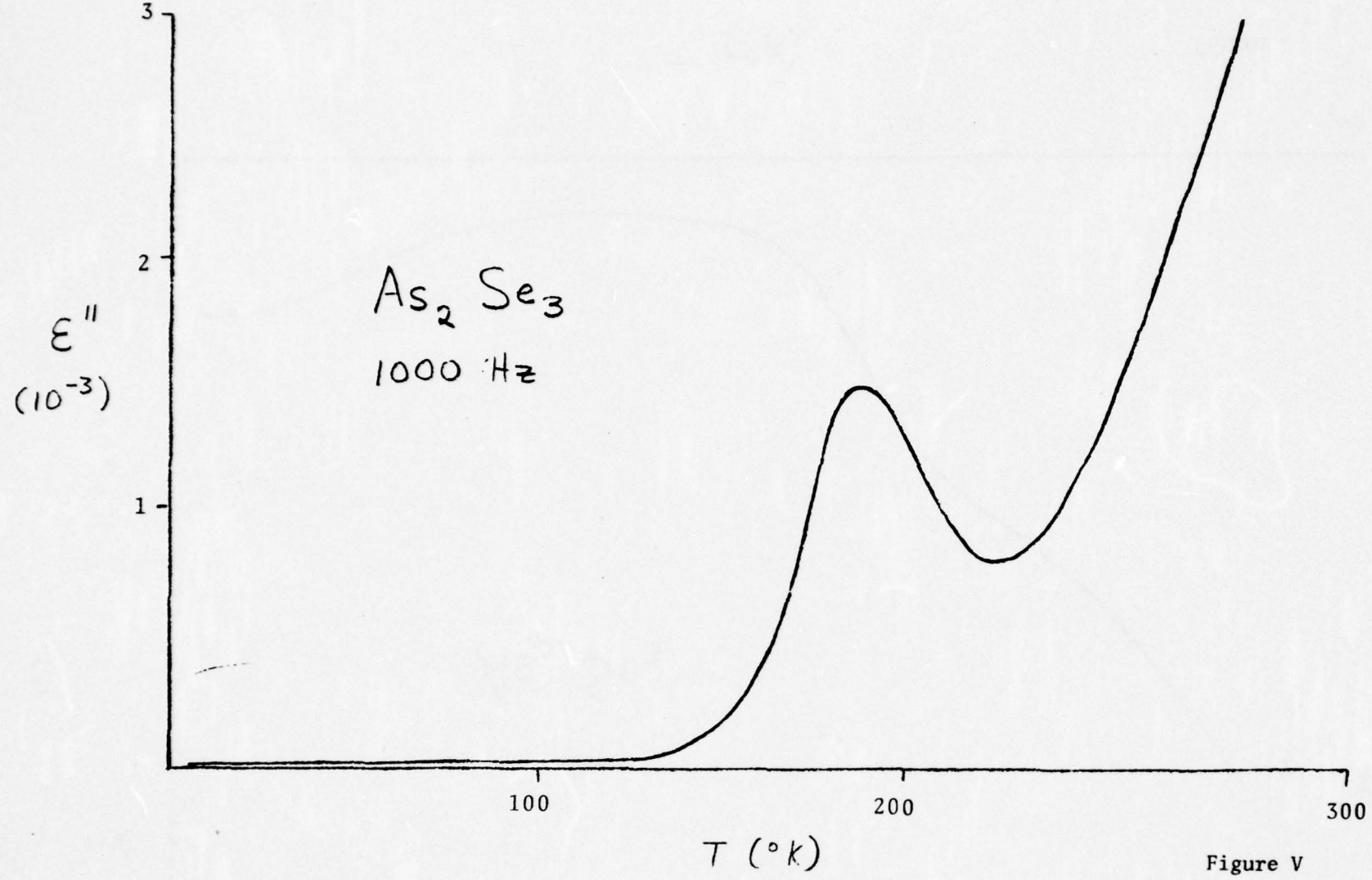


Figure V

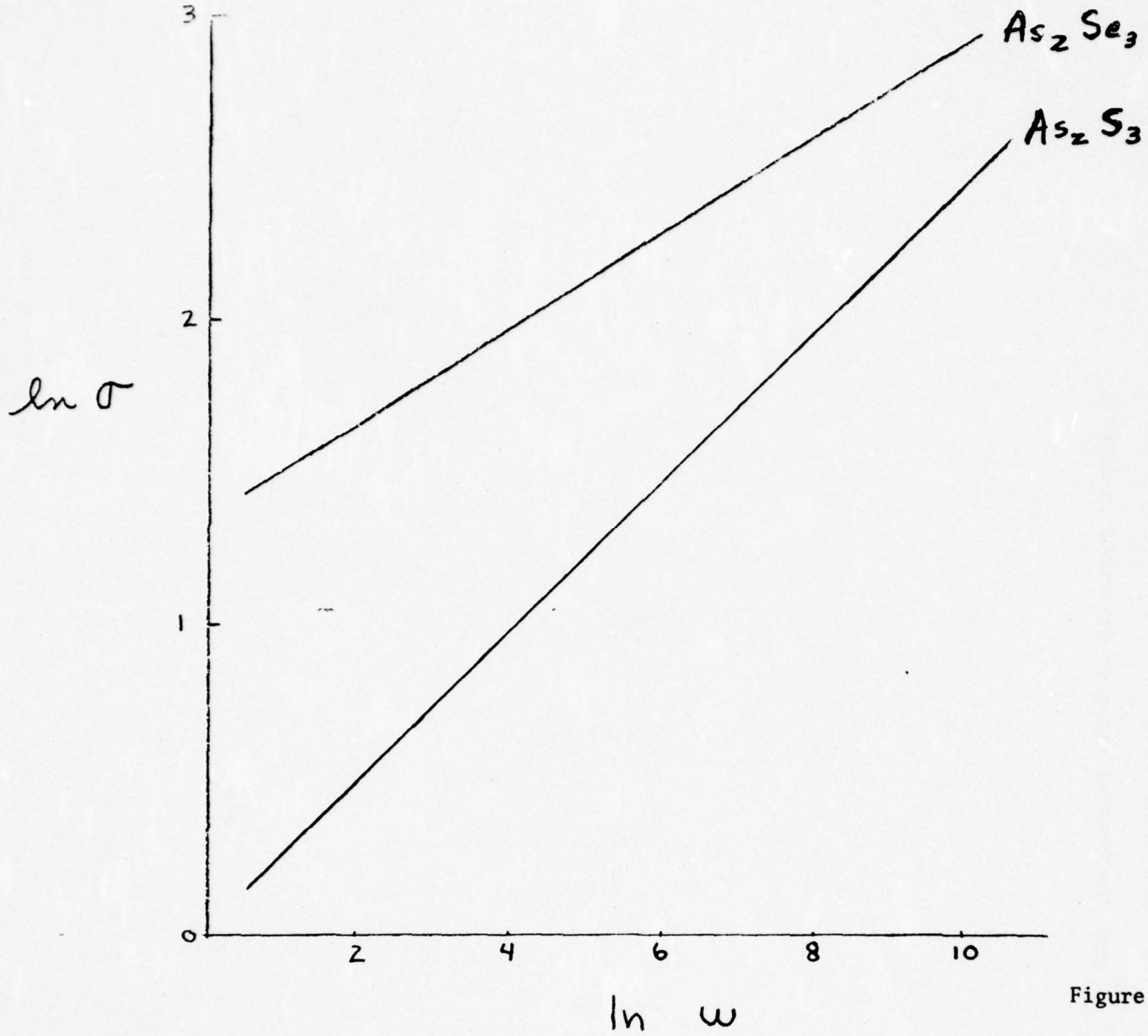


Figure VI

APPENDIX I

The actual evaporation process used to plate electrodes onto the crystal faces is described in detail.

The faces of the samples are thoroughly cleaned in freon and placed under circularly bent tungsten filaments. The aforementioned guard rings are centered and a vacuum is created using a Varian Corporation, model PS10, pumping station. This system is capable of providing a vacuum of 1×10^{-6} torr. Depending on the state of the system, this requires from one to two hours of pumping time.

Once the pressure inside the system is down sufficiently, a low pressure argon discharge system operated at 2000 volts is run for approximately five minutes to ion bombard the samples for one further cleaning. This also insures a good adherence of the aluminum electrodes to the face of the sample. The tungsten filaments, from which are hanging thin aluminum strips, are then heated to the point that the aluminum vaporizes and plates the sample. The amount of aluminum that is on the crystal is measured by watching the change in resistance of a bakelite strip placed at the same height as the sample in the vacuum system. Three samples can be plated in this manner each time the system is evacuated. The system is then vented and the guard rings checked. A good guard ring is one that is sufficiently thin and free from the effects of shadowing, and still insulates the center portion of the sample from the side.

Assuming a good insulating guard ring has been made, the sample is then plated on the other side using the same technique

with the exception that the steel guard ring is left off and the entire sample face plated. Once this process is complete, the samples are ready to be used in conjunction with the three terminal method of measuring capacitance.

APPENDIX II

The effective isobaric linear thermal coefficient of expansion, α_p, is tabulated at 10°K increments for the materials studied. α_p is in units of $10^{-6}/°K$.

For CdS and CdSe these values are determined from the literature as follows:

$CdS_{//}$ and $CdSe_{//}$

$$\alpha_p = 2\alpha_{\perp} - \alpha_{//}$$

$CdS_{\perp}$ and $CdSe_{\perp}$

$$\alpha_p = \alpha_{//}$$

where $\alpha_{\perp}$ and $\alpha_{//}$ are the linear thermal expansion coefficients perpendicular and parallel to the c-axis respectively.

T(°K)	CdSe[a,b]	CdSe[a,b]	CdS[c,d]	CdS[c,d]
400	6.05	3.715	8.54	3.8
390	6.02	3.71	8.54	3.785
380	5.98	3.705	8.54	3.78
370	5.93	3.695	8.54	3.76
360	5.87	3.69	8.51	3.73
350	5.80	3.67	8.45	3.69
340	5.72	3.64	8.36	3.64
330	5.63	3.63	8.26	3.58
320	5.53	3.59	8.17	3.51
310	5.42	3.52	8.07	3.43
300	5.30	3.44	7.97	3.33
290	5.18	3.36	7.7	3.22
280	5.06	3.28	7.46	3.12
270	4.94	3.20	7.21	3.01
260	4.81	3.12	6.95	2.91
250	4.69	3.05	6.7	2.80
240	4.57	2.97	6.44	2.70
230	4.45	2.89	6.19	2.59
220	4.30	2.79	5.87	2.45
210	4.17	2.71	5.56	2.32
200	4.02	2.61	5.2	2.18
190	3.85	2.51	4.84	2.02
180	3.68	2.40	4.44	1.86
170	3.47	2.26	3.96	1.66
160	3.24	2.11	3.45	1.45
150	2.98	1.94	2.89	1.21
140	2.69	1.75	2.27	.95
130	2.33	1.52	1.55	.65
120	1.94	1.26	.78	.32
110	1.46	.95	-.11	-.05
100	.97	.64	-1.01	-.45
90	.46	.30	-1.67	-.73
80	-.10	-.07	-2.65	-1.15
70	-.76	-.49	-3.62	-1.58
60	-1.39	-.90	-4.24	-1.86
50	-2.15	-1.39	-4.80	-2.10
40	-2.41	-1.57	-4.35	-1.91
30	-2.38	-1.54	-3.56	-1.56
20	-1.52	-.99	-1.78	-.78
10	-.33	-.22	-.22	-.10

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b. Y. Tsay, B. Bendow, and S. Mitra, Phys. Rev. B 8, 2688 (1973).

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T(^{o}K)	As_2S_3 [a,b]	As_2Se_3 [c]	ZnSe [d]
400	25.6	22.5	8.4
390	25.5	22.4	8.35
380	25.4	22.3	8.3
370	25.2	22.2	8.25
360	25.1	22.1	8.2
350	25	22.0	8.15
340	24.9	21.9	8.1
330	24.7	21.8	8.05
320	24.6	21.7	8.0
310	24.5	21.6	7.9
300	24.4	21.5	7.8
290	24.28	21.4	7.7
280	24.17	21.3	7.6
270	24.05	21.2	7.5
260	23.94	21.09	7.4
250	23.82	20.99	7.25
240	23.71	20.89	7.1
230	23.59	20.79	6.95
220	23.42	20.64	6.75
210	23.25	20.49	6.55
200	23.07	20.33	6.35
190	22.92	20.2	6.15
180	22.78	20.07	5.9
170	22.55	19.82	5.65
160	22.34	19.64	5.4
150	22.08	19.4	5.1
140	21.81	19.16	4.8
130	21.46	18.85	4.5
120	21.08	18.52	4.1
110	20.63	18.12	3.6
100	20.09	17.65	3.1
90	19.41	17.05	2.6
80	18.4	16.16	1.9
70	16.81	14.76	1.3
60	15.03	13.2	.5
50	13.29	11.67	.01
40	11.2	9.84	-.45
30	8.58	7.53	-.668
20	4.36	3.83	-.342
10	.93	.82	-.0227

a. Servofrax Corporation Pamphlet

b. A. Hilton and C. Jones, Appl. Optics 6, 1513 (1967).

c. N. Soga, M. Kunugi, and R. Ota, J. Phys. Chem. Solids 34, 2143 (1973).

d. T. Smith and G. White, J. Phys. C. 8, 2031 (1975).

APPENDIX III

The computer program SCORED, which was used to reduce the temperature data is listed. Given 300°K values of ε' and ε'', the program takes measured values of C and $\frac{G}{\omega}$ at various temperatures and frequencies and applies the correction factor α_p. The program then gives corrected values of ε', ε'', and σ. The printouts following the listing of SCORED are ε', ε'', and σ each on a separate page. The format on each page is that each line starts with a temperature and then gives whatever value was calculated for the five frequencies in ascending order. Therefore, there are three pages for each material and the materials in the order presented are: $CdSe_{\perp}$, $CdSe_{//}$, $CdS_{\perp}$, $CdS_{//}$, ZnSe, As_2S_3 (pure), As_2S_3 (impure), and As_2Se_3.

SCORED

```
100 FILE #1:"S2"
110 FILE #2:"*"
120 FILE #3:"DIAS2SE3"
130 FILE #4:"CDAS2SE3"
250 DIM A(500)
275 INPUT #1:E
280
300 FOR T=0 TO 400 STEP 10
400 READ A(T)
500 NEXT T
850 LET S=0
1000 IF E>300 THEN 2800
1100 LET D=10+(10*INT(E/10))
1700 FOR T=D TO 290 STEP 10
1800 LET B=((A(T)+A(T+10))/2)*(10^(-5))
1900 LET S=S+B
2000 NEXT T
2100 LET A=A(D)-(((D-E)/10)*(A(D)-A(D-10)))
2300 LET B=((A+A(D))/2)*(D-E)*(10^(-6))
2400 LET S=S+B
2410 FOR J=1 TO 10
2420 INPUT #1:H,
2430 INPUT #3:F,
2440 INPUT #4:G,
2450 LET K=F*((H/G)+S)
2550 PRINT #2:K
2600 NEXT J
2700 GO TO 4000
2800 LET D=10*INT(E/10)
3000 FOR T=300 TO (D-10) STEP 10
3100 LET B=((A(T)+A(T+10))/2)*(10^(-5))
3200 LET S=S+B
3300 NEXT T
3400 LET A=A(D)+(((E-D)/10)*(A(D+10)-A(D)))
3500 LET B=((A+A(D))/2)*(E-D)*(10^(-6))
3600 LET S=S+B
3610 FOR J=1 TO 10
3620 INPUT #1:H,
3630 INPUT #3:F,
3640 INPUT #4:G,
3650 LET K=F*((H/G)-S)
3750 PRINT #2:K
3800 NEXT J
3930 DATA 0,.82,3.83,7.53,9.84,11.67,13.2,14.76,16.16,17.05,17.65
3931 DATA 18.12,18.52,18.85,19.16,19.4,19.64,19.82,20.07,20.2,20.33
3932 DATA 20.49,20.64,20.79,20.89,20.99,21.09,21.2,21.3,21.4,21.5
3933 DATA 21.6,21.7,21.8,21.9,22,22.1,22.2,22.3,22.4,22.5
4000 RESET #2
4110 FILE #5:"KD6"
4111 FILE #6:"KG6"
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SCORED (continued)

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4112 FILE #7:"KC6"
4113 GOSUB 5000
4900 GO TO 8000
5000 PRINT #5:E;
5010 PRINT #6:E;
5020 PRINT #7:E;
5030 FOR W=2.0 TO 4.0 STEP .5
5040 INPUT #2:D
5050 INPUT #2:G
5060 PRINT #5:",";D;
5070 PRINT #6:",";G;
5080 LET G=G*10^W*2*3.1411592654
5090 PRINT #7:",";G;
5100 NEXT W
6000 RETURN
8000 END
```

KD2

290.583 , 10.3682 , 10.3667 , 10.3666 , 10.3594 , 10.3588
282.56 , 10.3482 , 10.3467 , 10.3468 , 10.3395 , 10.3379
274.775 , 10.3289 , 10.3276 , 10.3278 , 10.3207 , 10.3191
267.134 , 10.3103 , 10.3091 , 10.3094 , 10.3023 , 10.3002
259.619 , 10.2922 , 10.2911 , 10.2915 , 10.2844 , 10.2813
252.03 , 10.274 , 10.273 , 10.2737 , 10.2665 , 10.2626
244.501 , 10.2561 , 10.2553 , 10.2561 , 10.2488 , 10.2449
237.06 , 10.2386 , 10.2381 , 10.2389 , 10.2314 , 10.2284
229.633 , 10.2215 , 10.221 , 10.222 , 10.2142 , 10.2097
222.123 , 10.2042 , 10.2039 , 10.2049 , 10.1969 , 10.1911
214.733 , 10.1876 , 10.1873 , 10.1882 , 10.1804 , 10.1753
207.331 , 10.171 , 10.1707 , 10.1717 , 10.1638 , 10.158
199.983 , 10.1547 , 10.1622 , 10.1555 , 10.1479 , 10.1428
192.567 , 10.1384 , 10.1382 , 10.1393 , 10.1319 , 10.1268
185.553 , 10.1231 , 10.1229 , 10.1241 , 10.1169 , 10.1113
178.698 , 10.1083 , 10.1082 , 10.1094 , 10.1024 , 10.0975
172.526 , 10.0951 , 10.095 , 10.0962 , 10.0893 , 10.0839
166.437 , 10.0821 , 10.082 , 10.0833 , 10.0763 , 10.0719
159.222 , 10.067 , 10.0669 , 10.0682 , 10.0614 , 10.0488
152.009 , 10.0519 , 10.0519 , 10.0532 , 10.0465 , 10.0317
144.845 , 10.0372 , 10.0372 , 10.0384 , 10.0319 , 10.0216
137.54 , 10.0222 , 10.0222 , 10.0236 , 10.0169 , 9.98754
132.679 , 10.0125 , 10.0125 , 10.0138 , 10.0073 , 9.97876
127.95 , 10.003 , 10.0031 , 10.0044 , 9.99797 , 9.96953
120.886 , 9.989 , 9.98906 , 9.99045 , 9.98384 , 9.9576
113.742 , 9.97509 , 9.97515 , 9.97656 , 9.97 , 9.941
106.707 , 9.96157 , 9.96163 , 9.96306 , 9.9565 , 9.9443
99.65 , 9.94825 , 9.94831 , 9.94974 , 9.94331 , 9.94427
92.73 , 9.93546 , 9.93553 , 9.93693 , 9.94614 , 9.92411
85.83 , 9.92295 , 9.92303 , 9.92447 , 9.91816 , 9.92682
78.92 , 9.9108 , 9.9109 , 9.91233 , 9.90607 , 9.91848
71.97 , 9.89905 , 9.89912 , 9.90055 , 9.89424 , 9.90643
64.89 , 9.88756 , 9.88767 , 9.8891 , 9.88279 , 9.88371
57.64 , 9.87649 , 9.87659 , 9.87803 , 9.87173 , 9.84639
49.91 , 9.86558 , 9.86568 , 9.86715 , 9.8608 , 9.87812
41.19 , 9.85456 , 9.85466 , 9.85612 , 9.84979 , 9.86411
33.95 , 9.84665 , 9.84677 , 9.84826 , 9.84191 , 9.85096
26.85 , 9.84024 , 9.84035 , 9.84183 , 9.83539 , 9.84422
21.56 , 9.83686 , 9.83697 , 9.83842 , 9.83203 , 9.84081
17.31 , 9.83456 , 9.83466 , 9.83609 , 9.82971 , 9.83785
13.65 , 9.83322 , 9.8333 , 9.83475 , 9.82834 , 9.82997
8.885 , 9.83241 , 9.83251 , 9.83394 , 9.82756 , 9.83307
5.52 , 9.83231 , 9.8324 , 9.83385 , 9.82745 , 9.85686

KG2

290.583 , 594.435 , 313.558 , 201.353 , 162.239 , 130.801
282.56 , 256 , 225.736 , 164.373 , 136.5 , 181.489
274.775 , 248.323 , 184.425 , 137.717 , 115.053 , 201.113
267.134 , 205.328 , 160.338 , 116.222 , 103.047 , 224.825
259.619 , 181.28 , 138.834 , 95.5876 , 93.6152 , 275.513
252.03 , 160.677 , 118.192 , 80.1152 , 89.3336 , 320.478
244.501 , 140.073 , 99.2707 , 68.9443 , 88.485 , 411.221
237.06 , 121.188 , 82.9329 , 61.2146 , 86.7778 , 439.019
229.633 , 101.441 , 70.0397 , 57.7866 , 81.6371 , 365.452
222.123 , 82.555 , 60.5916 , 53.4981 , 69.6296 , 362.187
214.733 , 68.8343 , 54.5876 , 49.209 , 57.6217 , 310.692
207.331 , 57.6963 , 50.3057 , 43.1988 , 47.3303 , 293.529
199.983 , 51.7246 , 45.1616 , 38.0486 , 41.3303 , 343.399
192.567 , 46.1823 , 39.1558 , 32.8982 , 36.1885 , 294.355
185.553 , 39.7739 , 34.0093 , 28.6072 , 33.621 , 298.446
178.698 , 35.5161 , 28.8617 , 23.4551 , 31.053 , 322.156
172.526 , 31.252 , 25.434 , 20.883 , 29.3425 , 439.873
166.437 , 28.7085 , 22.8669 , 18.3103 , 28.49 , 1343.99
159.222 , 24.706 , 19.4406 , 16.5992 , 26.78 , 981.038
152.009 , 21.0456 , 16.8746 , 14.0272 , 23.3529 , 1268.79
144.845 , 17.6407 , 13.446 , 12.315 , 19.9254 , 1029.27
137.54 , 15.9563 , 11.7392 , 11.4627 , 19.0726 , 2925.79
132.679 , 13.3958 , 10.8877 , 10.6073 , 18.2177 , 2147.56
127.95 , 12.5557 , 10.0351 , 9.75139 , 17.3624 , 2320.87
120.886 , 10.8618 , 10.047 , 9.75747 , 16.5082 , 2942.14
113.742 , 10.0254 , 8.3347 , 8.04194 , 14.7952 , 2812.17
106.707 , 8.32258 , 7.48162 , 8.04616 , 13.9397 , 3666.41
99.65 , 7.47647 , 6.6266 , 6.32858 , 13.0836 , 3522.54
92.73 , 6.6254 , 6.63085 , 6.33076 , 11.3684 , 3560.14
85.83 , 5.76958 , 5.77183 , 6.33193 , 11.3692 , 2408.34
78.92 , 5.77005 , 4.9107 , 6.33203 , 11.3693 , 1058.72
71.97 , 4.90332 , 4.90849 , 6.33089 , 10.5102 , 963.073
64.89 , 4.89156 , 4.47298 , 4.60761 , 10.5085 , 885.414
57.64 , 4.87313 , 4.03471 , 5.46411 , 9.64748 , 1375.89
49.91 , 3.98392 , 3.1619 , 5.45823 , 9.64346 , 1859.82
41.19 , 2.65373 , 3.14615 , 4.58977 , 8.77963 , 788.13
33.95 , 2.18954 , 2.271 , 4.58269 , 9.63313 , 817.556
26.85 , 2.15766 , 2.25784 , 4.57595 , 9.62854 , 898.482
21.56 , 2.56913 , 3.11122 , 5.43229 , 10.4841 , 1008.02
17.31 , 2.55731 , 3.10634 , 5.42979 , 10.4824 , 594.385
13.65 , 2.98107 , 4.82611 , 6.28873 , 11.3397 , 1022.73
8.885 , 3.83794 , 4.82426 , 6.28778 , 11.3391 , 1073.42
5.52 , 3.83642 , 4.82363 , 6.28746 , 10.4805 , 2231.76

KC2

290.583 , 373495. , 623014. , 1.26514 E+6 , 3.22356 E+6 , 8.21847 E+6
282.56 , 160850. , 448519. , 1.03279 E+6 , 2.71214 E+6 , 1.14033 E+7
274.775 , 156026. , 366437. , 865301. , 2.28601 E+6 , 1.26363 E+7
267.134 , 129011. , 318578. , 730244. , 2.04746 E+6 , 1.41262 E+7
259.619 , 113902. , 275852. , 600595. , 1.86006 E+6 , 1.7311 E+7
252.03 , 100956. , 234838. , 503379. , 1.77499 E+6 , 2.01362 E+7
244.501 , 88010.5 , 197243. , 433190. , 1.75812 E+6 , 2.58378 E+7
237.06 , 76144.7 , 164781. , 384623. , 1.7242 E+6 , 2.75844 E+7
229.633 , 63737.3 , 139163. , 363084. , 1.62206 E+6 , 2.2962 E+7
222.123 , 51870.8 , 120391. , 336138. , 1.38348 E+6 , 2.27569 E+7
214.733 , 43249.9 , 108461. , 309189. , 1.1449 E+6 , 1.95214 E+7
207.331 , 36251.7 , 99953.3 , 271426. , 940414. , 18442971
199.983 , 32499.5 , 89732.4 , 239066. , 821199. , 2.15764 E+7
192.567 , 29017.2 , 77799.3 , 206705. , 719036. , 18494870
185.553 , 24990.7 , 67573.7 , 179744. , 668022. , 1.87519 E+7
178.698 , 22315.4 , 57345.8 , 147373. , 616998. , 2.02417 E+7
172.526 , 19636.2 , 50535.3 , 131212. , 583011. , 2.7638 E+7
166.437 , 18038.1 , 45434.6 , 115047. , 566073. , 84445383
159.222 , 15523.2 , 38626.9 , 104296. , 532097. , 6.16404 E+7
152.009 , 13223.3 , 33528.4 , 88135.5 , 464003. , 79720426
144.845 , 11084. , 26716.1 , 77377.4 , 395901. , 6.46709 E+7
137.54 , 10025.6 , 23324.8 , 72022.3 , 378957. , 1.83833 E+8
132.679 , 8416.83 , 21633. , 66647.6 , 361971. , 1.34935 E+8
127.95 , 7888.98 , 19938.9 , 61269.8 , 344977. , 1.45825 E+8
120.886 , 6824.67 , 19962.6 , 61308. , 328004. , 1.8486 E+8
113.742 , 6299.14 , 16560.4 , 50529. , 293968. , 1.76694 E+8
106.707 , 5229.23 , 14865.4 , 50555.5 , 276970. , 2.30367 E+8
99.65 , 4697.6 , 13166.5 , 39763.6 , 259960. , 2.21328 E+8
92.73 , 4162.86 , 13175. , 39777.3 , 225881. , 2.2369 E+8
85.83 , 3625.13 , 11468.2 , 39784.7 , 225897. , 1.5132 E+8
78.92 , 3625.43 , 9757.16 , 39785.3 , 225899. , 6.65213 E+7
71.97 , 3080.85 , 9752.77 , 39778.2 , 208829. , 60511661
64.89 , 3073.46 , 8887.44 , 28950.5 , 208795. , 5.56322 E+7
57.64 , 3061.88 , 8016.64 , 34332. , 191687. , 86449718
49.91 , 2503.17 , 6282.43 , 34295.1 , 191608. , 16855937
41.19 , 1667.39 , 6251.14 , 28838.4 , 174444. , 49519668
33.95 , 1375.73 , 4512.29 , 28793.9 , 191402. , 5.13686 E+7
26.85 , 1355.7 , 4486.14 , 28751.5 , 191311. , 56453289
21.56 , 1614.23 , 6181.74 , 34132.1 , 208310. , 6.33358 E+7
17.31 , 1606.81 , 6172.04 , 34116.4 , 208277. , 37346311
13.65 , 1873.06 , 9589.08 , 39513.3 , 225310. , 6.426 E+7
8.885 , 2411.45 , 9585.41 , 39507.3 , 225299. , 67444968
5.52 , 2410.49 , 9584.16 , 39505.3 , 208239. , 1.40226 E+8

KD1

290.583 , 9.43527 , 9.4327 , 9.43128 , 9.42958 , 9.42865
282.56 , 9.41908 , 9.41679 , 9.41556 , 9.41401 , 9.4131
274.775 , 9.40367 , 9.40155 , 9.40048 , 9.39902 , 9.39816
267.134 , 9.38885 , 9.38686 , 9.3859 , 9.38448 , 9.38369
259.619 , 9.37434 , 9.37249 , 9.37161 , 9.37022 , 9.36937
252.03 , 9.35993 , 9.35817 , 9.35729 , 9.35589 , 9.35503
244.501 , 9.3457 , 9.34399 , 9.34313 , 9.34165 , 9.34091
237.06 , 9.33178 , 9.33007 , 9.32914 , 9.32769 , 9.32731
229.633 , 9.31793 , 9.3162 , 9.31522 , 9.314 , 9.31406
222.123 , 9.30397 , 9.30216 , 9.30133 , 9.30049 , 9.30085
214.733 , 9.29025 , 9.2885 , 9.28801 , 9.28751 , 9.2881
207.331 , 9.27655 , 9.2751 , 9.27499 , 9.27472 , 9.27538
199.983 , 9.26323 , 9.26219 , 9.26234 , 9.26217 , 9.26291
192.567 , 9.25019 , 9.24945 , 9.24973 , 9.24964 , 9.25039
185.553 , 9.2382 , 9.23762 , 9.23796 , 9.2379 , 9.23869
178.698 , 9.22669 , 9.22617 , 9.22655 , 9.22651 , 9.2274
172.526 , 9.21644 , 9.21595 , 9.21635 , 9.21631 , 9.21734
166.437 , 9.20642 , 9.20594 , 9.20635 , 9.20631 , 9.2072
159.222 , 9.19465 , 9.19419 , 9.1946 , 9.19456 , 9.1951
152.009 , 9.183 , 9.18254 , 9.18293 , 9.18289 , 9.18341
144.845 , 9.17152 , 9.17105 , 9.17143 , 9.17141 , 9.17228
137.54 , 9.15994 , 9.15945 , 9.15984 , 9.15984 , 9.16038
132.679 , 9.15228 , 9.15179 , 9.15222 , 9.15223 , 9.15294
127.95 , 9.14488 , 9.14442 , 9.14486 , 9.14487 , 9.14543
120.886 , 9.13398 , 9.13354 , 9.13398 , 9.134 , 9.13414
113.742 , 9.12316 , 9.12273 , 9.12317 , 9.12318 , 9.1234
106.707 , 9.11264 , 9.11221 , 9.11265 , 9.11267 , 9.11308
99.65 , 9.10225 , 9.10182 , 9.10228 , 9.10229 , 9.10276
92.73 , 9.09229 , 9.09187 , 9.09231 , 9.09233 , 9.09355
85.83 , 9.08987 , 9.08216 , 9.08261 , 9.08262 , 9.08379
78.92 , 9.07318 , 9.07275 , 9.07319 , 9.07319 , 9.07425
71.97 , 9.06408 , 9.06366 , 9.0641 , 9.06411 , 9.065
64.89 , 9.05524 , 9.05481 , 9.05525 , 9.05525 , 9.05599
57.64 , 9.04674 , 9.04631 , 9.04675 , 9.04676 , 9.0445
49.91 , 9.03846 , 9.03802 , 9.03846 , 9.03847 , 9.03969
41.19 , 9.03017 , 9.02974 , 9.03017 , 9.03018 , 9.03019
33.95 , 9.02432 , 9.02388 , 9.02431 , 9.02431 , 9.02438
26.85 , 9.01965 , 9.01922 , 9.01965 , 9.01965 , 9.02098
21.56 , 9.01719 , 9.01676 , 9.01719 , 9.01719 , 9.01864
17.31 , 9.01555 , 9.01511 , 9.01554 , 9.01554 , 9.01689
13.65 , 9.01458 , 9.01415 , 9.01458 , 9.01458 , 9.01556
8.885 , 9.01402 , 9.01359 , 9.01402 , 9.01402 , 9.01443
5.52 , 9.01396 , 9.01351 , 9.01394 , 9.01394 , 9.01635

-1-

KG1

290.583 , 1490.55 , 659.497 , 375.263 , 275.537 , 258.451
282.56 , 691.318 , 381.396 , 274.137 , 236.186 , 240.635
274.775 , 391.922 , 274.223 , 229.651 , 217.02 , 233.712
267.134 , 273.639 , 226.723 , 208.427 , 208.956 , 22.8075
259.619 , 223.145 , 202.484 , 199.34 , 204.928 , 219.864
252.03 , 196.934 , 191.394 , 194.299 , 203.927 , 200.067
244.501 , 183.874 , 185.36 , 194.314 , 195.862 , 166.407
237.06 , 176.883 , 184.382 , 191.294 , 173.667 , 132.747
229.633 , 175.96 , 185.426 , 178.16 , 136.333 , 99.087
222.123 , 177.059 , 177.366 , 145.808 , 96.9809 , 72.3582
214.733 , 173.096 , 152.112 , 105.364 , 65.7021 , 55.5311
207.331 , 152.942 , 111.685 , 70.9891 , 44.5156 , 37.7137
199.983 , 114.573 , 72.2687 , 45.7162 , 30.3935 , 29.798
192.567 , 71.6487 , 43.9775 , 30.5573 , 24.3453 , 30.794
185.553 , 41.8719 , 27.8211 , 21.4661 , 20.3151 , 33.7699
178.698 , 24.7391 , 19.7547 , 17.4314 , 18.3029 , 34.7651
172.526 , 16.7037 , 15.7307 , 15.4181 , 15.2807 , 43.6812
166.437 , 12.7127 , 12.7171 , 13.4043 , 16.2952 , 95.1756
159.222 , 10.7529 , 11.729 , 13.4146 , 17.3103 , 10.0234
152.009 , 9.80134 , 11.7511 , 14.4358 , 15.2975 , 1.11611
144.845 , 9.85753 , 13.7945 , 13.4334 , 12.2749 ,-2.84053
137.54 , 12.9461 , 12.8026 , 11.4192 , 11.2706 ,-24.6209
132.679 , 12.9788 , 10.7917 , 10.413 , 10.2644 ,-21.6479
127.95 , 11.9966 , 9.79115 , 9.40636 , 9.25794 ,-15.7046
120.886 , 7.98922 , 7.78292 , 7.38993 , 10.2709 , 28.8572
113.742 , 7.01192 , 6.78414 , 7.39551 , 9.26486 ,-55.3069
106.707 , 7.03957 , 7.8057 , 8.41141 , 10.2767 ,-46.3931
99.65 , 6.04914 , 5.79069 , 6.392 , 9.26942 ,-46.3915
92.73 , 6.06365 , 6.80743 , 7.40578 , 9.27077 ,-44.4101
85.83 , 6.07135 , 6.81026 , 7.40702 , 9.27148 ,-12.7232
78.92 , 6.07185 , 6.81044 , 7.4071 , 10.2808 , 8.07093
71.97 , 6.06439 , 6.8077 , 7.4059 , 10.2801 , 12.0312
64.89 , 6.55419 , 6.8018 , 8.41473 , 10.2786 , 10.0496
57.64 , 7.03476 , 7.80394 , 8.41063 , 10.2762 , 195.214
49.91 , 6.9965 , 7.78992 , 7.39302 , 10.2727 , 285.319
41.19 , 6.94385 , 7.77063 , 8.39595 , 10.2678 , 120.943
33.95 , 6.89745 , 7.75362 , 8.38845 , 10.2635 , 152.626
26.85 , 7.86539 , 7.73754 , 9.39279 , 10.2594 , 73.4069
21.56 , 7.83886 , 7.72782 , 9.38851 , 11.2662 , 149.65
17.31 , 7.31653 , 8.73323 , 9.38586 , 10.2554 , 64.492
13.65 , 7.8128 , 8.22398 , 9.3843 , 11.2637 , 128.854
8.885 , 7.80644 , 8.72736 , 9.38327 , 11.2631 , 152.618
5.52 , 7.80425 , 8.72656 , 9.38292 , 11.2629 , 46.6671

KC1

290.583 , 936540. , 1.31037 E+6 , 2.35785 E+6 , 5.47469 E+6 , 1.6239 E+7
282.56 , 434368. , 757802. , 1.72245 E+6 , 4.69282 E+6 , 15119543
274.775 , 246252. , 544859. , 1.44294 E+6 , 4.31201 E+6 , 14684558
267.134 , 171932. , 450480. , 1.30959 E+6 , 4.15178 E+6 , 1.43304 E+6
259.619 , 140206. , 402319. , 1.25249 E+6 , 4.07175 E+6 , 1.38145 E+7
252.03 , 123737. , 380284. , 1.22082 E+6 , 4.05186 E+6 , 1.25706 E+7
244.501 , 115531. , 368295. , 1.22091 E+6 , 3.89162 E+6 , 1.04557 E+7
237.06 , 111139. , 366352. , 1.20194 E+6 , 3.45062 E+6 , 8340740
229.633 , 110559. , 368426. , 1.11941 E+6 , 2.70882 E+6 , 6.22582 E+6
222.123 , 111249. , 352412. , 916139. , 1.92693 E+6 , 4.5464 E+6
214.733 , 108759. , 302234. , 662022. , 1.30545 E+6 , 3.48912 E+6
207.331 , 96096.3 , 221909. , 446038. , 884488. , 2.36962 E+6
199.983 , 71988.3 , 143592. , 287243. , 603894. , 1.87226 E+6
192.567 , 45018.2 , 87379.7 , 191997. , 483721. , 1.93484 E+6
185.553 , 26308.9 , 55278.2 , 134875. , 403644. , 2.12183 E+6
178.698 , 15544. , 39251. , 109525. , 363664. , 2.18436 E+6
172.526 , 10495.2 , 31255.6 , 96874.8 , 303615. , 2.74457 E+6
166.437 , 7987.62 , 25267.8 , 84221.7 , 323772. , 5.98006 E+6
159.222 , 6756.25 , 23304.6 , 84286.4 , 343941. , 629789.
152.009 , 6158.36 , 23348.5 , 90702.8 , 303949. , 70127.3
144.845 , 6193.67 , 27408.5 , 84404.5 , 243892. ,-178476.
137.54 , 8134.27 , 25437.7 , 71748.9 , 223938. ,-1.54698 E+6
132.679 , 8154.82 , 21442.2 , 65426.8 , 203945. ,-1.36018 E+6
127.95 , 7537.69 , 19454.2 , 59101.9 , 183948. ,-986749.
120.886 , 5019.77 , 15464. , 46432.3 , 204074. , 1.81315 E+6
113.742 , 4405.72 , 13479.5 , 46467.4 , 184085. ,-3475035
106.707 , 4423.09 , 15509.3 , 52850.4 , 204190. ,-2.91496 E+6
99.65 , 3800.79 , 11505.6 , 40162.1 , 184176. ,-2.91486 E+6
92.73 , 3809.9 , 13525.8 , 46531.9 , 184203. ,-2.79037 E+6
85.83 , 3814.74 , 13531.4 , 46539.7 , 184217. ,-799422.
78.92 , 3815.06 , 13531.8 , 46540.2 , 204271. , 507111.
71.97 , 3810.37 , 13526.3 , 46532.6 , 204257. , 755943.
64.89 , 4118.12 , 13514.6 , 52871.3 , 204227. , 631435.
57.64 , 4420.07 , 15505.8 , 52845.5 , 204130. , 1.22657 E+7
49.91 , 4396.03 , 15477.9 , 46451.7 , 204110. , 1.79271 E+7
41.19 , 4362.95 , 15439.6 , 52753.3 , 204013. , 7.59907 E+6
33.95 , 4333.8 , 15405.8 , 52706.2 , 203927. , 9.58977 E+6
26.85 , 4941.97 , 15373.9 , 59016.6 , 203846. , 4.61229 E+6
21.56 , 4925.3 , 15354.5 , 58933.7 , 223850. , 9.40279 E+6
17.31 , 4597.11 , 17352.2 , 58973.1 , 203766. , 4.05215 E+6
13.65 , 4908.93 , 16340.4 , 58963.3 , 223800. , 8.09614 E+6
8.885 , 4904.93 , 17340.5 , 58956.8 , 223789. , 9.58927 E+6
5.52 , 4903.55 , 17339. , 58954.6 , 223785. , 2.93218 E+6

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KD3

290.583 , 10.0486 , 10.0476 , 10.0482 , 10.0392 , 10.0506
282.56 , 10.0299 , 10.0289 , 10.0298 , 10.0209 , 10.0317
274.775 , 10.012 , 10.0112 , 10.0125 , 10.0036 , 10.0129
267.134 , 9.99457 , 9.99417 , 9.99555 , 9.98665 , 9.99551
259.619 , 9.97778 , 9.97761 , 9.979 , 9.96967 , 9.97785
252.03 , 9.96105 , 9.96096 , 9.96243 , 9.95284 , 9.96092
244.501 , 9.94485 , 9.94479 , 9.9463 , 9.93641 , 9.94452
237.06 , 9.92897 , 9.92892 , 9.93044 , 9.92026 , 9.92894
229.633 , 9.91334 , 9.91331 , 9.9149 , 9.90433 , 9.91138
222.123 , 9.89758 , 9.89756 , 9.89922 , 9.88827 , 9.89423
214.733 , 9.88232 , 9.88236 , 9.88414 , 9.87319 , 9.87959
207.331 , 9.86713 , 9.86728 , 9.86916 , 9.85813 , 9.86406
199.983 , 9.85255 , 9.85275 , 9.85469 , 9.84404 , 9.84974
192.567 , 9.83789 , 9.83813 , 9.84008 , 9.8298 , 9.83495
185.553 , 9.8242 , 9.82413 , 9.82641 , 9.8165 , 9.82059
178.698 , 9.81101 , 9.81123 , 9.81324 , 9.80363 , 9.8138
172.526 , 9.79909 , 9.79932 , 9.80127 , 9.79199 , 9.79569
166.437 , 9.78745 , 9.78769 , 9.78963 , 9.78053 , 9.78349
159.222 , 9.7738 , 9.77402 , 9.77583 , 9.76714 , 9.76851
152.009 , 9.76036 , 9.76054 , 9.7623 , 9.75372 , 9.75195
144.845 , 9.74721 , 9.74734 , 9.74906 , 9.74063 , 9.73338
137.54 , 9.73388 , 9.73399 , 9.73583 , 9.72728 , 9.71709
132.679 , 9.72522 , 9.7253 , 9.72699 , 9.71883 , 9.70622
127.95 , 9.71688 , 9.71695 , 9.71864 , 9.71058 , 9.69753
120.886 , 9.70455 , 9.7046 , 9.70631 , 9.69824 , 9.68656
113.742 , 9.6924 , 9.69245 , 9.69416 , 9.68629 , 9.67043
106.707 , 9.68074 , 9.68079 , 9.68251 , 9.67465 , 9.66961
99.65 , 9.66939 , 9.66945 , 9.67117 , 9.66344 , 9.6658
92.73 , 9.65864 , 9.65869 , 9.66041 , 9.65285 , 9.65249
85.83 , 9.64827 , 9.64832 , 9.65004 , 9.64252 , 9.65171
78.92 , 9.63834 , 9.63838 , 9.64006 , 9.63263 , 9.64446
71.97 , 9.62884 , 9.62886 , 9.63056 , 9.62315 , 9.63624
64.89 , 9.61972 , 9.61975 , 9.62143 , 9.6142 , 9.62374
57.64 , 9.61104 , 9.61108 , 9.61276 , 9.60559 , 9.60718
49.91 , 9.60256 , 9.60261 , 9.60427 , 9.59721 , 9.61032
41.19 , 9.59402 , 9.59407 , 9.59574 , 9.58876 , 9.60153
33.95 , 9.5878 , 9.58786 , 9.58953 , 9.58263 , 9.59427
26.85 , 9.58266 , 9.58272 , 9.5844 , 9.57748 , 9.58726
21.56 , 9.58007 , 9.58013 , 9.58182 , 9.57495 , 9.58505
17.31 , 9.57839 , 9.57845 , 9.58015 , 9.57329 , 9.58396
13.65 , 9.5775 , 9.57756 , 9.57925 , 9.57242 , 9.55679
8.885 , 9.57706 , 9.57712 , 9.57882 , 9.57199 , 9.58216
5.52 , 9.57699 , 9.57706 , 9.57875 , 9.57191 , 9.58849

KG3

290.583 , 181.926 , 147.973 , 111.814 , 95.962 , 724.845
282.56 , 152.667 , 124.186 , 78.6959 , 78.4302 , 580.536
274.775 , 133.34 , 90.0519 , 52.8241 , 68.1203 , 628.686
267.134 , 102.512 , 59.0213 , 38.3393 , 66.064 , 595.96
259.619 , 65.9329 , 39.3718 , 30.0654 , 69.1661 , 483.382
252.03 , 42.9448 , 30.0689 , 24.8969 , 74.3316 , 427.108
244.501 , 30.4109 , 24.9045 , 20.7635 , 75.3699 , 456.826
237.06 , 25.1947 , 21.8091 , 16.6297 , 75.3761 , 417.954
229.633 , 21.0236 , 18.7134 , 11.4605 , 69.1917 , 310.49
222.123 , 18.9431 , 14.5828 , 4.22069 , 48.5627 , 283.901
214.733 , 14.7712 , 5.27834 ,-4.05468 , 23.8064 , 236.835
207.331 , 4.32616 ,-4.02639 ,-4.04859 , 10.399 , 206.149
199.983 ,-6.11938 ,-20.5743 ,-24.7471 , 7.3089 , 283.976
192.567 ,-9.2471 ,-24.7063 ,-11.2838 , 8.34553 , 244.073
185.553 ,-20.7394 ,-12.2841 ,-11.2788 , 10.4134 , 270.71
178.698 ,-20.7322 ,-12.2785 ,-13.3447 , 13.5127 , 300.417
172.526 ,-20.7262 ,-12.2739 ,-7.1296 , 19.7065 , 425.328
166.437 ,-20.7207 ,-9.16553 ,-6.09087 , 23.8366 , 758.054
159.222 ,-20.7147 ,-8.12621 , 2.19463 , 27.967 , 1208.51
152.009 ,-12.3458 ,-1.91398 , 5.30366 , 27.97 , 1468.55
144.845 ,-3.97756 , 2.22833 , 9.44745 , 26.9408 , 1388.71
137.54 , 1.25364 , 7.4048 , 10.4852 , 26.9431 , 1662.06
132.679 , 3.3467 , 9.47583 , 12.557 , 25.9125 , 1508.5
127.95 , 5.43931 , 10.5118 , 12.5581 , 25.9135 , 1704.04
120.886 , 8.5775 , 11.5479 , 12.5592 , 23.851 , 2078.73
113.742 , 9.62384 , 11.5486 , 13.595 , 22.8198 , 2252.77
106.707 , 10.1464 , 12.5832 , 13.5949 , 21.788 , 2490.27
99.65 , 10.668 , 12.5823 , 12.5589 , 20.7556 , 2375.61
92.73 , 10.1432 , 11.546 , 13.5929 , 21.7862 , 2255.83
85.83 , 10.6632 , 12.5786 , 14.6263 , 21.7846 , 1552.52
78.92 , 11.1821 , 13.6102 , 15.6591 , 20.7507 , 653.677
71.97 , 13.7903 , 14.6411 , 15.6559 , 19.7161 , 484.749
64.89 , 12.7393 , 13.6017 , 13.5816 , 17.6492 , 440.712
57.64 , 11.1641 , 11.5269 , 12.542 , 16.6136 , 525.664
49.91 , 10.6333 , 11.5206 , 11.5015 , 15.5772 , 551.235
41.19 , 9.57858 , 10.4787 , 11.4956 , 14.5402 , 226.689
33.95 , 9.57166 , 10.4733 , 11.4912 , 15.5681 , 189.817
26.85 , 9.56591 , 10.4689 , 11.4876 , 14.5331 , 255.32
21.56 , 9.56283 , 10.4665 , 11.4856 , 14.5313 , 330.044
17.31 , 9.03845 , 10.4652 , 11.4845 , 13.4987 , 181.599
13.65 , 8.51481 , 9.42979 , 11.4839 , 13.4981 , 311.611
8.885 , 8.51434 , 9.94676 , 10.4484 , 14.5296 , 320.823
5.52 , 7.99149 , 9.94667 , 10.4484 , 13.4978 , 698.578

KC3

290.583 , 114307. , 294010. , 702548. , 1.90669 E+6 , 4.55434 E+7
282.56 , 95923.5 , 246747. , 494461. , 1.55834 E+6 , 36476153
274.775 , 83780. , 178926. , 331904. , 1.35349 E+6 , 39501506
267.134 , 64410.2 , 117270. , 240893. , 1.31264 E+6 , 37445271
259.619 , 41426.9 , 78228.5 , 188906. , 1.37427 E+6 , 3.03718 E+7
252.03 , 26983. , 59744.4 , 156432. , 1.47691 E+6 , 2.6836 E+7
244.501 , 19107.7 , 49483.2 , 130461. , 1.49754 E+6 , 28703224
237.06 , 15830.3 , 43332.9 , 104487. , 1.49766 E+6 , 2.62608 E+7
229.633 , 13209.5 , 37182. , 72008.4 , 1.37478 E+6 , 1.95087 E+7
222.123 , 11902.3 , 28974.8 , 26519.4 , 964901. , 17838026
214.733 , 9281.02 , 10487.6 ,-25476.3 , 473014. , 1.48808 E+7
207.331 , 2718.21 ,-8000.11 ,-25438. , 206620. , 1.29527 E+7
199.983 ,-3844.92 ,-40879.4 ,-155491. , 145222. , 1.78427 E+7
192.567 ,-5810.12 ,-49089.4 ,-70898.2 , 165819. , 1.53356 E+7
185.553 ,-13030.9 ,-24407.5 ,-70866.8 , 206906. , 17009211
178.698 ,-13026.4 ,-24396.4 ,-83847.2 , 268486. , 1.88758 E+7
172.526 ,-13022.7 ,-24387.2 ,-44796.6 , 391552. , 2.67241 E+7
166.437 ,-13019.2 ,-18211.2 ,-38270.1 , 473614. , 4.76299 E+7
159.222 ,-13015.4 ,-16146.1 , 13789.3 , 555681. , 75932922
152.009 ,-7757.09 ,-3802.92 , 33323.9 , 555741. , 92271718
144.845 ,-2499.17 , 4427.51 , 59360.1 , 535292. , 87255223
137.54 , 787.685 , 14712.7 , 65880.5 , 535337. , 104430309
132.679 , 2102.79 , 18827.7 , 78898. , 514860. , 94781850
127.95 , 3417.62 , 20886.1 , 78904.9 , 514880. , 107067990
120.886 , 5389.4 , 22944.7 , 78911.8 , 473900. , 130610459
113.742 , 6046.84 , 22946.1 , 85419.9 , 453411. , 1.41546 E+8
106.707 , 6375.17 , 25001.8 , 85419.3 , 432910. , 1.56468 E+8
99.65 , 6702.9 , 25000. , 78909.9 , 412397. , 1.49264 E+8
92.73 , 6373.16 , 22941. , 85406.7 , 432874. , 1.41738 E+8
85.83 , 6699.89 , 24992.6 , 91899.8 , 432842. , 97547709
78.92 , 7025.92 , 27042.3 , 98389. , 412299. , 4.10717 E+7
71.97 , 8665.02 , 29090.7 , 98368.9 , 391743. , 30457678
64.89 , 8004.34 , 27025.5 , 85335.7 , 350675. , 2.76908 E+7
57.64 , 7014.61 , 22903. , 78803.7 , 330099. , 3.30284 E+7
49.91 , 6681.1 , 22890.5 , 72266.1 , 309506. , 3.46351 E+7
41.19 , 6018.4 , 20820.3 , 72229. , 288902. , 1.42433 E+7
33.95 , 6014.05 , 20809.6 , 72201.3 , 309325. , 1.19266 E+7
26.85 , 6010.44 , 20800.8 , 72178.7 , 288761. , 1.60422 E+7
21.56 , 6008.5 , 20796.1 , 72166.2 , 288725. , 20737276
17.31 , 5679.03 , 20793.5 , 72159.2 , 268208. , 1.14102 E+7
13.65 , 5350.01 , 18736.2 , 72155.5 , 268196. , 1.95791 E+7
8.885 , 5349.72 , 19763.4 , 65649.2 , 288691. , 2.01579 E+7
5.52 , 5021.2 , 19763.2 , 65649.2 , 268190. , 4.3893 E+7

KD8

290.583 , 9.09709 , 9.06945 , 9.04367 , 9.02344 , 9.00781
282.56 , 9.06255 , 9.03688 , 9.0154 , 8.99863 , 8.98439
274.775 , 9.03026 , 9.00847 , 8.99071 , 8.97628 , 8.96237
267.134 , 9.00122 , 8.98314 , 8.9683 , 8.95497 , 8.94164
259.619 , 8.97073 , 8.95733 , 8.94508 , 8.93297 , 8.92148
252.03 , 8.95053 , 8.93816 , 8.92584 , 8.91385 , 8.90337
244.501 , 8.92838 , 8.91717 , 8.90532 , 8.89441 , 8.88576
237.06 , 8.9074 , 8.89668 , 8.88546 , 8.87622 , 8.86916
229.633 , 8.88653 , 8.87629 , 8.8663 , 8.85902 , 8.85324
222.123 , 8.86562 , 8.85609 , 8.84811 , 8.84237 , 8.83758
214.733 , 8.84559 , 8.83772 , 8.83161 , 8.82691 , 8.8234
207.331 , 8.82649 , 8.82075 , 8.81592 , 8.81196 , 8.80888
199.983 , 8.80189 , 8.79867 , 8.79528 , 8.79227 , 8.79002
192.567 , 8.78684 , 8.78425 , 8.7813 , 8.7786 , 8.77652
185.553 , 8.77156 , 8.77034 , 8.76777 , 8.76544 , 8.76373
178.698 , 8.76005 , 8.75823 , 8.75583 , 8.75354 , 8.75157
172.526 , 8.74834 , 8.74689 , 8.74477 , 8.74265 , 8.74008
166.437 , 8.73749 , 8.73618 , 8.73418 , 8.73212 , 8.7298
159.222 , 8.72484 , 8.72376 , 8.72194 , 8.71991 , 8.71647
152.009 , 8.71247 , 8.71163 , 8.70985 , 8.70774 , 8.70441
144.845 , 8.70108 , 8.70013 , 8.69823 , 8.69605 , 8.69294
137.54 , 8.68901 , 8.68811 , 8.68619 , 8.684 , 8.68093
132.679 , 8.68132 , 8.68036 , 8.67841 , 8.67615 , 8.67323
127.95 , 8.67397 , 8.67295 , 8.67095 , 8.66865 , 8.66575
120.886 , 8.66316 , 8.66209 , 8.66001 , 8.65763 , 8.65459
113.742 , 8.65239 , 8.65124 , 8.64908 , 8.64661 , 8.64293
106.707 , 8.64194 , 8.6407 , 8.63841 , 8.6358 , 8.63222
99.65 , 8.63131 , 8.62995 , 8.62755 , 8.62478 , 8.62097
92.73 , 8.62101 , 8.61953 , 8.61696 , 8.6138 , 8.60952
85.83 , 8.61078 , 8.60913 , 8.60609 , 8.60179 , 8.59663
78.92 , 8.60044 , 8.59815 , 8.59372 , 8.58907 , 8.58493
71.97 , 8.58886 , 8.5851 , 8.58092 , 8.57742 , 8.57381
64.89 , 8.57503 , 8.57243 , 8.56937 , 8.56623 , 8.56275
57.64 , 8.56297 , 8.56101 , 8.55804 , 8.55493 , 8.55162
49.91 , 8.55082 , 8.54887 , 8.54601 , 8.54315 , 8.53974
41.19 , 8.53657 , 8.53501 , 8.53259 , 8.53026 , 8.52776
33.95 , 8.52628 , 8.52497 , 8.52287 , 8.52094 , 8.51888
26.85 , 8.51672 , 8.51579 , 8.51412 , 8.51267 , 8.51105
21.56 , 8.51111 , 8.51048 , 8.50908 , 8.50783 , 8.5065
17.31 , 8.50621 , 8.5058 , 8.50471 , 8.50379 , 8.50268
13.65 , 8.50245 , 8.50224 , 8.50144 , 8.50085 , 8.50009
8.885 , 8.49848 , 8.49866 , 8.49822 , 8.49792 , 8.49742
5.52 , 8.49622 , 8.49662 , 8.49636 , 8.49622 , 8.49588

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KG8

290.583 , 6920.29 , 4640.63 , 3435.34 , 2640.68 , 2264.58
282.56 , 4732.19 , 3580.17 , 2766.81 , 2239.67 , 2085.33
274.775 , 3694.32 , 2898.33 , 2308.06 , 1984.05 , 1887.71
267.134 , 3013.37 , 2400.36 , 2001.43 , 1811.99 , 1698.44
259.619 , 2374.21 , 1964.22 , 1754.97 , 1625.72 , 1505.83
252.03 , 2062.72 , 1792.21 , 1665.64 , 1507.97 , 1288.19
244.501 , 1777.14 , 1644.42 , 1535.35 , 1317.52 , 1101.42
237.06 , 1605.23 , 1528.39 , 1381.65 , 1113.7 , 949.67
229.633 , 1485.14 , 1400.65 , 1174.46 , 924.075 , 812.934
222.123 , 1377.58 , 1221.09 , 958.078 , 769.549 , 750.429
214.733 , 1244.93 , 1000.57 , 778.463 , 655.129 , 660.397
207.331 , 1037.04 , 798.43 , 642.307 , 568.283 , 567.027
199.983 , 680.335 , 551.986 , 479.401 , 454.693 , 510.353
192.567 , 543.472 , 461.833 , 420.132 , 414.637 , 487.04
185.553 , 432.498 , 392.563 , 372.557 , 376.246 , 488.746
178.698 , 384.203 , 354.211 , 344.201 , 362.084 , 560.51
172.526 , 337.551 , 321.694 , 320.85 , 352.094 , 543.023
166.437 , 305.096 , 295.856 , 305.017 , 346.279 , 553.059
159.222 , 276.833 , 274.205 , 295.038 , 345.48 , 509.716
152.009 , 253.568 , 260.066 , 294.248 , 348.02 , 438.845
144.845 , 241.987 , 259.291 , 299.302 , 352.227 , 419.684
137.54 , 233.733 , 261.851 , 302.68 , 357.265 , 420.537
132.679 , 236.297 , 265.222 , 306.877 , 360.62 , 424.718
127.95 , 239.686 , 270.26 , 315.25 , 368.987 , 429.73
120.886 , 246.422 , 276.97 , 324.459 , 379.862 , 451.425
113.742 , 254.804 , 289.519 , 338.676 , 396.58 , 480.621
106.707 , 266.503 , 305.397 , 357.898 , 419.14 , 506.477
99.65 , 280.68 , 321.261 , 380.454 , 455.9 , 571.528
92.73 , 298.179 , 343.799 , 419.719 , 529.422 , 650.755
85.83 , 323.179 , 390.566 , 509.126 , 623.83 , 638.23
78.92 , 381.589 , 503.347 , 605.21 , 590.38 , 557.306
71.97 , 523.56 , 572.651 , 532.45 , 502.608 , 509.739
64.89 , 499.987 , 453.048 , 448.815 , 464.965 , 493.861
57.64 , 377.748 , 398.624 , 428.693 , 448.208 , 470.473
49.91 , 359.967 , 384.303 , 406.053 , 408.881 , 426.226
41.19 , 317.078 , 331.519 , 339.105 , 338.628 , 336.934
33.95 , 279.269 , 288.797 , 287.222 , 276.747 , 276.012
26.85 , 228.953 , 234.39 , 227.828 , 218.216 , 217.598
21.56 , 198.774 , 203.422 , 200.218 , 189.785 , 190.892
17.31 , 160.275 , 160.773 , 151.726 , 144.65 , 144.176
13.65 , 132.664 , 124.821 , 109.927 , 101.192 , 104.136
8.885 , 84.1667 , 75.5017 , 65.6249 , 63.5853 , 69.1025
5.52 , 57.4133 , 47.9183 , 43.0568 , 42.6938 , 50.7523

KC3

290.583 , 4.34815 E+6 , 9.22055 E+6 , 2.15849 E+7 , 5.24681 E+7 ,
1.42288 E+8
282.56 , 2.97332 E+6 , 7.1135 E+6 , 17384380 , 4.45004 E+7 , 131025147
274.775 , 2.32121 E+6 , 5758743 , 1.4502 E+7 , 3.94214 E+7 , 118608318
267.134 , 1.89336 E+6 , 4.76932 E+6 , 1.25754 E+7 , 36002749 , 106716133
259.619 , 1.49176 E+6 , 3.90274 E+6 , 1.10268 E+7 , 3.23017 E+7 ,
94614089
252.03 , 1.29605 E+6 , 3.56097 E+6 , 1.04655 E+7 , 29962122 , 80939365
244.501 , 1116610 , 3.26733 E+6 , 9.64689 E+6 , 2.6178 E+7 , 69204259
237.06 , 1.0086 E+6 , 3.03679 E+6 , 8.68116 E+6 , 2.21283 E+7 , 59669526
229.633 , 933141. , 2.78298 E+6 , 7.37935 E+6 , 18360609 , 5.10781 E+7
222.123 , 865559. , 2.42621 E+6 , 6.01978 E+6 , 1.52903 E+7 , 4.71508 E+7
214.733 , 782213. , 1.98805 E+6 , 4.89123 E+6 , 1.30169 E+7 , 4.1494 E+7
207.331 , 651591. , 1.58641 E+6 , 4.03573 E+6 , 1.12913 E+7 , 35627357
199.983 , 427467. , 1.09675 E+6 , 3.01217 E+6 , 9.03438 E+6 , 3.20664 E+7
192.567 , 341474. , 917624. , 2.63977 E+6 , 8.2385 E+6 , 3.06016 E+7
185.553 , 271747. , 779990. , 2.34084 E+6 , 7.4757 E+6 , 3.07088 E+7
178.698 , 241402. , 703788. , 2.16268 E+6 , 7.19431 E+6 , 35217882
172.526 , 212090. , 639179. , 2015960 , 6.99582 E+6 , 3.41191 E+7
166.437 , 191697. , 587842. , 1.91648 E+6 , 6.88028 E+6 , 3.47497 E+7
159.222 , 173939. , 544823. , 1.85378 E+6 , 6.8644 E+6 , 3.20264 E+7
152.009 , 159321. , 516730. , 1.84881 E+6 , 6.91487 E+6 , 2.75734 E+7
144.845 , 152045. , 515190. , 1.88057 E+6 , 6.99846 E+6 , 2.63695 E+7
137.54 , 146859. , 520276. , 1.90179 E+6 , 7.09856 E+6 , 26423119
132.679 , 148470. , 526974. , 1.92817 E+6 , 7.16522 E+6 , 2.66858 E+7
127.95 , 150599. , 536984. , 1.98077 E+6 , 7.33147 E+6 , 2.70007 E+7
120.886 , 154832. , 550317. , 2.03864 E+6 , 7.54755 E+6 , 2.83639 E+7
113.742 , 160098. , 575250. , 2.12796 E+6 , 7879718 , 30198308
106.707 , 167449. , 606799. , 2.24874 E+6 , 8.32797 E+6 , 3.18229 E+7
99.65 , 176356. , 638319. , 2.39046 E+6 , 9.05836 E+6 , 3.59102 E+7
92.73 , 187351. , 683100. , 2.63717 E+6 , 10519179 , 4.08881 E+7
85.83 , 203059. , 776022. , 3198933 , 1.2395 E+7 , 40101174
78.92 , 239759. , 1.00011 E+6 , 3.80265 E+6 , 1.17304 E+7 , 3.50166 E+7
71.97 , 328962. , 1.13781 E+6 , 3345482 , 9986407 , 3.20278 E+7
64.89 , 314151. , 900169. , 2.81999 E+6 , 9.23847 E+6 , 3.10302 E+7
57.64 , 237346. , 792033. , 2.69356 E+6 , 8.90552 E+6 , 2.95607 E+7
49.91 , 226174. , 763578. , 2.55131 E+6 , 8.12413 E+6 , 2.67806 E+7
41.19 , 199226. , 658701. , 2.13066 E+6 , 6.72826 E+6 , 2.11702 E+7
33.95 , 175470. , 573816. , 1.80467 E+6 , 5498735 , 1.73423 E+7
26.85 , 143855. , 465714. , 1.43149 E+6 , 4.33577 E+6 , 1.36721 E+7
21.56 , 124893. , 404183. , 1.25801 E+6 , 3.77087 E+6 , 1.19941 E+7
17.31 , 100704. , 319443. , 953323. , 2.87408 E+6 , 9.05885 E+6
13.65 , 83355.2 , 248009. , 690692. , 2.0106 E+6 , 6.54306 E+6
8.885 , 52883.5 , 150016. , 412333. , 1.26339 E+6 , 4.34184 E+6
5.52 , 36073.8 , 95209.7 , 270534. , 848291. , 3.18886 E+6

KD5

290.583 , 9.114913 , 9.111146 , 9.09967 , 9.09294 , 9.08864
282.56 , 9.110778 , 9.09231 , 9.08421 , 9.07884 , 9.07535
274.775 , 9.08583 , 9.07631 , 9.0699 , 9.0656 , 9.06275
267.134 , 9.06896 , 9.06166 , 9.05651 , 9.05306 , 9.05066
259.619 , 9.05386 , 9.04794 , 9.04384 , 9.04102 , 9.03895
252.03 , 9.03939 , 9.0347 , 9.03146 , 9.02906 , 9.02723
244.501 , 9.02575 , 9.022111 , 9.01947 , 9.01735 , 9.01571
237.06 , 9.01294 , 9.0101 , 9.00783 , 9.00591 , 9.00443
229.633 , 9.00069 , 8.99839 , 8.99635 , 8.99459 , 8.99327
222.123 , 8.98875 , 8.98674 , 8.98485 , 8.98326 , 8.98212
214.733 , 8.97726 , 8.97541 , 8.97364 , 8.97222 , 8.97126
207.331 , 8.96591 , 8.96414 , 8.96253 , 8.96131 , 8.9605
199.983 , 8.95472 , 8.95306 , 8.95164 , 8.95059 , 8.94989
192.567 , 8.94349 , 8.94198 , 8.94074 , 8.93952 , 8.93929
185.553 , 8.93297 , 8.93166 , 8.93064 , 8.9299 , 8.92936
178.698 , 8.92281 , 8.92171 , 8.92085 , 8.92022 , 8.91977
172.526 , 8.91379 , 8.91288 , 8.91213 , 8.91157 , 8.91119
166.437 , 8.90503 , 8.92474 , 8.90362 , 8.90313 , 8.9028
159.222 , 8.89482 , 8.89419 , 8.89364 , 8.89323 , 8.89294
152.009 , 8.88479 , 8.88426 , 8.88379 , 8.88345 , 8.8832
144.845 , 8.87496 , 8.87453 , 8.87414 , 8.87385 , 8.87362
137.54 , 8.86512 , 8.86478 , 8.86446 , 8.8642 , 8.864
132.679 , 8.85866 , 8.8584 , 8.85811 , 8.85787 , 8.8577
127.95 , 8.85248 , 8.85226 , 8.852 , 8.85177 , 8.85163
120.886 , 8.8434 , 8.84325 , 8.843 , 8.84282 , 8.84274
113.742 , 8.83446 , 8.83432 , 8.83414 , 8.83401 , 8.83396
106.707 , 8.82584 , 8.82575 , 8.82562 , 8.82552 , 8.82551
99.65 , 8.81743 , 8.81741 , 8.81733 , 8.81726 , 8.81725
92.73 , 8.80952 , 8.80954 , 8.80948 , 8.80942 , 8.80943
85.83 , 8.80196 , 8.80201 , 8.80195 , 8.80191 , 8.80191
78.92 , 8.79479 , 8.79485 , 8.79479 , 8.79475 , 8.79538
71.97 , 8.78803 , 8.78809 , 8.78804 , 8.78798 , 8.78798
64.89 , 8.78164 , 8.78171 , 8.78166 , 8.78161 , 8.78159
57.64 , 8.77575 , 8.77581 , 8.77576 , 8.7757 , 8.77568
49.91 , 8.77029 , 8.77036 , 8.7703 , 8.77023 , 8.7702
41.19 , 8.76524 , 8.76529 , 8.76522 , 8.76514 , 8.7651
33.95 , 8.76197 , 8.76201 , 8.76195 , 8.76188 , 8.76186
26.85 , 8.75969 , 8.75974 , 8.75967 , 8.75961 , 8.75959
21.56 , 8.75869 , 8.75874 , 8.75869 , 8.75863 , 8.7586
17.31 , 8.75814 , 8.7582 , 8.75814 , 8.75808 , 8.75806
13.65 , 8.75788 , 8.75793 , 8.75786 , 8.75781 , 8.75779
8.885 , 8.75767 , 8.75772 , 8.75766 , 8.7576 , 8.75758
5.52 , 8.7574 , 8.75754 , 8.75749 , 8.75742 , 8.7574

KG5

290.583 , 48915.8 , 16461.9 , 5828.22 , 2269.79 , 1001.46
282.56 , 22343.2 , 7804.74 , 2988.32 , 1294.07 , 648.223
274.775 , 10283.5 , 3862.89 , 1647.85 , 807.37 , 458.782
267.134 , 4880.59 , 2051.76 , 992.982 , 552.263 , 352.78
259.619 , 2485.85 , 1196.89 , 657.636 , 412.949 , 291.073
252.03 , 1385.84 , 764.861 , 474.302 , 332.566 , 249.969
244.501 , 872.088 , 540.588 , 373.68 , 283.195 , 220.194
237.06 , 612.62 , 418.609 , 314.404 , 249.326 , 194.538
229.633 , 465.799 , 347.252 , 277.866 , 221.656 , 171.97
222.123 , 380.994 , 305.861 , 250.63 , 198.119 , 151.462
214.733 , 333.264 , 280.937 , 227.504 , 175.608 , 131.98
207.331 , 308.203 , 261.141 , 204.365 , 153.092 , 116.617
199.983 , 294.404 , 241.289 , 182.241 , 134.704 , 106.403
192.567 , 282.62 , 220.377 , 159.074 , 116.313 , 93.0963
185.553 , 266.412 , 198.29 , 138.962 , 102.042 , 82.8738
178.698 , 247.964 , 177.153 , 121.924 , 89.8274 , 73.6776
172.526 , 229.109 , 158.917 , 108.955 , 80.691 , 66.5323
166.437 , 210.142 , 144.761 , 98.0353 , 72.5818 , 62.4749
159.222 , 190.552 , 129.774 , 85.1158 , 63.4631 , 56.3667
152.009 , 176.016 , 117.83 , 75.2792 , 56.4052 , 53.3463
144.845 , 164.437 , 106.85 , 66.4527 , 51.4067 , 48.2622
137.54 , 154.857 , 97.9024 , 58.6487 , 46.404 , 43.1765
132.679 , 147.362 , 91.5563 , 55.8466 , 43.4091 , 39.0975
127.95 , 141.83 , 88.2599 , 53.0271 , 39.3741 , 35.0162
120.886 , 134.942 , 83.2467 , 48.2576 , 33.3134 , 30.9512
113.742 , 129.972 , 78.1592 , 42.429 , 28.2776 , 26.8828
106.707 , 125.803 , 72.9567 , 36.5616 , 23.2281 , 24.8693
99.65 , 120.406 , 66.6255 , 31.6963 , 21.2689 , 22.8513
92.73 , 114.78 , 62.2492 , 29.8954 , 19.2962 , 22.8885
85.83 , 112.046 , 60.8714 , 28.0597 , 19.379 , 22.9208
78.92 , 110.605 , 60.4002 , 28.2493 , 19.4465 , 21.9169
71.97 , 111.511 , 60.8454 , 27.3653 , 18.466 , 21.9378
64.89 , 111.657 , 61.1714 , 28.5093 , 19.539 , 22.9832
57.64 , 112.013 , 61.3465 , 28.5683 , 19.56 , 25.0517
49.91 , 112.133 , 61.4059 , 29.6224 , 21.635 , 25.0545
41.19 , 114.066 , 63.4067 , 30.634 , 21.6269 , 26.0816
33.95 , 114.809 , 63.2639 , 30.5859 , 21.6098 , 25.0447
26.85 , 113.422 , 62.0564 , 29.4932 , 20.555 , 25.0366
21.56 , 112.702 , 61.9565 , 29.4596 , 21.577 , 26.0621
17.31 , 112.074 , 61.9023 , 29.4413 , 21.5705 , 26.0595
13.65 , 112.017 , 61.8738 , 29.4317 , 21.5671 , 26.0582
8.885 , 113.025 , 61.8612 , 29.4274 , 21.5656 , 27.0878
5.52 , 112.504 , 61.859 , 29.4267 , 20.5314 , 25.0273

KC5

290.583 , 3.07347 E+7 , 3.27084 E+7 , 36619786 , 45098858 , 6.29236 E+7
282.56 , 11.40386 E+7 , 11.55074 E+7 , 11.87762 E+7 , 2.57121 E+7 , 40729052
274.775 , 6.46131 E+6 , 7.67524 E+6 , 10353747 , 16041777 , 2.88261 E+7
267.134 , 3.06657 E+6 , 4.07668 E+6 , 6.23909 E+6 , 10973011 , 22165821
259.619 , 11.56191 E+6 , 2.37812 E+6 , 4.13205 E+6 , 8.20496 E+6 ,
18288656
252.03 , 870749. , 11.51972 E+6 , 2.98013 E+6 , 6.60781 E+6 , 11.5706 E+7
244.501 , 547949. , 11.0741 E+6 , 2.3479 E+6 , 5.62685 E+6 , 13835197
237.06 , 384920. , 831742. , 11.97546 E+6 , 4.9539 E+6 , 12223183
229.633 , 292670. , 689961. , 11.74588 E+6 , 4.40412 E+6 , 11.08052 E+7
222.123 , 239386. , 607721. , 11.57475 E+6 , 3.93646 E+6 , 9.51664 E+6
214.733 , 209396. , 558199. , 11.42945 E+6 , 3.48919 E+6 , 8.29255 E+6
207.331 , 193650. , 518866. , 11.28406 E+6 , 3.04181 E+6 , 7.32726 E+6
199.983 , 184979. , 479421. , 11.14505 E+6 , 2.67646 E+6 , 6.6855 E+6
192.567 , 177575. , 437871. , 999491. , 2.31104 E+6 , 5.84941 E+6
185.553 , 167392. , 393986. , 873124. , 2.02749 E+6 , 5.20711 E+6
178.698 , 155800. , 351988. , 766071. , 11.7848 E+6 , 4.6293 E+6
172.526 , 143953. , 315755. , 684584. , 11.60326 E+6 , 4.18035 E+6
166.437 , 132036. , 287628. , 615974. , 11.44214 E+6 , 3.92541 E+6
159.222 , 119727. , 257850. , 534798. , 11.26096 E+6 , 3.54162 E+6
152.009 , 110594. , 234119. , 472993. , 11.12072 E+6 , 3.35185 E+6
144.845 , 103319. , 212302. , 417535. , 11.02141 E+6 , 3.0324 E+6
137.54 , 97299.5 , 194524. , 368501. , 922009. , 2.71286 E+6
132.679 , 92590.3 , 181915. , 350895. , 862503. , 2.45657 E+6
127.95 , 89114.4 , 175365. , 333179. , 782331. , 2.20013 E+6
120.886 , 84786.6 , 165404. , 303211. , 661910. , 1.94472 E+6
113.742 , 81663.8 , 155296. , 266589. , 561853. , 1.6891 E+6
106.707 , 79044.4 , 144959. , 229723. , 461523. , 1.56258 E+6
99.65 , 75653.3 , 132379. , 199154. , 422596. , 1.43579 E+6
92.73 , 72118.4 , 123684. , 187838. , 383400. , 1.43813 E+6
85.83 , 70400.6 , 120946. , 176304. , 385045. , 1.44016 E+6
78.92 , 69495.2 , 120010. , 177496. , 386386. , 1.37708 E+6
71.97 , 70064.4 , 120895. , 171941. , 366904. , 1.37839 E+6
64.89 , 70156.2 , 121543. , 179129. , 388224. , 1.44408 E+6
57.64 , 70379.8 , 121890. , 179500. , 388641. , 1.57404 E+6
49.91 , 70455.2 , 122008. , 186123. , 429870. , 1.57422 E+6
41.19 , 71669.8 , 125984. , 192479. , 429709. , 1.63876 E+6
33.95 , 72136.6 , 125700. , 192177. , 429369. , 1.5736 E+6
26.85 , 71265.1 , 123301. , 185311. , 408411. , 1.5731 E+6
21.56 , 70812.8 , 123102. , 185100. , 428717. , 1.63753 E+6
17.31 , 70418.2 , 122995. , 184985. , 428588. , 1.63737 E+6
13.65 , 70382.4 , 122938. , 184925. , 428521. , 1.63728 E+6
8.885 , 71015.7 , 122913. , 184898. , 428491. , 1.70198 E+6
5.52 , 70688.3 , 122909. , 184893. , 407942. , 1.57251 E+6

KD4

290.583 , 7.90745 , 7.90647 , 7.90551 , 7.90454 , 7.90369
282.56 , 7.90409 , 7.90315 , 7.90222 , 7.9013 , 7.90052
274.775 , 7.90092 , 7.90001 , 7.89913 , 7.89825 , 7.89754
267.134 , 7.89792 , 7.89705 , 7.89617 , 7.89537 , 7.89468
259.619 , 7.89506 , 7.89423 , 7.89341 , 7.89263 , 7.89198
252.03 , 7.89227 , 7.89147 , 7.89071 , 7.88997 , 7.88934
244.501 , 7.88961 , 7.88885 , 7.88813 , 7.88744 , 7.88684
237.06 , 7.88707 , 7.88636 , 7.88568 , 7.88504 , 7.88449
229.633 , 7.88465 , 7.88398 , 7.88335 , 7.88276 , 7.88225
222.123 , 7.88232 , 7.88169 , 7.88111 , 7.88056 , 7.8801
214.733 , 7.88015 , 7.87956 , 7.87903 , 7.87852 , 7.87805
207.331 , 7.87809 , 7.87756 , 7.87706 , 7.8766 , 7.87616
199.983 , 7.87618 , 7.87568 , 7.87524 , 7.87481 , 7.87448
192.567 , 7.87438 , 7.87393 , 7.87353 , 7.87314 , 7.87292
185.553 , 7.87282 , 7.87241 , 7.87204 , 7.87169 , 7.87149
178.698 , 7.87142 , 7.87105 , 7.87071 , 7.87039 , 7.87012
172.526 , 7.87027 , 7.86993 , 7.86962 , 7.86932 , 7.86902
166.437 , 7.86925 , 7.86893 , 7.86864 , 7.86841 , 7.86817
159.222 , 7.86818 , 7.86789 , 7.86763 , 7.86738 , 7.86698
152.009 , 7.86727 , 7.86701 , 7.86678 , 7.86654 , 7.8663
144.845 , 7.86654 , 7.8663 , 7.86608 , 7.86586 , 7.86587
137.54 , 7.86598 , 7.86576 , 7.86556 , 7.86535 , 7.86507
132.679 , 7.8657 , 7.8655 , 7.86531 , 7.86512 , 7.86488
127.95 , 7.86552 , 7.86532 , 7.86514 , 7.86496 , 7.86463
120.886 , 7.8654 , 7.86521 , 7.86505 , 7.86488 , 7.86455
113.742 , 7.86547 , 7.8653 , 7.86515 , 7.86499 , 7.86451
106.707 , 7.86573 , 7.86558 , 7.86544 , 7.86529 , 7.86489
99.65 , 7.86619 , 7.86604 , 7.86591 , 7.86577 , 7.86549
92.73 , 7.86681 , 7.86668 , 7.86656 , 7.86642 , 7.86645
85.83 , 7.86762 , 7.86749 , 7.86737 , 7.86724 , 7.86727
78.92 , 7.86858 , 7.86846 , 7.86835 , 7.86823 , 7.86823
71.97 , 7.86959 , 7.86957 , 7.86946 , 7.86934 , 7.8693
64.89 , 7.87091 , 7.8708 , 7.87069 , 7.87058 , 7.87048
57.64 , 7.87223 , 7.87212 , 7.87202 , 7.87191 , 7.87156
49.91 , 7.87367 , 7.87356 , 7.87346 , 7.87335 , 7.87319
41.19 , 7.87524 , 7.87513 , 7.87503 , 7.87492 , 7.87475
33.95 , 7.87639 , 7.87628 , 7.87619 , 7.87607 , 7.87593
26.85 , 7.87725 , 7.87714 , 7.87704 , 7.87693 , 7.8768
21.56 , 7.8776 , 7.87749 , 7.87739 , 7.87728 , 7.87706
17.31 , 7.87765 , 7.87754 , 7.87744 , 7.87734 , 7.87719
13.65 , 7.87749 , 7.87738 , 7.87729 , 7.87718 , 7.87704
8.885 , 7.87691 , 7.87682 , 7.87673 , 7.87663 , 7.87648
5.52 , 7.87624 , 7.87615 , 7.87607 , 7.87599 , 7.87629

KG4

290.583 , 136.542 , 137.595 , 137.811 , 136.966 , 124.326
282.56 , 132.528 , 132.741 , 132.061 , 129.926 , 121.371
274.775 , 128.513 , 127.887 , 126.31 , 123.769 , 115.01
267.134 , 124.048 , 122.588 , 120.559 , 117.17 , 104.816
259.619 , 119.583 , 117.289 , 114.807 , 110.57 , 102.285
252.03 , 115.119 , 111.989 , 108.611 , 104.412 , 94.6458
244.501 , 109.755 , 105.802 , 102.415 , 97.8121 , 89.5603
237.06 , 104.392 , 100.502 , 95.7734 , 91.4767 , 83.623
229.633 , 98.1298 , 94.1372 , 89.5764 , 85.4063 , 78.5371
222.123 , 91.8681 , 88.1273 , 83.8241 , 78.8943 , 72.5998
214.733 , 86.5039 , 81.9394 , 77.6268 , 73.6186 , 67.5135
207.331 , 80.2416 , 76.1951 , 71.4294 , 68.1661 , 61.065
199.983 , 73.9789 , 69.563 , 66.1205 , 63.0667 , 44.1445
192.567 , 68.6144 , 64.2622 , 59.9229 , 57.7906 , 49.6998
185.553 , 62.3505 , 58.96 , 55.5016 , 54.28 , 45.4633
178.698 , 56.984 , 54.5447 , 51.5241 , 49.8853 , 45.483
172.526 , 53.4113 , 50.1271 , 47.9887 , 47.2552 , 37.8384
166.437 , 49.8383 , 47.0403 , 44.8973 , 44.6247 , 25.0855
159.222 , 45.3707 , 43.0695 , 41.365 , 41.9976 , 14.0382
152.009 , 40.9028 , 39.986 , 38.7215 , 39.1054 , 19.1666
144.845 , 37.3327 , 36.9022 , 36.0775 , 36.5661 , 23.2729
137.54 , 34.661 , 34.2624 , 33.7005 , 34.4689 , 28.316
132.679 , 32.8796 , 32.5023 , 32.5601 , 33.2472 , 5.17251
127.95 , 31.0978 , 31.1855 , 30.9747 , 32.3784 , 20.9353
120.886 , 28.8737 , 28.988 , 29.0408 , 30.6331 , 38.8326
113.742 , 27.0986 , 27.2343 , 27.729 , 28.8878 , 9.90551
106.707 , 25.772 , 25.9237 , 26.4166 , 28.0253 , 10.7752
99.65 , 23.996 , 24.6127 , 25.1038 , 27.1624 , 3.13101
92.73 , 22.2191 , 23.7447 , 23.7902 , 26.2988 , 6.5537
85.83 , 21.3398 , 22.8761 , 22.9206 , 25.4345 , 17.6381
78.92 , 20.4599 , 22.0069 , 22.4946 , 24.5696 , 25.061
71.97 , 19.5791 , 21.1369 , 22.0679 , 24.1456 , 27.0346
64.89 , 19.5956 , 20.266 , 21.1959 , 23.7207 , 26.6237
57.64 , 18.7131 , 20.2817 , 21.2118 , 23.7367 , 28.766
49.91 , 18.7283 , 19.7645 , 20.8718 , 23.3988 , 65.8985
41.19 , 18.2945 , 19.6023 , 20.7984 , 23.326 , 39.8607
33.95 , 18.1256 , 19.4356 , 20.7205 , 23.2487 , 34.3366
26.85 , 18.3138 , 19.4443 , 20.8182 , 23.2574 , 37.324
21.56 , 17.8694 , 19.4489 , 20.5562 , 23.2621 , 39.2011
17.31 , 17.8719 , 19.4514 , 20.3809 , 22.9113 , 45.8438
13.65 , 17.8733 , 19.0091 , 20.0269 , 22.471 , 50.1019
8.885 , 16.9762 , 18.0338 , 18.6056 , 21.1468 , 26.2649
5.52 , 15.1803 , 16.7917 , 17.2726 , 19.3803 , 45.8463

KC4

290.583 , 85791.9 , 273390. , 865892. , 2.7214 E+6 , 7811633
282.56 , 83269.8 , 263745. , 829764. , 2.58152 E+6 , 7.62596 E+6
274.775 , 80747.1 , 254101. , 793629. , 2.45919 E+6 , 7.22629 E+6
267.134 , 77941.7 , 243572. , 757495. , 2.32807 E+6 , 6.58578 E+6
259.619 , 75136.2 , 233044. , 721354. , 2.19693 E+6 , 6.42676 E+6
252.03 , 72331.4 , 222513. , 682423. , 2.07458 E+6 , 5946771
244.501 , 68961.1 , 210220. , 643492. , 1.94345 E+6 , 5.62724 E+6
237.06 , 65591.4 , 199639. , 601762. , 1.81757 E+6 , 5.25419 E+6
229.633 , 61656.8 , 187043. , 562825. , 1.69695 E+6 , 4.93463 E+6
222.123 , 57722.4 , 175102. , 526682. , 1.56756 E+6 , 4561580
214.733 , 54352. , 162807. , 487744. , 1.46274 E+6 , 4.242 E+6
207.331 , 50417.3 , 151393. , 448804. , 1.3544 E+6 , 3.83683 E+6
199.983 , 46482.3 , 138216. , 415447. , 1.25308 E+6 , 2.77368 E+6
192.567 , 43111.7 , 127684. , 376507. , 1.14825 E+6 , 3.12273 E+6
185.553 , 39176. , 117149. , 348727. , 1.0785 E+6 , 2.85654 E+6
178.698 , 35804.1 , 108376. , 323735. , 991180. , 2.85778 E+6
172.526 , 33559.3 , 99598.4 , 301522. , 938922. , 2.37746 E+6
166.437 , 31314.3 , 93465.2 , 282098. , 886656. , 1.57617 E+6
159.222 , 28507.3 , 85575.5 , 259904. , 834458. , 882046.
152.009 , 25700. , 79448.9 , 243294. , 776992. , 1204273
144.845 , 23456.8 , 73321.6 , 226682. , 726538. , 1.46223 E+6
137.54 , 21778.1 , 68076.6 , 211746. , 684869. , 1.77915 E+6
132.679 , 20658.9 , 64579.4 , 204581. , 660594. , 324998.
127.95 , 19539.3 , 61963. , 194620. , 643332. , 1.3154 E+6
120.886 , 18141.9 , 57596.8 , 182469. , 608654. , 2.43992 E+6
113.742 , 17026.6 , 54112.3 , 174226. , 573977. , 622382.
106.707 , 16193. , 51508.3 , 165930. , 556840. , 677026.
99.65 , 15077.1 , 48903.4 , 157732. , 539695. , 196727.
92.73 , 13960.7 , 47178.8 , 149478. , 522535. , 411781.
85.83 , 13408.2 , 45452.9 , 144014. , 505363. , 1.10823 E+6
78.92 , 12855.3 , 43725.9 , 141338. , 488178. , 1.57463 E+6
71.97 , 12301.9 , 41997.3 , 138657. , 479753. , 1.69863 E+6
64.89 , 12312.3 , 40266.9 , 133178. , 471311. , 1.67282 E+6
57.64 , 11757.8 , 40298.1 , 133278. , 471629. , 1.80742 E+6
49.91 , 11767.3 , 39270.4 , 131141. , 464915. , 4.14052 E+6
41.19 , 11494.8 , 38948.2 , 130680. , 463468. , 2.50452 E+6
33.95 , 11388.7 , 38616.9 , 130191. , 461933. , 2.15743 E+6
26.85 , 11506.9 , 38634.2 , 130805. , 462105. , 2.34514 E+6
21.56 , 11227.7 , 38643.4 , 129158. , 462199. , 2.46308 E+6
17.31 , 11229.2 , 38648.3 , 128057. , 455229. , 2.88045 E+6
13.65 , 11230.1 , 37769.5 , 125833. , 446480. , 3.148 E+6
8.885 , 10666.5 , 35831.7 , 116902. , 420169. , 1.65027 E+6
5.52 , 9538.06 , 33363.7 , 108527. , 385071. , 2880608

AS2S3KD

360.001 , 7.48479 , 7.48275 , 7.48089 , 7.47912 , 7.47725
352.337 , 7.48131 , 7.47952 , 7.47781 , 7.47613 , 7.47434
344.893 , 7.4782 , 7.47659 , 7.47498 , 7.47335 , 7.47161
337.466 , 7.47529 , 7.4738 , 7.47226 , 7.47067 , 7.46899
329.999 , 7.47246 , 6797310 , 7.46958 , 7.46804 , 7.46643
322.407 , 7.46976 , 7.46843 , 7.46698 , 7.46547 , 7.4639
315.029 , 7.46727 , 7.46595 , 7.46452 , 7.46304 , 7.46152
307.414 , 7.46476 , 7.46346 , 7.46204 , 7.46059 , 7.45911
299.999 , 7.46223 , 7.46092 , 7.45953 , 7.45812 , 7.45668
294.812 , 7.46065 , 7.45935 , 7.45797 , 7.45659 , 7.45518
290.01 , 7.4592 , 7.45789 , 7.45654 , 7.4552 , 7.45381
284.96 , 7.45773 , 7.45642 , 7.45509 , 7.45378 , 7.45241
279.999 , 7.4563 , 7.45498 , 7.4537 , 7.45241 , 7.45108
274.866 , 7.45483 , 7.45356 , 7.4523 , 7.45103 , 7.44975
269.997 , 7.45349 , 7.45222 , 7.45101 , 7.44977 , 7.44852
264.808 , 7.45209 , 7.45085 , 7.44967 , 7.44846 , 7.44725
260 , 7.45083 , 7.44962 , 7.44847 , 7.44729 , 7.44612
252.275 , 7.44886 , 7.44771 , 7.44661 , 7.44549 , 7.44436
244.926 , 7.44709 , 7.44599 , 7.44493 , 7.44386 , 7.44279
240 , 7.44595 , 7.44491 , 7.44386 , 7.44282 , 7.44179
234.811 , 7.4448 , 7.44378 , 7.44278 , 7.44178 , 7.44077
230.001 , 7.44378 , 7.44279 , 7.44183 , 7.44085 , 7.43985
224.876 , 7.44274 , 7.44178 , 7.44085 , 7.43991 , 7.43891
219.972 , 7.44178 , 7.44087 , 7.43996 , 7.43904 , 7.43804
214.977 , 7.44086 , 7.43998 , 7.4391 , 7.43821 , 7.4372
209.997 , 7.43999 , 7.43914 , 7.43829 , 7.43741 , 7.4364
204.87 , 7.43915 , 7.43833 , 7.43751 , 7.43662 , 7.43562
200.113 , 7.43843 , 7.43761 , 7.43682 , 7.43593 , 7.43495
195.195 , 7.43772 , 7.43694 , 7.43616 , 7.43525 , 7.4343
190.316 , 7.43707 , 7.43632 , 7.43553 , 7.43462 , 7.43372
185.024 , 7.43644 , 7.43569 , 7.4349 , 7.434 , 7.43316
179.999 , 7.43589 , 7.43516 , 7.43434 , 7.43348 , 7.43269
174.802 , 7.43538 , 7.43466 , 7.43382 , 7.43301 , 7.43226
169.999 , 7.43497 , 7.43421 , 7.4334 , 7.43263 , 7.43193
160 , 7.43423 , 7.43345 , 7.43273 , 7.43205 , 7.43147
149.998 , 7.4337 , 7.43302 , 7.43236 , 7.43177 , 7.43133
139.998 , 7.43347 , 7.43287 , 7.43229 , 7.43184 , 7.43151
130 , 7.43359 , 7.43304 , 7.43261 , 7.43228 , 7.432
119.999 , 7.43403 , 7.43362 , 7.43331 , 7.43304 , 7.4328
109.998 , 7.43491 , 7.43461 , 7.43437 , 7.43414 , 7.43393
99.9999 , 7.43621 , 7.43597 , 7.43577 , 7.43558 , 7.43539
87.2878 , 7.43834 , 7.43812 , 7.43774 , 7.43543 , 7.41875
75.1607 , 7.4409 , 7.44075 , 7.44058 , 7.44043 , 7.44028
65.8731 , 7.44303 , 7.44288 , 7.44273 , 7.44259 , 7.44245
56.0343 , 7.44537 , 7.44524 , 7.44511 , 7.44498 , 7.44484
46.0581 , 7.4477 , 7.44758 , 7.44746 , 7.44733 , 7.44722
32.9265 , 7.4504 , 7.45028 , 7.45017 , 7.45006 , 7.44996
25.0017 , 7.45153 , 7.45141 , 7.45136 , 7.45168 , 7.45376
19.9997 , 7.4519 , 7.45178 , 7.45168 , 7.45157 , 7.45146
12.0018 , 7.45172 , 7.45161 , 7.4515 , 7.4514 , 7.45133

AS2S3KG

360.001 , 385.06 , 300.542 , 266.187 , 259.673 , 275.647
352.337 , 299.953 , 259.01 , 243.101 , 245.391 , 263.297
344.893 , 248.682 , 230.603 , 228.822 , 236.615 , 253.198
337.466 , 218.151 , 215.323 , 218.948 , 228.941 , 244.226
329.999 , 194.168 , 201.137 , 210.174 , 220.165 , 233
322.407 , 182.193 , 193.515 , 205.806 , 213.593 , 225.155
315.029 , 174.584 , 190.267 , 201.437 , 209.223 , 219.56
307.414 , 171.341 , 188.114 , 198.169 , 203.752 , 212.841
299.999 , 170.28 , 185.96 , 193.8 , 198.28 , 206.12
294.812 , 169.189 , 183.756 , 190.464 , 193.694 , 201.057
290.01 , 169.208 , 184.892 , 187.126 , 190.259 , 195.991
284.96 , 168.116 , 181.574 , 182.669 , 185.672 , 189.655
279.999 , 169.25 , 178.256 , 179.331 , 182.237 , 184.59
274.866 , 167.045 , 174.938 , 174.874 , 177.651 , 179.526
269.997 , 165.952 , 171.619 , 171.536 , 173.063 , 174.461
264.808 , 163.747 , 168.302 , 167.079 , 169.629 , 169.397
260 , 161.541 , 163.869 , 163.741 , 165.041 , 164.332
252.275 , 156.008 , 157.222 , 157.055 , 157.008 , 158.008
244.926 , 150.473 , 150.574 , 150.368 , 150.126 , 151.682
240 , 147.154 , 145.028 , 145.91 , 146.691 , 149.162
234.811 , 142.723 , 141.71 , 141.453 , 142.104 , 145.37
230.001 , 137.178 , 137.277 , 136.994 , 138.668 , 142.849
224.876 , 133.859 , 132.845 , 133.656 , 135.233 , 141.601
219.972 , 128.314 , 128.412 , 130.318 , 134.103 , 140.353
214.977 , 123.883 , 125.094 , 125.86 , 131.821 , 137.832
209.997 , 119.45 , 120.661 , 123.642 , 131.844 , 135.311
204.87 , 115.019 , 118.456 , 121.424 , 129.562 , 130.247
200.113 , 111.699 , 114.022 , 119.205 , 128.431 , 125.18
195.195 , 109.492 , 111.816 , 119.227 , 126.148 , 117.569
190.316 , 106.173 , 110.724 , 118.129 , 122.712 , 111.23
185.024 , 102.854 , 109.633 , 118.152 , 116.972 , 103.621
179.999 , 100.648 , 109.654 , 115.934 , 112.383 , 96.0109
174.802 , 99.5551 , 109.676 , 112.596 , 105.49 , 88.4012
169.999 , 98.4607 , 109.696 , 109.256 , 100.9 , 80.7895
160 , 99.6118 , 104.17 , 98.0976 , 87.1115 , 61.7506
149.998 , 97.4238 , 93.0762 , 86.9383 , 72.1693 , 45.2559
139.998 , 87.4447 , 83.0952 , 72.4178 , 56.0737 , 33.85
130 , 77.4651 , 70.8866 , 56.7765 , 43.4359 , 24.9881
119.999 , 65.2589 , 54.2231 , 44.4952 , 36.5613 , 18.6703
109.998 , 49.7133 , 43.1266 , 36.694 , 30.8387 , 14.8962
99.9999 , 37.5056 , 33.1427 , 24.4109 , 3.21211 ,-69.0366
87.2878 , 383.673 , 1151.18 , 3466.93 , 10576.7 , 30028.4
75.1607 , 26.4568 , 26.5496 , 24.5027 , 20.5979 , 4.85705
65.8731 , 24.2576 , 24.3516 , 23.4129 , 20.629 , 7.43405
56.0343 , 22.0572 , 23.2659 , 21.2014 , 18.3531 , 2.3755
46.0581 , 20.9671 , 21.0638 , 21.2274 , 18.3796 , 7.49253
32.9265 , 17.6529 , 11.0688 ,-11.2314 ,-83.0373 , 345.966
25.0017 ,-37.9833 ,-256.167 ,-852.513 ,-2286.01 ,-5838.89
19.9997 , 18.7813 , 19.994 , 19.0325 , 17.2735 , 7.54102
12.0018 , 14.3336 , 4.40899 ,-28.0126 ,-133.737 ,-511.571

AS2S3KC

360.001 , 241940. , 597152. , 1.6725 E+6 , 5.15949 E+6 , 1.73194 E+7
352.337 , 188466. , 514632. , 1.52745 E+6 , 4.87572 E+6 , 1.65434 E+7
344.893 , 156252. , 458189. , 1.43773 E+6 , 4.70135 E+6 , 1.59089 E+7
337.466 , 137068. , 427829. , 1.37569 E+6 , 4.54887 E+6 , 1.53452 E+7
329.999 , 121999. , 399643. , 1.32056 E+6 , 4.3745 E+6 , 1.46398 E+7
322.407 , 114475. , 384498. , 1.29312 E+6 , 4243917 , 1.41469 E+7
315.029 , 109694. , 378045. , 1265666 , 4.15709 E+6 , 1.37954 E+7
307.414 , 107657. , 373767. , 1.24513 E+6 , 4.04838 E+6 , 1.33732 E+7
299.999 , 106990. , 369487. , 1.21768 E+6 , 3.93966 E+6 , 1.29509 E+7
294.812 , 106305. , 365108. , 1.19672 E+6 , 3.84854 E+6 , 1.26328 E+7
290.01 , 106317. , 367365. , 1.17575 E+6 , 3.78029 E+6 , 1.23145 E+7
284.96 , 105630. , 360773. , 1.14774 E+6 , 3.68915 E+6 , 1.19164 E+7
279.999 , 106343. , 354180. , 1.12677 E+6 , 3.6209 E+6 , 1.15981 E+7
274.866 , 104957. , 347587. , 1.09877 E+6 , 3.52978 E+6 , 1.128 E+7
269.997 , 104271. , 340993. , 1.07779 E+6 , 3.43862 E+6 , 10961708
264.808 , 102885. , 334402. , 1.04979 E+6 , 3.37039 E+6 , 1.06435 E+7
260 , 101499. , 325594. , 1.02882 E+6 , 3.27923 E+6 , 1.03253 E+7
252.275 , 98022.7 , 312387. , 986806. , 3.11962 E+6 , 9.92794 E+6
244.926 , 94545. , 299178. , 944790. , 2.98288 E+6 , 9.53046 E+6
240 , 92459.6 , 288159. , 916780. , 2.91463 E+6 , 9.37212 E+6
234.811 , 89675.5 , 281566. , 888775. , 2.82349 E+6 , 9.13387 E+6
230.001 , 86191.5 , 272758. , 860759. , 2.75522 E+6 , 8.97547 E+6
224.876 , 84106.1 , 263952. , 839785. , 2.68697 E+6 , 8.89705 E+6
219.972 , 80622.1 , 255144. , 818812. , 2.66452 E+6 , 8.81864 E+6
214.977 , 77838. , 248551. , 790802. , 2.61917 E+6 , 8660240
209.997 , 75052.6 , 239743. , 776866. , 2.61963 E+6 , 8.50184 E+6
204.87 , 72268.6 , 235362. , 762929. , 2.57429 E+6 , 8.18366 E+6
200.113 , 70182.6 , 226552. , 748987. , 2.55182 E+6 , 7.86529 E+6
195.195 , 68795.9 , 222169. , 749125. , 2.50646 E+6 , 7.38708 E+6
190.316 , 66710.5 , 219999. , 742226. , 2.43819 E+6 , 6988787
185.024 , 64625.1 , 217832. , 742371. , 2.32414 E+6 , 6.5107 E+6
179.999 , 63239. , 217873. , 728435. , 2.23296 E+6 , 6.03254 E+6
174.802 , 62552.3 , 217917. , 707462. , 2.096 E+6 , 5.55441 E+6
169.999 , 61864.7 , 217957. , 686476. , 2.0048 E+6 , 5076154
160 , 62587.9 , 206977. , 616365. , 1.73083 E+6 , 3.8799 E+6
149.998 , 61213.2 , 184935. , 546249. , 1.43394 E+6 , 2.84351 E+6
139.998 , 54943.1 , 165103. , 455014. , 1.11414 E+6 , 2.12686 E+6
130 , 48672.8 , 140846. , 356737. , 863036. , 1.57005 E+6
119.999 , 41003.4 , 107737. , 279572. , 726443. , 1.17309 E+6
109.998 , 31235.8 , 85689. , 230555. , 612740. , 935956.
99.9999 , 23565.5 , 65851.8 , 153378. , 63822. ,-4.3377 E+6
75.1607 , 16623.3 , 52751.9 , 153955. , 409263. , 305177.
65.8731 , 15241.5 , 48384.6 , 147108. , 409881. , 467095.
56.0343 , 13858.9 , 46227.4 , 133212. , 364661. , 149257.
46.0581 , 13174. , 41852. , 133376. , 365188. , 470770.
19.9997 , 11800.6 , 39726.4 , 119585. , 343210. , 473816.

KD6

290.583 , 9.44127 , 9.39593 , 9.36454 , 9.34459 , 9.33243
282.56 , 9.42069 , 9.38031 , 9.35308 , 9.3361 , 9.32607
274.775 , 9.40175 , 9.3663 , 9.34286 , 9.32852 , 9.32029
267.134 , 9.38442 , 9.35362 , 9.33374 , 9.32182 , 9.31506
259.619 , 9.36862 , 9.34225 , 9.32547 , 9.31573 , 9.31022
252.03 , 9.35384 , 9.33176 , 9.31734 , 9.3102 , 9.30509
244.501 , 9.3406 , 9.32242 , 9.31127 , 9.30512 , 9.29954
237.06 , 9.32887 , 9.3142 , 9.30546 , 9.30017 , 9.29327
229.633 , 9.3185 , 9.30702 , 9.30026 , 9.29489 , 9.28584
222.123 , 9.30937 , 9.30075 , 9.29527 , 9.28868 , 9.27681
214.733 , 9.3017 , 9.29542 , 9.29005 , 9.2812 , 9.26633
207.331 , 9.29528 , 9.29048 , 9.28384 , 9.27188 , 9.25508
199.983 , 9.28991 , 9.28517 , 9.27598 , 9.26072 , 9.24492
192.567 , 9.28486 , 9.27849 , 9.26571 , 9.2488 , 9.23728
185.553 , 9.27948 , 9.27007 , 9.25404 , 9.23926 , 9.23247
178.698 , 9.27254 , 9.25932 , 9.24273 , 9.23276 , 9.22927
172.526 , 9.26404 , 9.2482 , 9.23472 , 9.22508 , 9.22712
166.437 , 9.25335 , 9.23813 , 9.22946 , 9.22644 , 9.22539
159.222 , 9.23984 , 9.22981 , 9.22572 , 9.22429 , 9.22368
152.009 , 9.22972 , 9.22526 , 9.22344 , 9.22266 , 9.22224
144.845 , 9.22429 , 9.22283 , 8.86604 , 9.22137 , 9.22106
137.54 , 9.22165 , 9.22136 , 9.22075 , 9.22037 , 9.22012
132.679 , 9.22067 , 9.22068 , 9.22018 , 9.21985 , 9.21963
127.95 , 9.22002 , 9.22019 , 9.21977 , 9.21948 , 9.21926
120.886 , 9.21947 , 9.21975 , 9.21939 , 9.21912 , 9.21895
113.742 , 9.21927 , 9.21963 , 9.2193 , 9.21906 , 9.21891
106.707 , 9.21943 , 9.21983 , 9.21953 , 9.21929 , 9.21915
99.65 , 9.22036 , 9.22034 , 9.22006 , 9.21984 , 9.21969
92.73 , 9.22077 , 9.22119 , 9.22091 , 9.2207 , 9.22056
85.83 , 9.22194 , 9.22237 , 9.22209 , 9.22189 , 9.22176
78.92 , 9.22346 , 9.22389 , 9.22363 , 9.22342 , 9.22329
71.97 , 9.22533 , 9.22576 , 9.2255 , 9.2253 , 9.22519
64.89 , 9.22757 , 9.22802 , 9.22775 , 9.22755 , 9.22745
57.64 , 9.23019 , 9.23063 , 9.23037 , 9.23017 , 9.23006
49.91 , 9.23325 , 9.2337 , 9.23344 , 9.23326 , 9.23315
41.19 , 9.23691 , 9.23736 , 9.2371 , 9.23691 , 9.2368
33.95 , 9.23988 , 9.24033 , 9.24006 , 9.23987 , 9.23977
26.85 , 9.24242 , 9.24286 , 9.24259 , 9.2424 , 9.24229
21.56 , 9.24374 , 9.24418 , 9.24391 , 9.24371 , 9.2436
17.31 , 9.24451 , 9.24493 , 9.24467 , 9.24446 , 9.24435
13.65 , 9.24482 , 9.24524 , 9.24497 , 9.24478 , 9.24466
8.885 , 9.24466 , 9.24508 , 9.24481 , 9.24373 , 9.24449
5.52 , 9.24412 , 9.24454 , 9.24428 , 9.24407 , 9.24397

KG6

290.583 , 8327.59 , 5690.81 , 3766.11 , 2402.68 , 1501.69
282.56 , 7292.38 , 4979.79 , 3257.18 , 2056.18 , 1294.91
274.775 , 6434.56 , 4344.02 , 2802.72 , 1751.2 , 1138.17
267.134 , 5662.38 , 3762.74 , 2392.39 , 1486.01 , 1040.96
259.619 , 4949.03 , 3233.36 , 2028.78 , 1271. , 1011.91
252.03 , 4257.34 , 2733.4 , 1695.45 , 1107.91 , 1059.65
244.501 , 36070.8 , 2280.17 , 1408.86 , 1020.1 , 1185.05
237.06 , 3023.61 , 1879.7 , 1188.01 , 1027.47 , 1370.83
229.633 , 2488.52 , 1532.01 , 1051.96 , 1130.88 , 1594.58
222.123 , 2007.1 , 1252.68 , 1024.96 , 1325.15 , 1812.29
214.733 , 1600.09 , 1078.9 , 1121.69 , 1571.33 , 1930.77
207.331 , 1282.22 , 1039.24 , 1329.19 , 1813.2 , 1842.17
199.983 , 1090.7 , 1150.14 , 1605.05 , 1929.57 , 1517.16
192.567 , 1067.96 , 1396.88 , 1859.26 , 1776.84 , 1074.79
185.553 , 1219.98 , 1692.05 , 1914.41 , 1386.99 , 701.441
178.698 , 1498.32 , 1910.16 , 1665.79 , 944.345 , 438.524
172.526 , 1779.99 , 1874.63 , 1256.15 , 615.014 , 285.161
166.437 , 1933.52 , 1561.32 , 843.908 , 387.782 , 188.741
159.222 , 1730.66 , 1024.05 , 480.216 , 224.644 , 123.42
152.009 , 1188.52 , 577.616 , 266.23 , 135.918 , 87.4338
144.845 , 671.444 , 310.291 , 154.346 , 90.4532 , 67.837
137.54 , 347.4 , 172.775 , 96.9883 , 65.7592 , 56.0081
132.679 , 228.444 , 124.067 , 77.4947 , 57.3699 , 52.7223
127.95 , 159.658 , 96.106 , 64.9095 , 50.702 , 49.4305
120.886 , 106.443 , 71.8905 , 54.2444 , 45.8865 , 46.2151
113.742 , 82.6532 , 61.5179 , 48.77 , 41.9356 , 44.7248
106.707 , 71.8063 , 55.445 , 45.874 , 39.7035 , 42.3645
99.65 , 66.9993 , 52.8207 , 43.8349 , 37.4662 , 40.0008
92.73 , 64.7384 , 51.0282 , 41.7732 , 36.9451 , 39.3538
85.83 , 63.3087 , 50.0779 , 41.4271 , 36.414 , 37.8377
78.92 , 62.7046 , 49.9662 , 41.0632 , 35.8716 , 37.1772
71.97 , 62.9141 , 48.9545 , 40.6762 , 35.3143 , 37.3702
64.89 , 62.6396 , 49.6391 , 39.4011 , 34.7422 , 37.5541
57.64 , 63.1748 , 49.4211 , 38.9663 , 34.1542 , 36.0023
49.91 , 63.2526 , 49.1866 , 39.3862 , 33.5591 , 36.1717
41.19 , 63.3304 , 48.9521 , 38.9406 , 33.8293 , 36.3411
33.95 , 63.9995 , 49.3995 , 39.2382 , 34.021 , 36.4613
26.85 , 64.5318 , 49.7556 , 40.3406 , 35.0388 , 36.5568
21.56 , 65.6814 , 50.8108 , 40.4669 , 35.1202 , 37.4707
17.31 , 65.8372 , 50.915 , 41.4016 , 35.1649 , 37.4986
13.65 , 65.9272 , 50.9753 , 41.4417 , 36.056 , 37.5149
8.885 , 65.9856 , 51.0143 , 41.4676 , 35.2074 , 37.5253
5.52 , 65.1399 , 50.1623 , 40.6111 , 35.213 , 36.666

KC6

290.583 , 5232380 , 11307200 , 23653167 , 47739300 , 94353966
282.56 , 4581940 , 9894430 , 20465500 , 40854603 , 81361595
274.775 , 4042950 , 8631210 , 17610009 , 34794900 , 71513330
267.134 , 3557780 , 7476250 , 15031800 , 29525800 , 65405446
259.619 , 3109570 , 6424420 , 12747200 , 25253700 , 63580200
252.03 , 2674970 , 5431040 , 10652800 , 22013300 , 66579800
244.501 , 22663952 , 4530510 , 8852130 , 20268500 , 74458888
237.06 , 1899790 , 3734810 , 7464490 , 20415000 , 86131789
229.633 , 1563580 , 3043980 , 6609660 , 22469700 , 100190416
222.123 , 1261100 , 2488970 , 6440010 , 26329639 , 113869539
214.733 , 1005370 , 2143690 , 7047790 , 31221033 , 121313857
207.331 , 805643 , 2064880 , 8351550 , 36026800 , 115746955
199.983 , 685307 , 2285230 , 10084800 , 38338967 , 95325974
192.567 , 671019 , 2775490 , 11682100 , 35304300 , 67531047
185.553 , 766536 , 3361964 , 12028600 , 27558349 , 44072838
178.698 , 941422 , 3795330 , 10466500 , 18763400 , 27553300
172.526 , 1118400 , 3724740 , 7892620 , 12219800 , 17917194
166.437 , 1214870 , 3102210 , 5302430 , 7704909 , 11858900
159.222 , 1087410 , 2034700 , 3017290 , 4463490 , 7754710
152.009 , 746769 , 1147680 , 1672770 , 2700580 , 5493630
144.845 , 421881 , 616523 , 969785 , 1797230 , 4262320
137.54 , 218278 , 343290 , 609395 , 1306580 , 3519090
132.679 , 143536 , 246511 , 486914 , 1139890 , 3312640
127.95 , 100316 , 190955 , 407838 , 1007410 , 3105810
120.886 , 66880.1 , 142841 , 340828 , 911727 , 2903780
113.742 , 51932.5 , 122231 , 306431 , 833226 , 2810140
106.707 , 45117.2 , 110165 , 288235 , 788876 , 2661840
99.65 , 42096.9 , 104950 , 275423 , 744423 , 2513320
92.73 , 40676.3 , 101389 , 262469 , 734069 , 2472670
85.83 , 39778 , 99500.7 , 260294 , 723516 , 2377410
78.92 , 39398.5 , 99278.7 , 258008 , 712739 , 2335910
71.97 , 39530.1 , 97268.6 , 255576 , 701666 , 2348040
64.89 , 39357.6 , 98628.8 , 247564 , 690299 , 2359590
57.64 , 39693.9 , 98195.7 , 244832 , 678616 , 2262090
49.91 , 39742.8 , 97729.7 , 247471 , 666792 , 2272730
41.19 , 39791.7 , 97263.8 , 244671 , 672160 , 2283380
33.95 , 40212.1 , 98152.7 , 246541 , 675969 , 2290930
26.85 , 40546.5 , 98860.3 , 253467 , 696192 , 2296930
21.56 , 41268.8 , 100957 , 254261 , 697809 , 2354350
17.31 , 41366.7 , 101164 , 260134 , 698698 , 2356110
13.65 , 41423.3 , 101284 , 260386 , 716403 , 2357130
8.885 , 41460 , 101361 , 260549 , 699542 , 2357780
5.52 , 40928.6 , 99668.4 , 255167 , 699653 , 2303790

APPENDIX IV

The computer program SCOREDP is listed. This program finds 1 atmosphere values of ε' and ε'' for various temperatures.

SCOREDP

```
5' CONVERTS 1 ATM C AND G TO DIELECTRIC CONSTANTS
6'
7' FILE #1 IS THE AT TEMPERATURE C AND G
8' FILE #2 IS THE FILE TO BE READ INTO
9' FILE #3 IS THE 300K DIELECTRIC CONSTANTS
10' FILE #4 IS THE 300K C AND G DATA
14'
15' FILE #1 HAS THE FORM FROM THE INTERFACE MINUS THE
16'"LINE NUMBERS".  IT ALSO HAS T AND P AS THE FIRST TWO LINES.
17' FILE #4 ALSO HAS THE FORM OF THE INTERFACE MINUS THE
18' LINE NUMBERS.  IT DOES NOT CONTAIN T AND P.
19' FILE #3 DOES NOT HAVE THE FORM OF THE INTERFACE OR T AND P.
20' IT IS IN THE FORM G,C,G,C,...
100 FILE #1:"PR40"
110 FILE #2:"*"
120 FILE #3:"300KDPR2"
140 FILE #4:"300KCPR2"
141 INPUT #1:E,
143 PRINT #2:E
145 INPUT #1:Z,
147 PRINT #2:Z
150 FOR Q=1 TO 4
250 DIM A(500)
300 FOR T = 0 TO 400 STEP 10
400 READ A(T)
500 NEXT T
850 LET S = 0
1000 IF E>300 THEN 2800
1100 LET D = 10 + (10*INT(E/10))
1700 FOR T= D TO 290 STEP 10
1800 LET B = ((A(T)+A(T+10))/2)*(10^(-5))
1900 LET S = S+B
2000 NEXT T
2100 LET A = A(D)-(((D-E)/10)*(A(D)-A(D-10)))
2300 LET B = ((A+A(D))/2)*(D-E)*(10^(-6))
2400 LET S = S+B
2401 FOR J=1 TO 13
2402 INPUT #1:H,
2403 INPUT #4:G,
2404 IF J = 3 THEN 2600
2405 IF J = 8 THEN 2600
2406 IF J = 11 THEN 2600
2430 INPUT #3:F,
2450 LET K = F*((H/G)+S)
2550 PRINT #2:K
2600 NEXT J
2700 GO TO 3850
2800 LET D = 10*INT(E/10)
3000 FOR T = 300 TO (D-10) STEP 10
3100 LET B = ((A(T)+A(T+10))/2)*(10^(-5))
```

SCOREDP (continued)

```
3200 LET S = S+B
3300 NEXT T
3400 LET A = A(D)+(((E-D)/10)*(A(D+10)-A(D)))
3500 LET B = ((A+A(D))/2)*(E-D)*(10^(-6))
3600 LET S = S+B
3601 FOR J=1 TO 13
3602 INPUT #1:H,
3603 INPUT #4:G,
3604 IF J = 3 THEN 3800
3605 IF J = 8 THEN 3800
3606 IF J = 11 THEN 3800
3630 INPUT #3:F,
3650 LET K = F*((H/G)-S)
3750 PRINT #2:K
3800 NEXT J
3850 NEXT Q
3860 RESET #2
3861 FILE #5:"1PD40"
3862 INPUT #2:T,P
3863 PRINT #5:T
3864 PRINT #5:P
3865 FOR I=1 TO 4
3866 INPUT #2:A,B,C,D,E,F,G,H,J,K
3867 PRINT #5:A;",";B;",";"1000";",";C;",";D
3868 PRINT #5:E;",";F;",";"2000";",";G;",";H;",";"3000";",";J;",";K
3869 NEXT I
3910 DATA 0,-.22,-.99,-1.54,-1.57,-1.39,-.9,-.49,-.07,.3,.64,
3911 DATA .95,1.26,1.52,1.75,1.94,2.11,2.26,2.40,2.51,2.61
3912 DATA 2.71,2.79,2.89,2.97,3.05,3.12,3.2,3.28,3.36,3.44
3913 DATA 3.52,3.59,3.63,3.64,3.67,3.69,3.7,3.705,3.711,3.715
3920 DATA 0,.93,4.36,8.58,11.2,13.29,15.03,16.81,18.4,19.41,20.09
3921 DATA 20.63,21.08,21.46,21.81,22.08,22.34,22.55,22.78,22.92,23.07
3922 DATA 23.25,23.42,23.59,23.71,23.82,23.94,24.05,24.17,24.28,24.4
3923 DATA 24.5,24.6,24.7,24.9,25,25.1,25.2,25.4,25.5,25.6
3930 DATA  0,.82,3.83,7.53,9.84,11.67,13.2,14.76,16.16,17.05,17.65
3931 DATA 18.12,18.52,18.85,19.16,19.40,19.64,19.82,20.07,20.2,20.33
3932 DATA 20.49,20.64,20.79,20.89,20.99,21.09,21.2,21.3,21.4,21.5
3933 DATA 21.6,21.7,21.8,21.9,22,22.1,22.2,22.3,22.4,22.5
3940 DATA 0,0,.05,.3,.8,1.6,2.6,3.7,5.1,6.4,7.6,8.7,9.9
3941 DATA 10.9,11.7,12.5,13.3,13.85,14.5,15.1,15.6,16.1,16.5
3942 DATA 16.9,17.3,17.6,17.9,18.2,18.5,18.75,18.95,19.15,19.3
3943 DATA 19.45,19.6,19.65,19.75,19.85,19.9,19.95,20
4000 END
```

APPENDIX V

The effective isothermal compressibility, χ_T, along with its pressure and temperature derivatives where they exist, are tabulated for the materials studied.

For CdS and CdSe these values are determined from the literature as follows:

$CdS_{//}$ and $CdSe_{//}$

$$\chi_T = 2\chi_{\perp} - \chi_{//}$$

$CdS_{\perp}$ and $CdSe_{\perp}$

$$\chi_T = \chi_{//}$$

where $\chi_{\perp}$ and $\chi_{//}$ are the isothermal compressibilities perpendicular and parallel to the c-axis respectively.

Material	Ref	χ_T	$\left(\frac{\partial \chi_T}{\partial p}\right)_T$	$\left(\frac{\partial \chi_T}{\partial T}\right)_p$
		$(10^{-11}/Pa)$	$(10^{-20}/Pa^2)$	$(10^{-13}/Pa\text{-}K^o)$
$CdSe_{\perp}$	a,b	1.61		
$CdSe_{//}$	a,b	1.68		
$CdS_{\perp}$	a,b	2.055		
$CdS_{//}$	a,b	1.78		
As_2S_3	c,d	7.32	-4.17	1.69
As_2Se_3	e,f,g	7.04	-4.02	.258
ZnSe	a,b,h	1.68		

a. R. Montalvo and D. Langer, J. of Appl. Phys. 41, 4101 (1970).

b. C. Cline and D. Stephens, J. of Appl. Phys. 36, 2869 (1965).

c. Servofrax Corporation pamphlet

d. W. Glaze, D. Blackburn, et. al., J of Research of the NBS, 52, 83 (1957).

e. A. Hilton, Appl. Optics, 5, 1877 (1965).

f. N. Soga, M. Kunugi, and R. Ota, J. Phys. Chem. Solids, 34, 2143 (1973).

g. B. Joiner and J. Thompson, J. Non-Cryst. Solids, 13, 179 (1973).

APPENDIX VI

The computer program PRESSRED, which was used to reduce the pressure data is listed. Given 1 atmosphere values of ε' and ε'', the program takes measured values of C and $\frac{G}{\omega}$ at various pressures and temperatures and applies the correction factor χ_T. The program then gives corrected values of ε' and ε''. The printouts following the listing of PRESSRED, are the corrected ε' and ε'' for each pressure, at a given temperature. The temperature (°K) and pressure (Pa), are the first two lines of each data file. The data files for each sample are included in the following order: $CdSe_{\perp}$, As_2S_3 (pure), ZnSe, $CdSe_{//}$, As_2S_3 (impure), As_2Se_3, $CdS_{//}$, and $CdS_{\perp}$.

PRESSRED

```
100 FILE #1:"PR40"
110 FILE #2:"*"
120 FILE #3:"1PD40"
130 FILE #4:"PR40"
140 INPUT #1:T
150 INPUT #1:P
160 PRINT #2:T
170 PRINT #2:P
180 INPUT #3:T3,P3
190 INPUT #4:T4,P4
200 IF T3<>T THEN 4000
210 IF T4<>T THEN 4000
220 IF P3<>100000 THEN 4000
230 IF P4<>1E5 THEN 4000
300 FOR C=1 TO 4
310 READ X,X0
320 LET X=X/3*1E-11
330 LET X0=X0/3*1E-22
335 FOR I=1 TO 13
340 INPUT #1:H,
350 INPUT #3:G,
360 INPUT #4:F,
370 IF I=3 THEN 520
380 IF I=8 THEN 520
390 IF I=11 THEN 520
500 LET K=G*((H/F)+X*P+X0*P^2)
510 PRINT #2:K
520 NEXT I
530 NEXT C
1000 DATA 1.78,0
1001 DATA 7.32,-4.17
1002 DATA 7.04,-4.02
1003 DATA 1.225,-7.48
2000 RESET #2
2100 FILE #5:"PR2T4"
2200 INPUT #2:T,P
2300 PRINT #5:T
2350 PRINT #5:P
2400 FOR I=1 TO 4
2500 INPUT #2:A,B,C,D,E,F,G,H,J,K
2600 PRINT #5:A;",";B;",";C;",";D
2700 PRINT #5:E;",";F;",";G;",";H;",";J;",";K
2800 NEXT I
2900 GO TO 5000
4000 PRINT "TROUBLE"
5000 END
```

PR1T1

```
 300.019
 100000
 1430.08 , 10.392 , 590.394 , 10.3903
 302.162 , 10.3901 , 206.087 , 10.3829 , 102.929 , 10.3836
 141 , 7.91154 , 142 , 7.91054
 144 , 7.90953 , 144 , 7.90852 , 126 , 7.90753
 14145.6 , 9.28532 , 39417.9 , 9.14768
 13286.6 , 9.12005 , 4728.45 , 9.1103 , 1845.12 , 9.1048
 10.9 , 6.79867 , 13.8 , 6.79862
 14.6 , 6.79853 , 11.8 , 6.79848 , 9.06 , 6.79846
 300.019
 97216040
 1293.84 , 10.3773 , 512.068 , 10.3759
 243.227 , 10.3763 , 145.97 , 10.3698 , 148.117 , 10.3709
 144.816 , 8.01439 , 140.605 , 8.01339
 143.441 , 8.01238 , 141.554 , 8.01138 , 124.473 , 8.01044
 14541.2 , 9.26917 , 39641.4 , 9.12986
 13364.3 , 9.10203 , 4747.13 , 9.09226 , 1848.37 , 9.08679
 54.5043 , 6.77655 , 16.5654 , 6.77652
 11.6858 , 6.77644 ,-11.7953 , 6.7764 , 11.3286 , 6.77634
 300.019
 1.44193 E+8
 1220.31 , 10.3709 , 468.962 , 10.3698
 221.452 , 10.3705 , 148.656 , 10.364 , 154.495 , 10.3654
 144.107 , 8.06354 , 141.633 , 8.06249
 143.606 , 8.06148 , 141.719 , 8.06049 , 122.791 , 8.05954
 81616.8 , 9.26512 , 40198.4 , 9.12212
 13532.1 , 9.09376 , 4800.13 , 9.08394 , 1863.48 , 9.0785
 54.5064 , 6.76633 , 16.5681 , 6.76624
 11.6885 , 6.76616 ,-11.7931 , 6.76612 , 12.0853 , 6.76607
 300.019
 1.98431 E+8
 1123.56 , 10.3638 , 433.758 , 10.3629
 214.273 , 10.3637 , 170.564 , 10.3572 , 190.488 , 10.3587
 143.423 , 8.1197 , 140.089 , 8.11867
 142.896 , 8.11769 , 140.051 , 8.1167 , 122.044 , 8.11577
 15217.7 , 9.25386 , 40020.2 , 9.11201
 13477.4 , 9.08372 , 4778.56 , 9.07395 , 1857.29 , 9.06854
 54.5087 , 6.75402 , 13.8111 , 6.75402
 11.6917 , 6.75388 , 9.44522 E-3 , 6.75383 , 11.3323 , 6.75378
 300.019
 2.99718 E+8
 1008.15 , 10.3507 , 442.04 , 10.3499
 332.756 , 10.3502 , 444.907 , 10.3425 , 591.701 , 10.3413
 143.77 , 8.22357 , 143.037 , 8.22257
 142.351 , 8.22156 , 139.477 , 8.22058 , 119.616 , 8.21964
 15696.1 , 9.23833 , 40292.1 , 9.09425
 13567.1 , 9.06574 , 4800.8 , 9.05596 , 1865.08 , 9.05059
 54.5131 , 6.73171 , 13.8166 , 6.73167
 11.6975 , 6.73159 , 1.41771 E-2 , 6.73155 , 11.3359 , 6.7315
```

```
280.05
100000
332.777 , 10.3411 , 204.752 , 10.3402
162.059 , 10.3408 , 126.65 , 10.3337 , 112.109 , 10.3347
138.457 , 7.90304 , 129.947 , 7.90214
129.67 , 7.90123 , 125.489 , 7.90033 , 106.887 , 7.89946
12119.4 , 9.08987 , 6328.13 , 9.08645
2543.15 , 9.07885 , 1150.92 , 9.07398 , 582.717 , 9.07094
54.5041 , 6.76593 , 16.5652 , 6.76554
11.6855 , 6.76544 , 4.41113 E-3 , 6.7654 , 9.81839 , 6.76534
280.05
46684800
332.883 , 10.3334 , 181.192 , 10.3331
121.596 , 10.3339 , 102.234 , 10.3276 , 141.053 , 10.3288
174.31 , 7.95244 , 130.088 , 7.95081
128.01 , 7.94999 , 124.696 , 7.9491 , 106.09 , 7.94826
12147.4 , 9.08201 , 6340.49 , 9.07794
2549.69 , 9.07028 , 1151.22 , 9.06544 , 581.744 , 9.06241
54.5144 , 6.75462 , 13.8075 , 6.75508
11.6877 , 6.75507 , 8.33003 E-7 , 6.75503 , 9.82024 , 6.75496
280.05
95089331
332.994 , 10.3267 , 157.635 , 10.3264
105.444 , 10.3275 , 113.631 , 10.3212 , 158.013 , 10.3226
174.466 , 8.00191 , 130.234 , 8.00108
127.255 , 8.00018 , 122.978 , 7.9993 , 102.556 , 7.99846
12233.3 , 9.073 , 6379.08 , 9.06913
2550.38 , 9.06143 , 1151.53 , 9.05669 , 585.277 , 9.05365
54.525 , 6.41314 , 13.8107 , 6.74437
11.69 , 6.74435 , 1.69163 E-6 , 6.74432 , 9.82216 , 6.74426
280.05
114907332
219.063 , 10.3234 , 134.037 , 10.3238
113.569 , 10.3249 , 142.472 , 10.3185 , 207.384 , 10.3199
132.731 , 8.0221 , 125.963 , 8.02154
128.215 , 8.02068 , 123.965 , 8.0198 , 105.345 , 8.01899
12209.8 , 9.06837 , 6396.43 , 9.06559
2553.01 , 9.05791 , 1151.66 , 9.05313 , 585.342 , 9.05011
981.099 , 6.73979 , 5.5294 , 6.74
11.6909 , 6.74 , 4.41317 E-3 , 6.73996 , 9.82293 , 6.7399
280.05
1.81946 E+8
286.603 , 10.3125 , 229.42 , 10.3124
299.201 , 10.3124 , 470.946 , 10.3042 , 568.441 , 10.3022
167.779 , 8.09106 , 126.165 , 8.09019
126.616 , 8.08933 , 122.301 , 8.08845 , 103.685 , 8.08765
12330 , 9.05632 , 6417.84 , 9.05335
2552.79 , 9.04589 , 1152.09 , 9.04114 , 585.561 , 9.03813
10.9406 , 6.72536 , 11.0556 , 6.72545
11.694 , 6.72536 , 4.41435 E-3 , 6.72532 , 9.0703 , 6.72527
280.05
3.05487 E+8
835.135 , 10.2729 , 724.936 , 10.2687
843.046 , 10.2646 , 1092.08 , 10.2522 , 1128.38 , 10.2455
175.142 , 8.21661 , 138.666 , 8.21532
126.088 , 8.2144 , 120.802 , 8.21354 , 100.337 , 8.21275
12586.2 , 9.03515 , 6481.7 , 9.03166
2576.87 , 9.02413 , 1152.89 , 9.01942 , 585.964 , 9.01644
54.5704 , 6.69911 , 13.8245 , 6.69879
11.6997 , 6.6987 , 5.36389 E-6 , 6.69866 , 9.07507 , 6.6986
READY
```

PR1T3

260.395
100000
84.3629 , 10.292 , 83.6022 , 10.2922
85.951 , 10.2933 , 92.6206 , 10.2869 , 128.337 , 10.288
158.542 , 7.89577 , 115.294 , 7.89458
113.538 , 7.89378 , 108.835 , 7.893 , 89.5991 , 7.89227
2087.36 , 9.04421 , 1354.71 , 9.04869
755.181 , 9.04429 , 461.5 , 9.0416 , 296.27 , 9.03975
54.508 , 6.73257 , 16.5701 , 6.7338
14.6107 , 6.73374 , 23.6086 , 6.7337 , 2.27163 , 6.73364
260.395
96676484
334.166 , 10.2719 , 299.761 , 10.2715
407.918 , 10.2705 , 581.124 , 10.2611 , 603.692 , 10.2583
200.695 , 7.9939 , 112.94 , 7.99382
111.979 , 7.99299 , 105.347 , 7.99223 , 86.1337 , 7.99154
1833 , 9.02585 , 1379.42 , 9.03102
755.59 , 9.0269 , 461.75 , 9.0242 , 298.683 , 9.02232
54.5291 , 6.71393 , 13.8148 , 6.7128
14.6164 , 6.71269 , 35.422 , 6.71265 , 1.5153 , 6.71259
260.395
1.47589 E+8
476.192 , 10.2544 , 556.906 , 10.2517
647.962 , 10.2488 , 816.203 , 10.2377 , 811.05 , 10.2332
296.696 , 8.04632 , 104.402 , 8.0451
111.206 , 8.04437 , 104.54 , 8.04363 , 86.2347 , 8.04296
1922.1 , 9.01821 , 1355.83 , 9.02213
746.365 , 9.0179 , 461.881 , 9.01522 , 299.894 , 9.01334
54.5401 , 6.70164 , 13.8182 , 6.70193
14.6193 , 6.7018 , 35.4268 , 6.70175 , 1.33879 E-3 , 6.70169
260.395
2.00201 E+8
584.808 , 10.2367 , 654.735 , 10.233
851.518 , 10.2288 , 1166.62 , 10.2158 , 1209.51 , 10.2082
96.5248 , 8.10079 , 95.8669 , 8.09835
109.536 , 8.09771 , 103.736 , 8.09697 , 84.5104 , 8.09631
2149.82 , 9.01043 , 1344.24 , 9.01247
744.228 , 9.0084 , 456.249 , 9.0058 , 299.982 , 9.00392
65.453 , 6.69238 , 16.5833 , 6.69048
17.5445 , 6.69041 , 35.4317 , 6.69037 , 1.81007 E-3 , 6.69031
260.395
3.0203 E+8
835.45 , 10.1882 , 986.047 , 10.1823
1289.44 , 10.1758 , 1887.55 , 10.159 , 2040.26 , 10.1438
221.45 , 8.19762 , 113.464 , 8.19615
108.89 , 8.19537 , 102.121 , 8.19465 , 82.8834 , 8.194
1806.17 , 8.99286 , 1321.04 , 8.99582
756.458 , 8.99193 , 456.512 , 8.98941 , 304.657 , 8.98751
54.5731 , 6.6718 , 13.8282 , 6.67016
14.6282 , 6.67012 , 47.2454 , 6.67008 ,-0.754497 , 6.67

PRINT4

319.022
100000
10916.6 , 10.4419 , 3534.41 ; 10.4387
1279.08 , 10.438 , 555.359 , 10.4303 , 226.29 , 10.4302
118.305 , 7.91505 , 86.5194 , 7.91421
53.033 , 7.91371 , 32.4491 , 7.91366 , 54.724 , 7.91347
16485.7 , 10.3287 , 23749.4 , 10.3393
61419 , 9.20424 , 20127.7 , 9.15207 , 6783.17 , 9.14043
10.896 , 6.83137 , 19.315 , 6.83129
5.83469 , 6.83122 ,-59.0043 , 6.83121 , 12.8317 , 6.83125
319.022
96490226
10483.2 , 10.4278 , 3355.7 , 10.4245
1195.68 , 10.4239 , 448.322 , 10.4173 , 207.406 , 10.4182
116.856 , 8.01883 , 104.036 , 8.01791
90.0165 , 8.01728 , 55.7066 , 8.01681 , 53.0342 , 8.0167
16494.6 , 10.3343 , 23762.2 , 10.3449
62661.1 , 9.18919 , 20598.6 , 9.13475 , 6929.63 , 9.12234
54.4843 , 6.80911 , 13.804 , 6.80911
11.6717 , 6.80899 ,-47.2267 , 6.80896 , 13.5916 , 6.809
319.022
1.46172 E+8
10802.8 , 10.4196 , 3395.47 , 10.417
1159.66 , 10.4171 , 418.822 , 10.4109 , 182.105 , 10.4124
112.656 , 8.07082 , 113.662 , 8.0699
85.5892 , 8.06908 , 27.9341 , 8.06871 ,-3.44471 , 8.06899
16499.2 , 10.3372 , 23768.8 , 10.3478
61762.7 , 9.17957 , 20305.2 , 9.12605 , 6871.92 , 9.11387
76.2785 , 6.7977 , 16.5672 , 6.79772
2.92082 , 6.79767 ,-94.442 , 6.79766 , 19.6326 , 6.79776
319.022
1.98746 E+8
10075.1 , 10.4133 , 3158.23 , 10.4112
1105.85 , 10.4113 , 437.359 , 10.4048 , 204.745 , 10.4062
122.383 , 8.12661 , 107.721 , 8.12583
94.6487 , 8.12504 , 53.9367 , 8.12453 , 41.3196 , 8.1245
16504 , 10.3402 , 23775.8 , 10.3508
63517.8 , 9.17192 , 20863.2 , 9.11634 , 7026.83 , 9.10388
32.6968 , 6.78599 , 8.29343 , 6.78586
8.75674 , 6.78577 ,-47.251 , 6.78574 , 15.1065 , 6.78577
319.022
3.01975 E+8
9716.99 , 10.4001 , 3022.19 , 10.3986
1063.82 , 10.3992 , 447.357 , 10.3927 , 250.022 , 10.3945
134.871 , 8.23395 , 121.791 , 8.23302
104.675 , 8.23217 , 63.2929 , 8.23149 , 28.6942 , 8.23147
16513.6 , 10.3462 , 23789.6 , 10.3567
64245.8 , 9.1547 , 21104.9 , 9.09807 , 7101.59 , 9.08547
43.5973 , 6.76279 , 11.0607 , 6.76279
5.84179 , 6.76269 ,-70.877 , 6.76266 , 17.3762 , 6.76268

PR2T1

299.847
100000
4107 , 9.45456 , 1505 , 9.45162
663 , 9.45001 , 382 , 9.4481 , 303 , 9.44705
168.888 , 7.46076 , 175.888 , 7.4594
181.488 , 7.45807 , 177.888 , 7.45669 , 158.888 , 7.45539
9895.62 , 9.46645 , 6635.49 , 9.4151
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10.9 , 6.79838 , 13.8 , 6.79833
14.6 , 6.79824 , 11.8 , 6.79819 , 9.06003 , 6.79816
299.847
98407747
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663.387 , 9.45552 , 382.223 , 9.45361 , 303.177 , 9.45256
174.923 , 7.56254 , 176.31 , 7.56122
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4821.15 , 9.54469 , 3104.89 , 9.5189 , 1947.22 , 9.50291
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1.47102 E+8
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663.579 , 9.45825 , 382.333 , 9.45634 , 303.264 , 9.45529
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181.012 , 7.60962 , 174.022 , 7.60826 , 151.57 , 7.60699
11683 , 9.72329 , 833.325 , 9.66585
5015 , 9.6251 , 3234.61 , 9.59852 , 2034.86 , 9.58182
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11.6887 , 6.76511 , 11.807 , 6.76506 , 11.5363 , 6.765
299.847
1.96726 E+8
13347800 , 87.9213 , 1790950 , 87.8723
344761 , 87.8412 , 118420 , 87.8086 , 73932.4 , 87.7854
180.957 , 7.66258 , 181.241 , 7.66127
181.231 , 7.65991 , 173.112 , 7.65855 , 150.635 , 7.65729
12402.5 , 9.80935 , 1212.49 , 9.74979
5238.59 , 9.70762 , 310.213 , 9.67993 , 2113.97 , 9.66257
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14.6116 , 6.75405 , 9.36505 E-3 , 6.75399 , 11.5381 , 6.75394
299.847
3.07459 E+8
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203.93 , 7.7735 , 185.098 , 7.77204
182.847 , 7.77067 , 174.717 , 7.7693 , 152.19 , 7.76803
14518.5 , 9.99886 , 8928.85 , 9.93453
5780.92 , 9.88926 , 3684.15 , 9.85905 , 2310.35 , 9.84006
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PR2T2

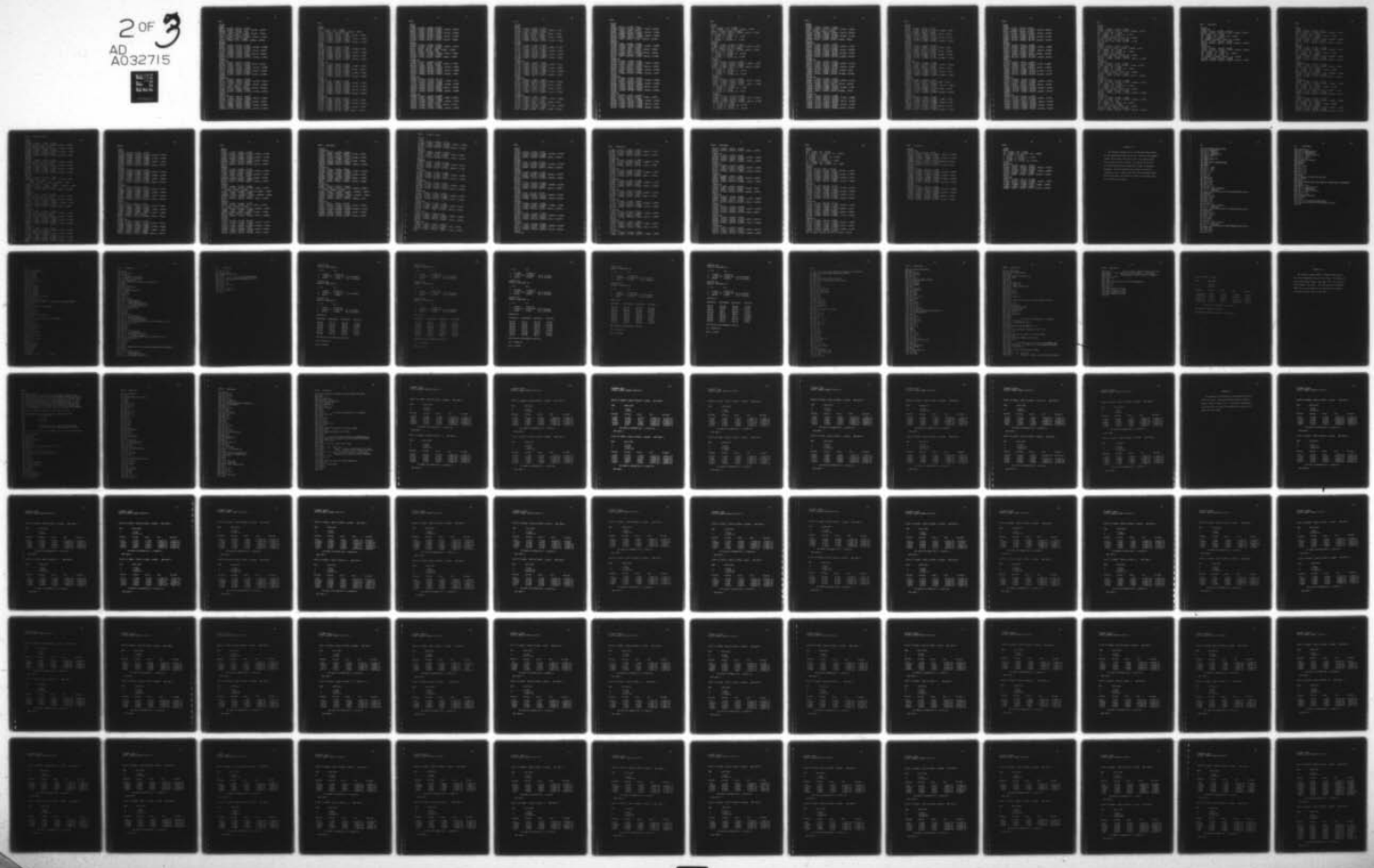
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194.93 , 7.46443 , 195.819 , 7.46295 , 182.477 , 7.46144
18303.6 , 9.52903 , 10296.6 , 9.4612
6377.22 , 9.4141 , 4047.88 , 9.38179 , 2546.68 , 9.36095
13.076 , 6.83138 , 19.315 , 6.83126
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318.987
98354622
32702.3 , 9.48066 , 10501.4 , 9.47623
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187.531 , 7.5679 , 189.557 , 7.56645 , 176.175 , 7.56503
23006.3 , 9.7088 , 12135.1 , 9.63514
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188.891 , 7.6166 , 188.666 , 7.61519 , 174.141 , 7.61377
25740.2 , 9.79199 , 13134 , 9.71594
7640.01 , 9.66369 , 4688.05 , 9.62756 , 2918.25 , 9.60419
13.0837 , 6.79793 , 16.5671 , 6.79787
14.606 , 6.79777 , 11.8027 , 6.79772 , 9.8862 , 6.79769
318.987
1.9993 E+8
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184.654 , 7.67273 , 186.686 , 7.67133 , 172.141 , 7.66991
30027.8 , 9.89076 , 14691.7 , 9.81118
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2778.16 , 9.44027 , 1030.47 , 9.43745 , 466.439 , 9.43612
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185.158 , 7.77588 , 187.192 , 7.77448 , 173.739 , 7.77308
40757.2 , 10.0701 , 18455.2 , 9.98464
9694.99 , 9.92713 , 5629.64 , 9.88684 , 3389.73 , 9.86046
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14.6169 , 6.76275 , 11.81 , 6.7627 , 11.5391 , 6.76264

PR2T3

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163.54 , 7.45273 , 157.709 , 7.45148 , 137.555 , 7.45034
7817.93 , 9.41585 , 4745.62 , 9.37778
3092.36 , 9.35209 , 1943.41 , 9.33635 , 1235.1 , 9.32701
6.54411 , 6.76531 , 16.5652 , 6.76525
11.6855 , 6.76517 , 11.8044 , 6.76513 , 9.88705 , 6.76507
279.888
101148401
546.99 , 9.39856 , 278.192 , 9.39641
214.595 , 9.39494 , 201.73 , 9.39267 , 200.163 , 9.39156
160.318 , 7.55826 , 159.435 , 7.55724
161.669 , 7.55602 , 155.827 , 7.55479 , 133.369 , 7.55366
8401.37 , 9.58792 , 5150.42 , 9.54668
3364.81 , 9.51869 , 2119.56 , 9.50139 , 1336.51 , 9.49111
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1.47449 E+8
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158.225 , 7.60504 , 158.478 , 7.6038
161.845 , 7.6026 , 154.87 , 7.60137 , 132.389 , 7.60026
7836.31 , 9.66571 , 5338 , 9.62298
3501.16 , 9.59393 , 2203.2 , 9.57591 , 1386.66 , 9.56511
13.0921 , 6.73281 , 19.3359 , 6.73268
11.6924 , 6.73262 , 11.8114 , 6.73259 , 9.89291 , 6.73252
279.888
1.99144 E+8
506.809 , 9.38256 , 256.272 , 9.38074
222.81 , 9.37916 , 228.056 , 9.37681 , 249.798 , 9.37547
158.403 , 7.65645 , 158.669 , 7.6554
159.785 , 7.65419 , 153.933 , 7.65297 , 131.427 , 7.65186
8145.95 , 9.75246 , 5554.88 , 9.70823
3640.43 , 9.67786 , 2302.37 , 9.65905 , 1437.82 , 9.64772
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11.6948 , 6.7213 , 11.8138 , 6.72126 , 9.07102 , 6.7212
279.888
3.01029 E+8
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158.755 , 7.75661 , 159.045 , 7.75553
160.172 , 7.75434 , 153.179 , 7.75312 , 131.752 , 7.75203
8800.34 , 9.92129 , 5988.47 , 9.87388
3935.8 , 9.84104 , 2491.29 , 9.82056 , 1558.95 , 9.80809
10.9147 , 6.69954 , 13.8242 , 669138
14.6209 , 6.69941 , 11.8185 , 6.69937 , 9.07498 , 6.69931

AD-A032 715 NAVAL ACADEMY ANNAPOLIS MD F/G 20/12
LOW FREQUENCY DIELECTRIC PROPERTIES OF WIDE BAND-GAP SEMICONDUC--ETC(U)
MAR 76 S M JENKINS
UNCLASSIFIED USNA-TSPR-77 NL

2 OF 3
AD
A032715



PR2T4

299.804
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30658.3 , 9.45408 , 1705.67 , 9.45119
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10081 , 9.47779 , 6711.48 , 9.42618
4455.35 , 9.38953 , 2867.45 , 9.36586 , 1804.42 , 9.35111
13.08 , 6.7984 , 19.3201 , 6.79824
17.5201 , 6.79807 , 11.8 , 6.79812 , 9.06003 , 6.79809
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99169769
30109.7 , 9.43759 , 1510.02 , 9.43447
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4856.03 , 9.55709 , 3121.13 , 9.5313 , 1964.41 , 9.51514
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1.47299 E+8
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177.631 , 7.61161 , 174.032 , 7.61026 , 157.222 , 7.60898
11961.8 , 9.73489 , 7680.15 , 9.67762
5061.72 , 9.63679 , 3244.05 , 9.61003 , 2034.92 , 9.59324
13.0878 , 6.76518 , 16.5716 , 6.76504
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299.804
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3093.72 , 9.41685 , 1099.96 , 9.41464 , 461.999 , 9.41367
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175.609 , 7.66502 , 172.011 , 7.66369 , 154.051 , 7.66241
12774.9 , 9.827 , 8076.77 , 9.76717
545.84 , 9.72475 , 3391.89 , 9.69693 , 2131.31 , 9.67935
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2.98924 E+8
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3039.97 , 9.40163 , 1100.62 , 9.39936 , 486.045 , 9.39815
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170.41 , 7.76384 , 170.193 , 7.76251 , 147.683 , 7.76124
14762.2 , 9.99654 , 8995.61 , 9.93222
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PR3T1

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195.001 , 7.44726 , 195.001 , 7.4458 , 184.001 , 7.44441
179.001 , 7.46149 , 186.001 , 7.46016
189.001 , 7.45876 , 186.001 , 7.45733 , 170.001 , 7.45596
177.001 , 7.44995 , 17.1826 , 7.44863
190.001 , 7.44726 , 186.001 , 7.44583 , 170.001 , 7.44446
299.82
98632491
9.0877 , 6.77606 , 9.86267 , 6.77595
12.1725 , 6.77591 , 5.90472 , 6.77587 , 12.9465 , 6.7758
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192.938 , 7.54948 , 192.093 , 7.54804 , 180.223 , 7.54668
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187.219 , 7.56096 , 183.087 , 7.55955 , 164.818 , 7.5582
183.136 , 7.55207 , 183.322 , 7.55069
188.169 , 7.54932 , 183.025 , 7.54791 , 164.705 , 7.54655
299.82
1.44124 E+8
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12.1752 , 6.76571 , 5.90688 , 6.76568 , 12.9482 , 6.76561
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192.31 , 7.59595 , 191.465 , 7.59451 , 179.583 , 7.59315
181.867 , 7.61024 , 183.293 , 7.60882
187.428 , 7.60742 , 183.293 , 7.60601 , 163.888 , 7.60467
190.184 , 7.59845 , 190.214 , 7.59712
188.379 , 7.59572 , 183.231 , 7.59432 , 164.894 , 7.59298
299.82
1.99994 E+8
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12.1784 , 6.75331 , 5.90952 , 6.75328 , 12.9502 , 6.75322
169.625 , 7.65542 , 186.228 , 7.65399
194.263 , 7.65257 , 192.575 , 7.65113 , 181.522 , 7.64979
185.467 , 7.66688 , 185.787 , 7.66542
187.686 , 7.66407 , 183.546 , 7.66265 , 164.119 , 7.66131
189.283 , 7.65499 , 189.092 , 7.65365
188.638 , 7.65227 , 183.484 , 7.65086 , 163.984 , 7.64952
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3.05484 E+8
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196.452 , 7.75796 , 193.919 , 7.75649 , 181.994 , 7.75514
191.52 , 7.77241 , 191.867 , 7.77089
190.407 , 7.76948 , 185.144 , 7.76805 , 164.555 , 7.7667
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191.415 , 7.75752 , 185.103 , 7.7561 , 164.42 , 7.75474
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PR3T2

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178.222 , 7.44108 , 173.157 , 7.43976 , 157.934 , 7.43855
179.097 , 7.45514 , 172.655 , 7.4538
172.327 , 7.45251 , 164.811 , 7.45122 , 142.131 , 7.45003
171.386 , 7.44366 , 174.211 , 7.44232
172.934 , 7.44101 , 164.42 , 7.43973 , 142.709 , 7.43853
277.73
96330742
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12.1774 , 6.74035 , 11.8121 , 6.74031 , 9.06736 , 6.74025
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176.93 , 7.5393 , 170.164 , 7.538 , 154.907 , 7.53682
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170.473 , 7.55074 , 161.815 , 7.54946 , 139.09 , 7.54829
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277.73
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12.1798 , 6.7295 , 11.8133 , 6.72947 , 9.06941 , 6.72941
169.443 , 7.59171 , 177.59 , 7.59041
176.289 , 7.58909 , 169.518 , 7.58779 , 153.399 , 7.58661
179.701 , 7.60302 , 173.237 , 7.60179
169.551 , 7.60052 , 160.882 , 7.59924 , 138.134 , 7.59808
163.966 , 7.59143 , 172.506 , 7.59011
171.227 , 7.58883 , 161.549 , 7.58757 , 138.624 , 7.5864
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12.1825 , 6.71758 , 11.8146 , 6.71755 , 7.77689 , 6.7175
171.345 , 7.64624 , 176.128 , 7.64492
177.359 , 7.64359 , 170.581 , 7.64228 , 155.288 , 7.64112
168.733 , 7.65761 , 172.334 , 7.65631
170.888 , 7.65501 , 161.09 , 7.65374 , 138.313 , 7.65258
160.754 , 7.64587 , 175.018 , 7.64451
171.445 , 7.64324 , 161.757 , 7.64199 , 138.804 , 7.64082
277.73
2.97553 E+8
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12.1871 , 6.6968 , 11.8168 , 6.69678 , 7.78084 , 6.69672
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178.602 , 7.73869 , 171.813 , 7.73738 , 156.485 , 7.73621
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PR3T3

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161.42 , 7.4367 , 152.979 , 7.43551 , 135.222 , 7.43447
167.984 , 7.4505 , 161.527 , 7.44926
155.63 , 7.44809 , 144.72 , 7.44693 , 120.952 , 7.44589
165.75 , 7.43898 , 160.544 , 7.43777
155.844 , 7.43659 , 145.098 , 7.43543 , 119.961 , 7.43439
260.468
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169.307 , 7.53633 , 164.787 , 7.53512
160.075 , 7.53394 , 150.771 , 7.53276 , 132.976 , 7.53174
157.145 , 7.54762 , 157.386 , 7.5465
153.724 , 7.54533 , 142.786 , 7.54419 , 118.971 , 7.54318
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161.045 , 7.58507 , 164.123 , 7.58389
159.406 , 7.5827 , 150.093 , 7.58153 , 132.279 , 7.58052
157.328 , 7.59648 , 157.562 , 7.59529
152.774 , 7.59413 , 141.822 , 7.59299 , 115.743 , 7.59198
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154.056 , 7.58245 , 142.14 , 7.58131 , 118.064 , 7.58031
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163.128 , 7.64988 , 157.755 , 7.64865
152.96 , 7.6475 , 141.995 , 7.64636 , 117.007 , 7.64535
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154.242 , 7.63573 , 141.17 , 7.63459 , 117.064 , 7.63358
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14.6274 , 6.66917 , 35.4413 , 6.66913 ,-7.72757 , 6.66904
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161.66 , 7.7349 , 151.472 , 7.73372 , 133.595 , 7.7327
163.514 , 7.74921 , 162.613 , 7.74797
154.437 , 7.74683 , 142.327 , 7.74569 , 117.285 , 7.74468
165.721 , 7.73701 , 159.33 , 7.73586
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PR3T4

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205.883 , 7.45369 , 210.104 , 7.45213 , 205.015 , 7.45061
193.46 , 7.46808 , 195.997 , 7.46665
201.214 , 7.46519 , 202.721 , 7.46366 , 188.933 , 7.46216
194.046 , 7.45665 , 198.076 , 7.45517
203.647 , 7.4537 , 203.03 , 7.45217 , 190.457 , 7.45067
319.176
98869238
12.7164 , 6.8086 , 13.8005 , 6.80843
14.6005 , 6.80836 , 17.6983 , 6.80831 , 10.3552 , 6.80828
175.907 , 7.56058 , 192.07 , 7.55921
203.869 , 7.55771 , 208.1 , 7.55617 , 200.468 , 7.55467
196.183 , 7.57211 , 196.49 , 7.57066
200.602 , 7.5692 , 199.87 , 7.56769 , 184.937 , 7.56621
192.251 , 7.56048 , 193.994 , 7.55905
201.87 , 7.55757 , 200.118 , 7.55606 , 185.234 , 7.55458
319.176
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194.196 , 7.6245 , 194.503 , 7.62304
200.861 , 7.62157 , 199.011 , 7.62006 , 184.062 , 7.61859
191.36 , 7.61287 , 195.394 , 7.61137
202.132 , 7.60989 , 200.379 , 7.60838 , 184.339 , 7.6069
319.176
1.99735 E+8
12.7208 , 6.78572 , 13.8061 , 6.78554
14.6064 , 6.78546 , 17.7031 , 6.78541 , 10.3594 , 6.78538
176.37 , 7.66477 , 192.958 , 7.66334
206.084 , 7.66182 , 208.639 , 7.66026 , 200.994 , 7.65879
192.206 , 7.67623 , 194.753 , 7.67479
201.118 , 7.67331 , 200.39 , 7.67179 , 185.421 , 7.67033
193.891 , 7.66448 , 199.081 , 7.66304
202.393 , 7.66155 , 199.498 , 7.66003 , 183.441 , 7.65855
319.176
3.0347 E+8
9.09334 , 6.76251 , 11.8411 , 6.76234
12.118 , 6.76227 , 5.91229 , 6.76222 , 12.9514 , 6.76215
182.75 , 7.77008 , 199.717 , 7.76861
210.846 , 7.76705 , 211.724 , 7.76546 , 204.065 , 7.76398
198.307 , 7.78152 , 198.629 , 7.77998
205.001 , 7.77852 , 203.164 , 7.77698 , 189.273 , 7.7755
197.826 , 7.76961 , 200.748 , 7.76811
205.217 , 7.76663 , 201.174 , 7.76509 , 185.084 , 7.76361

PR4T1

```
299.853
100000
10.9 , 6.79838 , 13.8 , 6.79833
14.6 , 6.79825 , 11.8 , 6.79823 , 9.06003 , 6.79817
14654.9 , 9.13894 , 7283.5 , 9.10913
4721.41 , 9.07975 , 3399.96 , 9.05448 , 2637.98 , 9.03551
3 , 15.2668 , 3 , 15.2669
3 , 15.2668 ,-5 , 15.2668 ,-29 , 15.2666
4 , 18.696 , 4 , 18.6959
5 , 18.6958 , 5 , 18.6958 ,-7 , 18.6958
299.853
99795516
13.6294 , 6.77582 , 23.0056 , 6.77583
10.9559 , 6.77575 , 14.7548 , 6.77573 , 10.0704 , 6.77563
14913 , 9.12725 , 7092.47 , 9.09644
4572.33 , 9.06797 , 3279.76 , 9.04386 , 2553.97 , 9.0253
1 , 15.2511 , 1 , 15.2508
2 , 15.2508 ,-6 , 15.2508 ,-31 , 15.2506
1 , 18.6745 , 1 , 18.6745
5 , 18.6744 , 1 , 18.6743 ,-8 , 18.6744
299.853
1.44669 E+8
8.18138 , 6.76583 , 23.0081 , 6.76575
10.9585 , 6.76568 , 14.7569 , 6.76567 , 9.73645 , 6.76557
13379.5 , 9.12208 , 7094.22 , 9.09043
4437.51 , 9.06204 , 3173.15 , 9.0386 , 2449.86 , 9.02079
7 , 15.2436 , 5 , 15.2435
2 , 15.2436 ,-6 , 15.2435 ,-32 , 15.2434
2 , 18.6648 , 4 , 18.6609
5 , 18.6648 , 1 , 18.6647 ,-10 , 18.6648
299.853
1.99717 E+8
8.18378 , 6.7536 , 13.8111 , 6.75354
10.9618 , 6.75346 , 14.7595 , 6.75345 , 10.074 , 6.75335
14513.3 , 9.11641 , 7195.61 , 9.08417
4420.85 , 9.05628 , 3112.63 , 9.03333 , 2398.77 , 9.01602
5 , 15.2348 , 5 , 15.2348
2 , 15.2347 ,-8 , 15.2348 ,-35 , 15.2346
1 , 18.6531 , 2 , 18.653
3 , 18.653 ,-1 , 18.6529 ,-12 , 18.653
299.853
2.9906 E+8
13.6381 , 6.73173 , 23.0165 , 6.73176
10.9675 , 6.73165 , 14.7641 , 6.73164 , 9.742 , 6.73155
14170.9 , 9.10495 , 7025.82 , 9.07213
4241.69 , 9.04539 , 2967.39 , 9.02361 , 2355.43 , 9.00754
2 , 15.2189 , 6 , 15.2189
1 , 15.2188 ,-9 , 15.2189 ,-36 , 15.2187
4 , 1.6319 , 3 , 18.6318
3 , 18.6317 ,-1 , 18.6317 ,-11 , 18.6319
```

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PR4T2

 280.242
 100000
 8.17904 , 6.76584 , 27.6051 , 6.76586
 10.9554 , 6.76575 , 14.7544 , 6.76575 , 9.73447 , 6.76565
 12093 , 9.05292 , 5334.6 , 9.02529
 3064.88 , 9.00572 , 2223.75 , 8.99014 , 1914.08 , 8.97639
 3.00048 , 15.2385 , 5.00048 , 15.2386
 3.00048 , 15.2385 ,-5.99952 , 15.2384 ,-30.9995 , 15.2383
 5.00048 , 18.6461 , 5.00048 , 18.6461
 6.00048 , 18.646 , 3.00048 , 18.646 ,-7.99952 , 18.646
 280.242
 100095428
 8.18234 , 6.74384 , 23.0154 , 6.74365
 10.9598 , 6.74352 , 14.7604 , 6.74353 , 9.40273 , 6.74343
 11484.7 , 9.04162 , 5234.67 , 9.01441
 2917.31 , 8.99584 , 2162.36 , 8.98095 , 1825.61 , 8.96758
 4.00064 , 15.2225 , 4.00038 , 15.2225
 2.00032 , 15.2224 ,-5.99952 , 15.2224 ,-31.9995 , 15.2223
 6.00058 , 18.6249 , 6.00058 , 18.6247
 6.00048 , 18.6246 , 2.00032 , 18.6246 ,-8.99946 , 18.6246
 280.242
 1.46062 E+8
 19.0892 , 6.73365 , 32.2222 , 6.73359
 10.9618 , 6.73348 , 14.7631 , 6.73348 , 9.40451 , 6.73338
 10683.3 , 9.03372 , 4863.81 , 9.00869
 2810.97 , 8.99145 , 2120.15 , 8.97732 , 1862.69 , 8.96453
 4.00064 , 15.2152 , 4.00038 , 15.2152
 3.00048 , 15.2151 ,-5.99952 , 15.215 ,-30.9995 , 15.215
 4.00038 , 18.615 , 5.00048 , 18.6149
 7.00056 , 18.6148 , 5.0008 , 18.6148 ,-0.99994 , 18.6148
 280.242
 2.01218 E+8
 8.18563 , 6.72168 , 18.4257 , 6.72152
 10.9642 , 6.72141 , 14.7663 , 6.72141 , 9.07097 , 6.72131
 10186.5 , 9.02459 , 4658.03 , 9.00299
 2770.97 , 8.98684 , 2120.8 , 8.9722 , 1874.45 , 8.95949
 4.00064 , 15.2064 , 4.00038 , 15.2064
 3.00048 , 15.2063 ,-5.99952 , 15.2062 ,-31.9995 , 15.206
 3.00029 , 18.6032 , 3.00029 , 18.6032
 6.00048 , 18.603 , 2.00032 , 18.603 ,-8.99946 , 18.603
 280.242
 3.01217 E+8
 8.18885 , 6.70023 , 18.4365 , 6.70008
 10.9685 , 6.69998 , 11.8212 , 6.69998 , 8.73913 , 6.69989
 10139.3 , 9.01554 , 4527.97 , 8.99328
 2712.45 , 8.97737 , 2102.18 , 8.96315 , 1869.37 , 8.95035
 4.00064 , 15.1905 , 5.00048 , 15.1905
 3.00048 , 15.1905 ,-5.99952 , 15.1904 ,-31.9995 , 15.1903
 4.00038 , 18.5821 , 5.00048 , 18.582
 6.00048 , 18.5819 , 2.00032 , 18.5819 ,-9.9994 , 18.5819
```

PR4T3

```
260.429
100000
10.908 , 6.73398 , 18.4101 , 6.7339
10.9607 , 6.73379 , 8.85863 , 6.73379 , 7.05329 , 6.7337
7071.9 , 8.98027 , 3190.75 , 8.96033
2062.89 , 8.94705 , 1700.4 , 8.93435 , 1378.3 , 8.92271
5.00096 , 15.2112 , 9.00096 , 15.2111
3.00096 , 15.211 ,-5.99904 , 15.2109 ,-30.999 , 15.2109
1.00096 , 18.5975 , 9.00096 , 18.5975
6.00096 , 18.5974 , 3.00096 , 18.5973 ,-9.99904 , 18.5973
260.429
96471672
8.18522 , 6.71292 , 13.8147 , 6.71293
10.9649 , 6.7128 , 8.86205 , 6.7128 , 6.72014 , 6.7127
7014.78 , 8.97252 , 3156.95 , 8.95284
2044.7 , 8.9398 , 1698.15 , 8.92709 , 1409.53 , 8.91596
4.00077 , 15.1958 , 4.00043 , 15.1957
3.00096 , 15.1956 ,-4.9992 , 15.1955 ,-29.999 , 15.1955
1.00096 , 18.5771 , 7.00075 , 18.577
6.00096 , 18.5769 , 3.00096 , 18.5768 ,-9.99904 , 18.5768
260.429
1.45911 E+8
8.18736 , 6.70229 , 23.0234 , 6.70226
10.9671 , 6.70216 , 5.91092 , 6.70216 , 6.72153 , 6.70206
6083.51 , 8.9605 , 2829.86 , 8.94333
1920.08 , 8.9313 , 1601.59 , 8.91935 , 1343.78 , 8.909
3.00058 , 15.1878 , 4.00043 , 15.1879
3.00096 , 15.1878 ,-5.99904 , 15.1877 ,-31.999 , 15.1877
4.00384 , 18.5666 , 6.00064 , 18.5665
7.00112 , 18.5665 , 3.00096 , 18.5664 ,-9.99904 , 18.5663
260.429
1.9973 E+8
16.3707 , 6.69071 , 27.6298 , 6.69061
14.623 , 6.6905 , 2.95992 , 6.6905 , 5.37954 , 6.6904
6085.55 , 8.95664 , 2829.01 , 8.93914
1924.29 , 8.92686 , 1608.34 , 8.91482 , 1341.12 , 8.90455
6.00115 , 15.1793 , 6.00064 , 15.1793
3.00096 , 15.1792 ,-4.9992 , 15.1791 ,-30.999 , 15.1791
4.00384 , 18.5552 , 6.00064 , 18.5551
7.00112 , 18.5552 , 3.00096 , 18.5549 ,-9.99904 , 18.5549
260.429
2.96045 E+8
10.9208 , 6.67092 , 18.4317 , 6.67084
14.6271 , 6.67072 , 2.96325 , 6.67072 , 5.3822 , 6.6706
5921.17 , 8.94688 , 2757.98 , 8.93005
1934.98 , 8.91785 , 1640.51 , 8.90564 , 1400.83 , 8.8952
5.00096 , 15.1644 , 5.00053 , 15.1644
3.00096 , 15.1643 ,-4.9992 , 15.1642 ,-30.999 , 15.1642
4.00384 , 18.5355 , 9.00096 , 18.5353
7.00112 , 18.5353 , 3.00096 , 18.5352 ,-8.99914 , 18.5352
```

PR4T4

```
318.85
100000
10.8961 , 6.83104 , 32.195 , 6.83104
14.5947 , 6.83092 , 11.7957 , 6.83092 , 9.72784 , 6.83084
5739.5 , 9.15844 , 4787.85 , 9.13774
4348.11 , 9.11212 , 3545.75 , 9.08475 , 2761.88 , 9.06365
2.99954 , 15.2955 , 5.99954 , 15.2956
2.99954 , 15.2956 ,-5.00046 , 15.2955 ,-30.0005 , 15.2954
5.99954 , 18.7462 , 5.99954 , 18.7463
5.99954 , 18.7462 , 2.99954 , 18.7462 ,-7.00046 , 18.7461
318.85
52814058
16.3465 , 6.81904 , 36.8012 , 6.81887
14.5979 , 6.81876 , 11.7983 , 6.81876 , 9.72994 , 6.81868
5934.11 , 9.15316 , 4893.75 , 9.13184
4368.59 , 9.10609 , 3494.61 , 9.07896 , 2705.72 , 9.05824
4.99923 , 15.2871 , 4.99962 , 15.287
2.99954 , 15.2871 ,-5.00046 , 15.287 ,-30.0005 , 15.2869
4.99962 , 18.7349 , 5.99954 , 18.7349
6.99946 , 18.7347 , 2.99954 , 18.7348 ,-6.00039 , 18.7347
318.85
13130415
10.9019 , 6.80099 , 36.8115 , 6.80087
14.6025 , 6.80074 , 11.802 , 6.80074 , 9.73304 , 6.80067
6247.45 , 9.14295 , 5142.07 , 9.12067
4300.64 , 9.09395 , 3350.1 , 9.06807 , 2585.87 , 9.04826
2.99954 , 15.2743 , 4.99962 , 15.2743
1.99969 , 15.2743 ,-6.00055 , 15.2743 ,-33.0005 , 15.2742
2.99977 , 18.7177 , 2.99977 , 18.7178
4.99962 , 18.7177 , 1.99969 , 18.7177 ,-10.0007 , 18.7176
318.85
1.58382 E+8
10.9031 , 6.79584 , 32.2157 , 6.79567
14.6041 , 6.79554 , 11.8033 , 6.79554 , 10.0695 , 6.79546
6448.41 , 9.14127 , 4900.01 , 9.11949
4195.4 , 9.09394 , 3350.62 , 9.06814 , 2599.49 , 9.04815
1.99969 , 15.2706 , 2.99977 , 15.2706
2.99954 , 15.2706 ,-5.00046 , 15.2705 ,-29.0005 , 15.2704
3.99969 , 18.7128 , 7.99939 , 18.7128
6.99946 , 18.7127 , 3.99939 , 18.7127 ,-5.00033 , 18.7126
318.85
2.53889 E+8
8.18326 , 6.77339 , 18.4302 , 6.77329
10.961 , 6.77316 , 17.7057 , 6.77316 , 10.4087 , 6.77306
6701.52 , 9.13089 , 4975.11 , 9.10778
4106.19 , 9.08255 , 3237.72 , 9.05775 , 2495.15 , 9.03859
2.99954 , 15.2546 , 2.99977 , 15.2546
2.99954 , 15.2546 ,-5.00046 , 15.2545 ,-30.0005 , 15.2544
3.99969 , 18.6915 , 3.99969 , 18.6914
5.99954 , 18.6913 , 2.99954 , 18.6913 ,-8.00053 , 18.6912
```

PR5T1

```
299.623
100000
10.9001 , 6.79799 , 13.8001 , 6.79794
14.6001 , 6.79785 , 11.8001 , 6.7978 , 9.06006 , 6.79777
400 , 7.47224 , 235 , 7.47002
101 , 7.46894 , 19 , 7.4687 ,-51 , 7.46871
113 , 8.00742 , 46 , 8.00707
15 , 8.00693 ,-8.99999 , 8.00687 ,-58 , 8.00693
231.494 , 10.0701 , 179.461 , 10.0687
147 , 10.0691 , 130 , 10.06 , 600.701 , 10.0701
299.623
96809038
5.45433 , 6.77636 , 16.5655 , 6.77609
4.87244 , 6.776 , 14.427 , 6.77596 , 9.86896 , 6.7759
445 , 7.52489 , 266 , 7.52249
120 , 7.52119 , 26 , 7.52088 ,-50 , 7.52089
104 , 8.03265 , 48 , 8.03224
16 , 8.03211 ,-8.99999 , 8.03206 ,-60 , 8.03212
209.217 , 10.0658 , 157.931 , 9449710
140.156 , 10.0659 , 153.494 , 10.0574 , 1663.81 , 10.0689
299.623
1.41003 E+8
2.73125 , 6.76613 , 16.568 , 6.76609
4.87503 , 6.76602 , 13.118 , 6.76597 , 9.4679 , 6.76591
460 , 7.5495 , 280 , 7.54692
131 , 7.54551 , 31 , 7.54517 ,-47 , 7.54516
117 , 8.04438 , 51 , 8.04401
18 , 8.04386 ,-6.99999 , 8.04379 ,-57 , 8.04384
177.537 , 10.0636 , 146.471 , 10.0631
154.573 , 10.064 , 211.499 , 10.0553 , 2617.81 , 10.0666
299.623
1.98904 E+8
2.73377 , 6.75347 , 16.5712 , 6.75336
9.74511 , 6.75328 , 13.1207 , 6.75323 , 9.26866 , 6.75318
487 , 7.58265 , 299 , 7.57983
144 , 7.57826 , 35 , 7.57787 ,-45 , 7.57786
113 , 8.06041 , 52 , 8.06003
17 , 8.05988 ,-7.99999 , 8.05982 ,-57 , 8.05987
195.534 , 10.0622 , 164.476 , 10.0618
200.957 , 10.0624 , 317.532 , 10.0532 , 4159.37 , 10.0639
299.623
2.43625 E+8
2.73571 , 6.74286 , 5.53356 , 6.74297
9.74771 , 6.74285 , 11.8117 , 6.74281 , 9.27027 , 6.74275
500 , 7.609 , 350 , 7.606
156 , 7.60427 , 40 , 7.60381 ,-43 , 7.60376
123 , 8.07292 , 50 , 8.07246
18 , 8.0723 ,-6.99999 , 8.07221 ,-57 , 8.07225
164.602 , 10.06 , 184.307 , 10.0597
268.635 , 10.0597 , 492.069 , 10.0496 , 6271.87 , 10.0575
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PR5T11 (continued)

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 299.623
 2.96528 E+8
 5.46301 , 6.73221 , 11.0565 , 6.73192
 9.75076 , 6.73184 , 13.1253 , 6.7318 , 9.07083 , 6.73175
 524 , 7.6396 , 333 , 7.63664
 171 , 7.63478 , 46 , 7.63428 ,-40 , 7.63426
 110 , 8.0882 , 53 , 8.08774
 19 , 8.08758 ,-6.99999 , 8.0875 ,-56 , 8.08755
 246.814 , 10.0578 , 318.266 , 10.0564
 568.538 , 10.0544 , 1108.14 , 10.0387 , 10902.7 , 10.0337
 299.623
 3.51733 E+8
 2.74034 , 6.71984 , 16.5795 , 6.7199
 9.75392 , 6.71981 , 13.1278 , 6.71977 , 9.27413 , 6.71972
 546 , 7.67261 , 354 , 7.66943
 187 , 7.66738 , 53 , 7.6668 ,-40 , 7.66676
 116 , 8.10401 , 50 , 8.1036
 17 , 8.10347 ,-7.99999 , 8.10341 ,-57 , 8.10347
 681.496 , 10.0101 , 975.425 , 9.99695
 1284.41 , 9.98207 , 1581.34 , 9.95562 , 10361.6 , 9.9445
```

PR5T2

```
319
100000
10.896 , 6.83135 , 16.555 , 6.83132
14.5947 , 6.83122 , 10.4846 , 6.83117 , 8.65404 , 6.83113
338 , 7.52729 , 435 , 7.52304
273 , 7.52009 , 120 , 7.51867 ,-12.0001 , 7.51835
265 , 8.06168 , 137 , 8.06085
52.9995 , 8.06037 , 4.99953 , 8.06024 ,-50.0005 , 8.06028
162.01 , 10.1162 , 164.708 , 10.1145
150.706 , 10.115 , 142.863 , 10.106 , 765.634 , 10.1152
319
98288829
5.45237 , 6.80875 , 24.8391 , 6.80867
14.6006 , 6.80858 , 10.4888 , 6.80853 , 8.65751 , 6.8085
349 , 7.58167 , 469 , 7.5772
302 , 7.57395 , 142 , 7.57229 ,-4.00003 , 7.57187
255 , 8.08766 , 138 , 8.08684
54.9995 , 8.08635 , 5.99944 , 8.08611 ,-52.0005 , 8.08615
143.434 , 10.1113 , 139.034 , 10.1106
123.63 , 10.1114 , 138.843 , 10.1028 , 1201.67 , 10.1139
319
1.4955 E+8
10.9026 , 6.79709 , 19.3242 , 6.79698
14.6036 , 6.79689 , 10.491 , 6.79684 , 8.65931 , 6.7968
367 , 7.61086 , 487 , 7.60624
318 , 7.60284 , 155 , 7.60106 , 2.00002 , 7.60058
255 , 8.10154 , 134 , 8.10064
48.9995 , 8.10017 ,-0.999906 , 8.1001 ,-56.0006 , 8.10019
125.563 , 10.1089 , 117.918 , 10.1086
118.88 , 10.1096 , 151.18 , 10.1012 , 1551.71 , 10.1124
319
1.95934 E+8
19.0767 , 6.78656 , 19.3273 , 6.7865
14.6063 , 6.78641 , 10.4929 , 6.78636 , 8.66092 , 6.78632
366 , 7.63762 , 503 , 7.63291
333 , 7.62937 , 166 , 7.62747 , 6.00005 , 7.62692
255 , 8.11465 , 138 , 8.1138
55.9995 , 8.113 , 5.99944 , 8.11313 ,-51.0005 , 8.11316
130.831 , 10.1074 , 120.721 , 10.1071
133.83 , 10.1081 , 189.275 , 10.0995 , 2122.83 , 10.1109
319
2.9888 E+8
19.0811 , 6.76352 , 19.3341 , 6.76345
9.74739 , 6.76334 , 11.8078 , 6.76329 , 8.86573 , 6.76322
374 , 7.69862 , 539 , 7.69373
367 , 7.68985 , 196 , 7.68767 , 19.0002 , 7.68697
249 , 8.14425 , 143 , 8.14334
56.9995 , 8.14279 , 5.99944 , 8.14266 ,-52.0005 , 8.14271
126.818 , 10.1046 , 138.299 , 10.1044
203.146 , 10.1051 , 353.298 , 10.0956 , 4565.38 , 10.1058
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 280.172
 100000
 5.45405 , 6.76576 , 13.8051 , 6.76576
 4.87209 , 6.76568 , 13.1155 , 6.76564 , 8.6607 , 6.76558
 166 , 7.42171 , 68.0001 , 7.4211
 21.0001 , 7.42098 ,-6.99994 , 7.42093 ,-54.9999 , 7.42096
 24.0005 , 7.95535 , 9.00048 , 7.95529
-0.999519 , 7.95527 ,-15.9995 , 7.95525 ,-59.9995 , 7.9553
 76.204 , 10.0219 , 78.2536 , 10.022
 78.3159 , 10.0234 , 92.5425 , 10.0154 , 825.229 , 10.026
 280.172
 95814004
 13.6372 , 6.74456 , 13.8104 , 6.74451
 4.87397 , 6.74443 , 11.809 , 6.74439 , 8.46263 , 6.74434
 192 , 7.47276 , 81.0001 , 7.47212
 25.0001 , 7.47198 ,-5.99995 , 7.47192 ,-55.9999 , 7.47195
 20.0004 , 7.97978 , 5.00027 , 7.97967
-3.99808 , 7.97968 ,-17.9994 , 7.97968 ,-61.9995 , 7.97974
 56.8203 , 10.0176 , 72.3115 , 10.018
 99.6684 , 10.0196 , 176.349 , 10.0116 , 2565.25 , 10.0229
 280.172
 95154359
 19.0913 , 6.74474 , 11.0494 , 6.74467
 4.87396 , 6.74459 , 13.1205 , 6.74455 , 8.46261 , 6.7445
 1 , 1.00001 , 1 , 1.00001
 1 , 1.00001 , 0.999991 , 1.00001 , 0.999998 , 1.00001
 1.00002 , 1.00006 , 1.00005 , 1.00006
 0.999519 , 1.00006 , 0.999969 , 1.00006 , 0.999992 , 1.00006
 57.9407 , 10.0175 , 68.6287 , 10.018
 101.266 , 10.0195 , 181.62 , 10.0115 , 2565.25 , 10.0229
 280.172
 1.43807 E+8
 8.18423 , 6.7341 , 8.29104 , 6.73399
 4.87491 , 6.7339 , 11.8115 , 6.73386 , 8.66571 , 6.7338
 210 , 7.49914 , 89.0001 , 7.49833
 28.0001 , 7.49817 ,-4.99996 , 7.49812 ,-56.9999 , 7.49813
 10.0002 , 7.99243 , 7.00037 , 7.99233
-1.99904 , 7.99235 ,-15.9995 , 7.99234 , 60.9995 , 7.99239
 132.298 , 10.0121 , 255.998 , 10.0107
 479.548 , 10.0085 , 832.37 , 9.99342 , 6978.8 , 9.99186
 280.172
 1.9924 E+8
 5.4584 , 6.72189 , 16.5771 , 6.72187
 9.74807 , 6.72181 , 11.8144 , 6.72177 , 8.66761 , 6.72172
 233 , 7.53012 , 98.0001 , 7.52917
 31.0001 , 7.52898 ,-3.99997 , 7.52892 ,-54.9999 , 7.52895
 27.0006 , 8.00722 , 6.00032 , 8.00724
-2.99856 , 8.00725 ,-16.9995 , 8.00725 ,-59.9995 , 8.00733
 358.692 , 9.99652 , 647.291 , 9.98949
 1026.19 , 9.97959 , 1467.31 , 9.95585 , 10497.8 , 9.94475
 280.172
 3.0264 E+8
 13.6417 , 6.69975 , 16.5828 , 6.6997
 9.75005 , 6.69963 , 11.8198 , 6.69959 , 8.26831 , 6.69954
 271 , 7.58928 , 116 , 7.58805
 38.0002 , 7.5878 ,-1.99998 , 7.58773 ,-54.9999 , 7.58775
 31.0006 , 8.03597 , 7.00037 , 8.03597
-2.99856 , 8.03597 ,-15.9995 , 8.03597 ,-59.9995 , 8.03605
 665.046 , 9.88789 , 955.287 , 9.8748
 1260.65 , 9.86042 , 1572.79 , 9.83425 , 10376.2 , 9.82129
READY
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PR5T3B

```
276.31
100000
5.45483 , 6.75955 , 16.5661 , 6.75947
4.87313 , 6.75938 , 11.8052 , 6.75934 , 8.66135 , 6.75928
1.00008 , 1.00008 , 1.00008 , 1.00008
1.00008 , 1.00008 , 1.00008 , 1.00008 , 1.00008 , 1.00008
1.00057 , 1.00057 , 1.00057 , 1.00057
1.00057 , 1.00057 , 1.00057 , 1.00057 , 1.00057 , 1.00057
72.4768 , 10.0195 , 74.1173 , 10.0196
76.1897 , 10.0212 , 97.8165 , 10.0133 , 1145.4 , 10.0249
276.31
62116300
8.18361 , 6.75254 , 19.3313 , 6.75245
4.87435 , 6.75236 , 11.8082 , 6.75233 , 8.66352 , 6.75227
1.00008 , 1.00008 , 1.00008 , 1.00008
1.00008 , 1.00008 , 1.00008 , 1.00008 , 1.00008 , 1.00008
1.00057 , 1.00057 , 1.00057 , 1.00057
1.00057 , 1.00057 , 1.00057 , 1.00057 , 1.00057 , 1.00057
67.2717 , 10.0193 , 67.2377 , 10.0196
85.2737 , 10.0212 , 127.722 , 10.0133 , 1680.54 , 10.0249
276.31
112984059
16.367 , 6.74126 , 16.5736 , 6.74122
4.87534 , 6.74114 , 11.8106 , 6.7411 , 8.66529 , 6.74104
1.00008 , 1.00008 , 1.00008 , 1.00008
1.00008 , 1.00008 , 1.00008 , 1.00008 , 1.00008 , 1.00008
1.00057 , 1.00057 , 1.00057 , 1.00057
1.00057 , 1.00057 , 1.00057 , 1.00057 , 1.00057 , 1.00057
68.4131 , 10.0173 , 77.847 , 10.0177
118.329 , 10.0192 , 229.081 , 10.0109 , 3384.11 , 10.0217
276.31
13149111133
13.64 , 6.73721 , 13.8138 , 6.73715
9.74883 , 6.73707 , 11.8114 , 6.73703 , 8.4645 , 6.73698
1.00008 , 1.00008 , 1.00008 , 1.00008
1.00008 , 1.00008 , 1.00008 , 1.00008 , 1.00008 , 1.00008
1.00057 , 1.00057 , 1.00057 , 1.00057
1.00057 , 1.00057 , 1.00057 , 1.00057 , 1.00057 , 1.00057
61.696 , 10.0162 , 97.65 , 10.0166
181.739 , 10.0178 , 387.238 , 10.0086 , 5216.21 , 10.016
276.31
2.46851 E+8
21.8247 , 6.71247 , 13.8214 , 6.71239
9.75106 , 6.7123 , 11.8168 , 6.71226 , 8.26702 , 6.71221
1.00008 , 1.00008 , 1.00008 , 1.00008
1.00008 , 1.00008 , 1.00008 , 1.00008 , 1.00008 , 1.00008
1.00057 , 1.00057 , 1.00057 , 1.00057
1.00057 , 1.00057 , 1.00057 , 1.00057 , 1.00057 , 1.00057
587.76 , 9.94602 , 874.779 , 9.93386
1152.01 , 9.92081 , 1426.97 , 9.8964 , 9455.26 , 9.88631
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PR5T4

 260.521
 100000
 5.45795 , 6.73406 , 11.0501 , 6.73406
 9.74398 , 6.73398 , 9.18638 , 6.73394 , 6.85194 , 6.73388
 44.0001 , 7.37412 , 13.0001 , 7.37401
 3.00012 , 7.37397 ,-11.9999 , 7.37393 ,-54.9999 , 7.37396
 5.00095 , 7.90429 , 3.00095 , 7.90429
-0.999046 , 7.90427 ,-14.999 , 7.90424 ,-58.999 , 7.90429
 56.0743 , 9.97757 , 62.1736 , 9.97814
 75.6738 , 9.97974 , 117.155 , 9.9719 , 1627.35 , 9.98249
 260.521
 31812800
 5.45865 , 6.72718 , 5.52646 , 6.72713
 9.74523 , 6.72706 , 9.18756 , 6.72702 , 6.65129 , 6.72696
 43.0001 , 7.3906 , 14.0001 , 7.39056
 4.00016 , 7.3905 ,-12.9999 , 7.39046 ,-53.9999 , 7.39049
 14.0027 , 7.91211 , 4.00127 , 7.91217
-0.999046 , 7.91213 ,-14.999 , 7.91211 ,-58.999 , 7.91216
 55.7105 , 9.97551 , 86.5936 , 9.97616
 153.493 , 9.9774 , 317.511 , 9.96857 , 4344.29 , 9.97629
 260.521
 64921100
 13.6463 , 6.71999 , 13.8155 , 6.71994
 9.74652 , 6.71987 , 9.18877 , 6.71983 , 6.6522 , 6.71976
 1 , 1.00002 , 1.00001 , 1.00002
 1.00004 , 1.00002 , 0.999992 , 1.00002 , 0.999998 , 1.00002
 1.00019 , 1.00012 , 1.00032 , 1.00012
 0.999046 , 1.00012 , 0.999933 , 1.00012 , 0.999983 , 1.00012
 95.3467 , 9.97274 , 196.215 , 9.97221
 403.443 , 9.97136 , 798.454 , 9.95775 , 7635.6 , 9.95567
 260.521
 91586331
 10.9179 , 6.71416 , 11.0542 , 6.71412
 9.74756 , 6.71404 , 9.18975 , 6.7114 , 6.4514 , 6.71394
 20 , 7.42212 , 17.0001 , 7.42207
 4.00016 , 7.42203 ,-11.9999 , 7.42199 ,-54.9999 , 7.42202
 5.00095 , 7.92726 , 4.00127 , 7.92716
-1.99809 , 7.92714 ,-14.999 , 7.92711 ,-59.999 , 7.92716
 280.4 , 9.9563 , 499.723 , 9.95156
 826.056 , 9.94471 , 1243.07 , 9.92402 , 9312.71 , 9.91564
 260.521
 93231779
 19.1049 , 6.71382 , 19.3418 , 6.71377
 9.74762 , 6.71368 , 9.18981 , 6.71364 , 6.65297 , 6.71357
 53.0001 , 7.42312 , 16.0001 , 7.42301
 4.00016 , 7.42295 ,-11.9999 , 7.42291 ,-54.9999 , 7.42295
 5.00095 , 7.9276 , 3.00095 , 7.9276
-1.99809 , 7.92759 ,-15.9989 , 7.92756 ,-60.999 , 7.92761
 310.307 , 9.95994 , 572.951 , 9.95399
 919.316 , 9.94563 , 1342.07 , 9.92356 , 9758.35 , 9.9137
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PR5T4 (continued)

```
 260.521
 1.57456 E+8
 24.5642 , 6.70004 , 13.8196 , 6.69997
 9.7501 , 6.6999 , 7.87981 , 6.69986 , 6.25166 , 6.69979
 51.0001 , 7.45762 , 16.0001 , 7.45751
 5.0002 , 7.45746 ,-10.9999 , 7.45742 ,-54.9999 , 7.45745
 10.0019 , 7.94405 , 3.00095 , 7.94415
-1.99809 , 7.94414 ,-14.999 , 7.94411 ,-59.999 , 7.94416
 624.343 , 9.89868 , 913.316 , 9.88621
 1239.09 , 9.87258 , 1605.13 , 9.84635 , 10683.2 , 9.83242
 260.521
 1.97062 E+8
 16.3781 , 6.6914 , 16.5838 , 6.69135
 14.6236 , 6.69127 , 7.88125 , 6.69123 , 6.25273 , 6.69117
 50.0001 , 7.47977 , 18.0001 , 7.47968
 5.0002 , 7.47963 ,-11.9999 , 7.47959 ,-55.9999 , 7.47961
 10.0019 , 7.95491 , 3.00095 , 7.95483
-1.99809 , 7.95481 ,-15.9989 , 7.95478 ,-59.999 , 7.95482
 800.055 , 9.8596 , 1096.17 , 9.84395
 1413.9 , 9.82762 , 1770.34 , 9.79914 , 11578.1 , 9.78287
 260.521
 2.31612 E+8
 8.19195 , 6.68471 , 8.29774 , 6.68472
 9.75294 , 6.68464 , 7.88249 , 6.68459 , 6.25366 , 6.68452
 1 , 1.00002 , 1.00001 , 1.00002
 1.00004 , 1.00002 , 0.999992 , 1.00002 , 0.999998 , 1.00002
 1.00019 , 1.00012 , 1.00032 , 1.00012
 0.999046 , 1.00012 , 0.999933 , 1.00012 , 0.999983 , 1.00012
 834.084 , 9.83693 , 1128.88 , 9.82089
 1480.53 , 9.80399 , 1896.31 , 9.77454 , 12885.6 , 9.756
 260.521
 2.91435 E+8
 27.296 , 6.67223 , 11.0628 , 6.67207
 9.75522 , 6.67201 , 7.88463 , 6.67197 , 5.8522 , 6.67189
 50.0001 , 7.53119 , 23.0002 , 7.53116
 6.00024 , 7.53112 ,-10.9999 , 7.53108 ,-53.9999 , 7.53112
 4.00076 , 7.97993 , 4.00127 , 7.9799
-1.99809 , 7.97987 ,-15.9989 , 7.97984 ,-60.999 , 7.97987
 815.038 , 9.76366 , 1123.83 , 9.74825
 1540.25 , 9.73158 , 2110.15 , 9.7005 , 14437.5 , 9.67512
```

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 290.117
 100000
 13.627 , 6.78214 , 13.8026 , 6.78212
 9.73605 , 6.78204 , 10.4911 , 6.78199 , 8.05502 , 6.78196
 84.0276 , 10.0455 , 87.4432 , 10.0456
 86.294 , 10.0466 , 83.7488 , 10.0384 , 580.943 , 10.0486
 290.117
 59694531
 10.9049 , 6.76883 , 16.5665 , 6.76872
 9.73841 , 6.76864 , 11.805 , 6.76859 , 8.6611 , 6.76853
 72.077 , 10.039 , 73.1762 , 10.0394
 74.0424 , 10.0408 , 94.2906 , 10.033 , 1145.38 , 10.0448
 290.117
 126799440
 5.45778 , 6.75389 , 13.8097 , 6.75378
 9.74104 , 6.75371 , 11.8079 , 6.75366 , 8.4619 , 6.75361
 62.7406 , 10.0326 , 72.7159 , 10.033
 91.6208 , 10.0345 , 156.37 , 10.0266 , 2280.86 , 10.0384
 290.117
 1.94472 E+8
 8.18686 , 6.73897 , 16.5739 , 6.73885
 4.87564 , 6.73878 , 11.8107 , 6.73874 , 8.46407 , 6.73868
 63.4875 , 10.0265 , 92.0455 , 10.027
 159.271 , 10.0282 , 345.537 , 10.0196 , 5231.79 , 10.0282
 290.117
 2.28675 E+8
 13.6395 , 6.73141 , 13.8153 , 6.7314
 9.74498 , 6.73133 , 11.8121 , 6.73128 , 8.46516 , 6.73123
 218.098 , 10.0162 , 413.744 , 10.013
 725.509 , 10.0076 , 1129.73 , 9.98842 , 8681.14 , 9.98293
 290.117
 2.63934 E+8
 5.4652 , 6.72382 , 11.0567 , 6.72371
 9.74634 , 6.72363 , 11.8136 , 6.72358 , 8.46628 , 6.72352
 286.814 , 10.0116 , 568.841 , 10.0065
 977.466 , 9.99788 , 1496.94 , 9.97476 , 11552.8 , 9.96334
 290.117
 2.94817 E+8
 21.8193 , 6.71722 , 22.1004 , 6.71702
 9.74752 , 6.71699 , 11.8148 , 6.71695 , 8.46726 , 6.7169
 575.869 , 9.97151 , 902.046 , 9.95965
 1243.27 , 9.94577 , 1592.4 , 9.91953 , 10608.8 , 9.90728
 290.117
 3.31311 E+8
 8.1942 , 6.70923 , 11.0603 , 6.7091
 9.74891 , 6.70902 , 11.8163 , 6.70898 , 8.46841 , 6.70893
 700.603 , 9.94481 , 1037.35 , 9.93053
 1388.69 , 9.91464 , 1775.71 , 9.88634 , 11843.3 , 9.87082
 290.117
 3.49875 E+8
 10.9206 , 6.70524 , 11.0613 , 6.70516
 9.74962 , 6.70507 , 11.8171 , 6.70502 , 8.469 , 6.70497
 672.968 , 9.91633 , 967.398 , 9.90311
 1294.94 , 9.88853 , 1657.41 , 9.86168 , 11133.6 , 9.84759
READY
```

PR5T6

270.157
100000
27.2561 , 6.74954 , 19.3277 , 6.7495
24.3414 , 6.74942 ,-3.92678 , 6.74938 , 0.810365 , 6.74934
62.7793 , 9.99933 , 64.9223 , 9.99981
69.805 , 10.0014 , 9.98438 , 9.99366 , 1267.55 , 10.0047
270.157
24339061
49.0637 , 6.7443 , 16.5685 , 6.74416
24.3438 , 6.74407 ,-3.92717 , 6.74403 , 0.405262 , 6.74399
57.9214 , 9.9968 , 61.2388 , 9.99733
73.535 , 9.99897 , 116.876 , 9.99124 , 1600.94 , 10.0029
270.157
43685599
13.6329 , 6.74017 , 13.8089 , 6.73987
24.3457 , 6.7398 ,-3.92747 , 6.73976 , 0.607917 , 6.73972
57.174 , 9.99467 , 60.7783 , 9.99526
82.0608 , 9.99689 , 141.543 , 9.98911 , 2039.96 , 10.0007
270.157
60592300
13.6347 , 6.73627 , 16.5713 , 6.73618
24.3473 , 6.73611 ,-3.92774 , 6.73607 , 0.810563 , 6.73602
46.3371 , 9.99287 , 57.0948 , 9.9936
91.6524 , 9.9953 , 178.544 , 9.98743 , 2743.06 , 9.99865
270.157
77635351
13.6366 , 6.7325 , 19.3337 , 6.73245
24.349 , 6.73236 ,-2.61908 , 6.73233 , 0.810618 , 6.73228
48.5792 , 9.99091 , 73.6707 , 9.99164
138.011 , 9.99307 , 302.468 , 9.98461 , 4429.82 , 9.99312
270.157
95394044
13.6385 , 6.72862 , 19.3351 , 6.72856
24.3507 , 6.72848 ,-3.92829 , 6.72844 , 0.608084 , 6.7284
65.3951 , 9.9881 , 126.161 , 9.98847
265.366 , 9.98904 , 583.793 , 9.9533 , 6595.22 , 9.98032
270.157
113338871
10.9148 , 6.72469 , 13.8143 , 6.72467
24.3525 , 6.72457 ,-3.92857 , 6.72453 , 0.810734 , 6.72449
118.832 , 9.98437 , 239.43 , 9.98358
488.102 , 9.98186 , 930.309 , 9.96658 , 8321.6 , 9.96276
270.157
131500468
13.6424 , 6.72079 , 16.5768 , 6.72071
24.3542 , 6.72063 ,-3.92885 , 6.72059 , 0.608201 , 6.72055
196.933 , 9.97856 , 396.901 , 9.97573
740.146 , 9.97061 , 1222.21 , 9.95102 , 9721.18 , 9.94299
270.157
1.47115 E+8

PR5T6 (continued)

```
16.3697 , 6.71737 , 19.3391 , 6.71732
24.3557 , 6.71724 ,-3.92909 , 6.7172 , 0.608251 , 6.71716
293.717 , 9.97064 , 558.976 , 9.96531
947.963 , 9.95707 , 1438.93 , 9.93422 , 10721.4 , 9.9231
270.157
1.64033 E+8
13.6459 , 6.71375 , 13.8182 , 6.71365
24.3574 , 6.71356 ,-5.23828 , 6.71352 , 0.608306 , 6.71348
419.65 , 9.95624 , 720.591 , 9.94826
1131.27 , 9.93708 , 1603.37 , 9.91162 , 11355.1 , 9.8982
270.157
1.67517 E+8
13.6463 , 6.71299 , 13.8185 , 6.71291
24.3577 , 6.71283 ,-3.92941 , 6.71278 , 0.405726 , 6.71274
475.329 , 9.94126 , 774.003 , 9.93191
1137.13 , 9.91984 , 1504.7 , 9.89469 , 10094.2 , 9.88322
270.157
1.67129 E+8
13.6463 , 6.71304 , 16.5795 , 6.71297
24.3577 , 6.71288 ,-3.92941 , 6.71284 , 0.405724 , 6.7128
454.029 , 9.9439 , 756.506 , 9.9349
1132.33 , 9.92306 , 1521.15 , 9.89785 , 10331.9 , 9.88603
270.157
1.79301 E+8
16.3732 , 6.71041 , 19.3416 , 6.71035
24.3589 , 6.71026 ,-3.9296 , 6.71022 , 0.405763 , 6.71018
502.982 , 9.94468 , 848.594 , 9.93451
1269.81 , 9.92092 , 1722.6 , 9.8936 , 11856.9 , 9.87849
270.157
1.88781 E+8
16.3742 , 6.70834 , 16.5812 , 6.70831
24.3598 , 6.70823 ,-3.92974 , 6.7082 , 0.608385 , 6.70815
565.387 , 9.93729 , 924.107 , 9.92558
1336.95 , 9.91078 , 1780.16 , 9.88269 , 12091.2 , 9.86675
270.157
2.1712 E+8
10.926 , 6.70219 , 16.5833 , 6.70217
14.6259 , 6.70209 , 5.23231 , 6.70206 , 5.47067 , 6.70201
738.404 , 9.9103 , 1095.85 , 9.89516
1486.15 , 9.87796 , 1897.03 , 9.84801 , 12411.4 , 9.83031
270.157
2.28547 E+8
13.6529 , 6.69984 , 13.8231 , 6.69979
14.627 , 6.69971 , 5.23213 , 6.69967 , 4.66034 , 6.69962
792.215 , 9.89835 , 1141.9 , 9.8824
1532.51 , 9.86551 , 1924.64 , 9.8355 , 12477.4 , 9.81753
270.157
2.51241 E+8
2.75287 , 6.69499 , 13.8248 , 6.69483
4.89262 , 6.69476 , 11.7764 , 6.69473 , 8.10446 , 6.69467
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PR5T6 (continued)

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856.863 , 9.87089 , 1187.94 , 9.85394
1541.04 , 9.83577 , 1919.35 , 9.8054 , 12378.4 , 9.78731
270.157
2.68655 E+8
13.6572 , 6.69109 , 13.8261 , 6.6911
9.76256 , 6.69101 , 11.7761 , 6.69867 , 8.10452 , 6.69093
883.394 , 9.84923 , 1198.07 , 9.83196
1533.05 , 9.81375 , 1896.44 , 9.78374 , 12348.7 , 9.76595
270.157
2.72261 E+8
13.6576 , 6.69055 , 16.5875 , 6.69058
24.3677 , 6.6905 ,-5.23996 , 6.69046 , 0.203468 , 6.69043
823.231 , 9.84935 , 1138.21 , 9.83322
1488.29 , 9.81592 , 1870.02 , 9.78636 , 12361.9 , 9.76913
270.157
2.8354 E+8
2.75631 , 6.68799 , 13.8273 , 6.688
4.8957 , 6.68789 , 11.7759 , 6.68786 , 8.10456 , 6.68779
870.689 , 9.8297 , 1169.52 , 9.81282
1489.35 , 9.79526 , 1857.09 , 9.76603 , 12361.9 , 9.74854
270.157
3.06078 E+8
13.6611 , 6.68351 , 13.829 , 6.68318
4.89784 , 6.6831 ,-11.7851 , 6.68307 ,-8.10267 , 6.683
846.399 , 9.8031 , 1132.69 , 9.78677
1460.04 , 9.77007 , 1874.13 , 9.7412 , 12919.8 , 9.72273
270.157
3.18724 E+8
13.6625 , 6.68029 , 13.8299 , 6.68037
4.89903 , 6.68027 , 11.7754 , 6.68023 , 8.10467 , 6.68017
854.621 , 9.78869 , 1127.62 , 9.77247
1472.3 , 9.75588 , 1925.22 , 9.72679 , 13464.4 , 9.70694
270.157
3.31651 E+8
10.9382 , 6.67756 , 13.8309 , 6.67756
4.90025 , 6.67748 , 11.7752 , 6.67744 , 8.10471 , 6.67738
834.815 , 9.77341 , 1160.31 , 9.75781
1474.96 , 9.74156 , 1973.38 , 9.71226 , 13953 , 9.69077
270.157
3.50037 E+8
8.21457 , 6.67424 , 13.8323 , 6.67391
4.90199 , 6.67384 , 11.7749 , 6.6738 , 8.10477 , 6.67374
800.062 , 9.75495 , 1088.48 , 9.74009
1495.75 , 9.72412 , 2075.58 , 9.69391 , 14613.1 , 9.66944
270.157
3.65536 E+8
10.9418 , 6.67124 , 11.0723 , 6.67127
4.90345 , 6.6712 , 11.7747 , 6.67116 , 8.10482 , 6.67109
766.431 , 9.74152 , 1070.07 , 9.72743
1526.65 , 9.71152 , 2173.07 , 9.68013 , 14969.6 , 9.65305
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PR6T1 115

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280.376
100000
332 , 10.0249 , 308 , 10.0239
251 , 10.0249 , 211 , 10.016 , 217 , 10.0264
9 , 6.76372 , 9 , 6.76378
3 , 6.76366 , 1 , 6.76371 ,-10 , 6.76356
9 , 6.76245 , 9 , 6.76495
6 , 6.76493 , 3 , 6.76488 ,-6 , 6.7649
168 , 7.90094 , 191 , 7.90229
188 , 7.90137 , 184 , 7.90046 , 175 , 7.8997
280.376
51656900
338.321 , 10.0213 , 283.2 , 10.0206
207.511 , 10.0222 , 216.233 , 10.014 , 472.479 , 10.0264
5.00188 , 6.75449 , 5.00188 , 6.75228
3.75063 , 6.75216 , 1.00021 , 6.75221 ,-10.0021 , 6.75207
10.0019 , 6.75462 , 10.0019 , 6.75349
6.00125 , 6.75342 , 3.00063 , 6.75338 ,-6.00125 , 6.7534
158.657 , 7.87332 , 189.32 , 7.95863
186.318 , 7.95772 , 182.315 , 7.95682 , 173.298 , 7.95608
280.376
107014105
389.261 , 10.0184 , 264.629 , 10.0183
249.076 , 10.0201 , 354.896 , 10.0117 , 914.853 , 10.0243
8.00388 , 6.74166 , 6.00388 , 6.74003
3.00129 , 6.73993 , 1.00043 , 6.73998 ,-10.0043 , 6.73983
10.0039 , 6.74114 , 10.0039 , 6.74125
6.00259 , 6.74118 , 3.00129 , 6.74113 ,-6.00259 , 6.74115
157.919 , 8.01939 , 185.746 , 8.01823
185.606 , 8.01736 , 181.598 , 8.01648 , 172.567 , 8.01575
280.376
1.64875 E+8
523.207 , 10.0151 , 480.433 , 10.0143
780.199 , 10.0142 , 1400.66 , 10.0009 , 2505.56 , 10.0023
3.00596 , 6.72997 , 3.00596 , 6.72739
3.00199 , 6.72725 , 1.00066 , 6.7273 ,-9.00662 , 6.72716
9.00596 , 6.72755 , 9.00596 , 6.72858
6.00397 , 6.7285 , 3.00199 , 6.72845 ,-6.00397 , 6.72848
245.008 , 8.07982 , 186.958 , 8.07985
185.859 , 8.07897 , 180.893 , 8.07809 , 171.846 , 8.07738
280.376
1.97228 E+8
1145.77 , 10.0054 , 1421.08 , 9.96757
1670.15 , 9.95947 , 1927.16 , 9.93906 , 2276.14 , 9.93664
9.00711 , 6.71972 , 10.0071 , 6.72039
3.75237 , 6.72024 , 1.00079 , 6.72029 ,-9.0079 , 6.72015
19.0071 , 6.72111 , 10.0071 , 6.72156
6.00474 , 6.72148 , 3.00237 , 6.72144 ,-6.00474 , 6.72145
226.044 , 8.11346 , 187.102 , 8.11323
186 , 8.11236 , 181.031 , 8.11149 , 171.978 , 8.11078
```

PR6T1 (continued)

```
280.376
2.17729 E+8
1303.5 , 9.993 , 1721.86 , 9.98359
2221.97 , 9.97241 , 2710.16 , 9.94713 , 3325.87 , 9.93798
2.00784 , 6.7164 , 2.00784 , 6.71592
3.00261 , 6.71576 , 1.00087 , 6.71581 ,-9.00871 , 6.71567
6.00784 , 6.71784 , 7.00784 , 6.71704
6.00523 , 6.717 , 3.00261 , 6.71696 ,-6.00523 , 6.71698
229.942 , 8.13463 , 191.968 , 8.13558
186.09 , 8.1347 , 181.119 , 8.13383 , 171.105 , 8.13311
280.376
2.69048 E+8
2054.75 , 9.94015 , 2276.76 , 9.92461
2456.44 , 9.91059 , 2702.98 , 9.88484 , 3147.35 , 9.87553
7.00966 , 6.70701 , 6.00966 , 6.70484
3.75322 , 6.70469 , 1.00107 , 6.70474 ,-9.01073 , 6.7046
5.00966 , 6.70573 , 5.00966 , 6.70597
6.00644 , 6.70592 , 3.00322 , 6.70587 ,-5.00644 , 6.70589
191.961 , 8.19051 , 190.285 , 8.18931
187.268 , 8.18842 , 181.338 , 8.18754 , 171.314 , 8.18683
280.376
3.14341 E+8
1743.58 , 9.87779 , 1797.73 , 9.86654
1946.21 , 9.85642 , 2235.52 , 9.83457 , 2773.62 , 9.82796
4.01125 , 6.69757 , 4.01125 , 6.69524
3.00375 , 6.69511 , 1.00125 , 6.69516 ,-9.01251 , 6.69502
7.01125 , 6.69473 , 7.01125 , 6.69641
6.0075 , 6.69634 , 3.00375 , 6.69629 ,-5.0075 , 6.69632
149.183 , 8.23419 , 194.306 , 8.23616
188.42 , 8.23526 , 182.485 , 8.23438 , 172.454 , 8.23366
```

PR6T2

260.576
100000
311 , 9.97807 , 181 , 9.97768
160 , 9.97954 , 182 , 9.97117 , 356 , 9.98288
5 , 6.73253 , 5 , 6.72941
4 , 6.7317 , 4 , 6.73175 ,-1 , 6.73159
-1 , 6.73081 , 5 , 6.73314
7 , 6.73307 , 8 , 6.73303 ,-12 , 6.73303
260.576
1.53915 E+8
1648.57 , 9.89682 , 1984.95 , 9.88467
2254.68 , 9.87213 , 2514.03 , 9.84756 , 2928.23 , 9.83933
5.00307 , 6.70053 , 5.00307 , 6.69614
4.00246 , 6.69838 , 4.00246 , 6.69844 , 1.99939 , 6.69828
1.99939 , 6.69969 , 2.00307 , 6.6998
7.0043 , 6.69976 , 9.00491 , 6.69972 ,-17.0074 , 6.69971
260.576
2.9416 E+8
1918.35 , 9.75905 , 2161.96 , 9.74658
2574.81 , 9.73343 , 3251.48 , 9.70581 , 4083.69 , 9.68653
5.00582 , 6.66964 , 5.00582 , 6.66668
4.80466 , 6.66895 , 5.00466 , 6.669 , 3.99884 , 6.66882
6.99884 , 6.66925 , 7.00582 , 6.6703
8.00815 , 6.6703 , 11.0093 , 6.67027 ,-24.014 , 6.67023

APPENDIX VII

The computer programs used to fit the Debye dipole peaks and the resulting printouts are listed. The first two programs listed, FIT and ALEQ, were used to fit ε'' to Equation (166). This was done for each frequency. The results of each fit are listed following the program ALEQ in order of ascending frequency. The next program listed, POLFIT, was used to calculate τ_0 and E, using a best fit of the preceeding results from FIT and ALEQ. The results of POLFIT are included, after the listing of the program.

FIT

```
90 DIM U(1000),V(1000),W(1000)
100 FILE #1:"PEAKFIT4"
110 LET W = 19869.18
120 LET H = .00000000001
130 PRINT "INPUT E";
140 INPUT E
150 PRINT "INPUT TO";
160 INPUT R
170 PRINT "INPUT CONCENTRATION";
180 INPUT C
190 PRINT
200 LET J = .0001
210 LET K = 1E-14
215 LET L = 1E3
220 LET P =1
230 LET Q =1
240 LET Z=1
250 GOSUB 1500
260 LET U(1)=S
270 LET E = E+J
280 GOSUB 1500
290 LET P = P+1
300 LET U(P) = S
310 IF U(P) < U(P-1) THEN 270
320 IF P = 2 THEN 2500
330 LET E = E-J*((U(P)-U(P-1))/(U(P)-2*U(P-1)+U(P-2))+.5)
340 GOSUB 1500
350 LET V(1) = S
360 PRINT E,V(1),P
370 LET R = R+K
380 GOSUB 1500
390 LET Q = Q+1
400 LET V(Q) =S
410 IF V(Q) < V(Q-1) THEN 370
420 IF Q = 2 THEN 3500
430 LET R = R-K*((V(Q)-V(Q-1))/(V(Q)-2*V(Q-1)+V(Q-2))+.5)
440 GOSUB 1500
450 LET W(1) = S
460 PRINT R,W(1),Q
470 LET C = C+L
480 GOSUB 1500
490 LET Z=Z+1
500 LET W(Z) = S
510 IF W(Z) < W(Z-1) THEN 470
520 IF Z = 2 THEN 4500
530 LET C = C-L*((W(Z)-W(Z-1))/(W(Z)-2*W(Z-1)+W(Z-2))+.5)
540 GOSUB 1500
550 PRINT C,S,Z
560 GO TO 5000
1500 LET S = 0
```

FIT (continued)

```
1600 INPUT #1:T,D
1700 LET A =(.861735E-4)*T
1800 LET B = W*R*EXP(E/A)
1900 LET G = (C*B)/(T*(1+B^2))
2000 LET X = (D-G)^2
2100 LET S = S+X
2200 IF MORE #1 THEN 1600
2250 RESET #1
2300 RETURN
2500 LET J =-J
2600 GO TO 270
3500 LET K = -K
3600 GO TO 370
4500 LET L = -L
4600 GO TO 470
5000 PRINT
5100 IF ABS((V(1)-S)/V(1))<H THEN 6000
5500 GO TO 220
6000 PRINT
6100 PRINT "TEMPERATURE","EXPERIMENTAL","THEORETICAL","DIFFERENCE"
6150 PRINT
6200 INPUT #1:T,D
6300 LET A = (.861735E-4)*T
6400 LET B = W*R*EXP(E/A)
6500 LET G = (C*B)/(T*(1+B^2))
6550 LET X = D-G
6600 PRINT T,D,G,X
6700 IF MORE #1 THEN 6200
6800 RESET #1
6850 PRINT
6900 LET M = -E/((.861735E-4)*LOG(W*R))
7000 PRINT "THE POSITION OF THE MAXIMUM IS";M;"K"
7100 END
```

ALEQ

```
800 FILE #1:"PEAKFIT5"
910 LET U2=1E-10
920 LET U3=1E5
930 LET Q(1)=1
940 LET Q(2)=U2
950 LET Q(3)=U3
1015 LET Q = 62831.85
1020 LET L=1
1040 LET N = 3
1050 MAT W=ZER(N,N)
1060 MAT X=ZER(N)
1070 MAT Y=ZER(N)
1080 MAT Z=ZER(N)
1090 MAT F=ZER(N)
1100 MAT D=ZER(N,N)
1110 PRINT "INITIAL VALUES";
1120 MAT INPUT X
1130 IF NUM =N THEN 1160
1140 PRINT"INCORRECT NUMBER OF INITIAL VALUES, PLEASE RETYPE"
1150 GO TO 1110
1160 LET T=1
1180 PRINT "NUMBER OF ITERATIONS";
1190 INPUT M
1200 FOR K=L TO M
1210 go sub 6000
1220 FOR I=1 TO N
1230 IF ABS(F(I))>T THEN 1270
1240 NEXT I
1250 PRINT"ALL FUNCTIONS WITHIN TOLERANCE."
1260 GO TO 1460
1270 mat u=f
1280 let t1=1e-4
1290 for a=1 to n
1300 let x(a)=x(a)+t1
1310 GO SUB 6000
1320 mat f=f-u
1330 mat f=(1/t1)*f
1340 FOR B=1 TO N
1350 let d(b,a)=f(b)
1360 next b
1370 LET X(A)=X(A)-T1
1380 next a
1390 mat f=u
1400 MAT W=INV(D)
1410 MAT Y=W*F
1420 MAT Z=X-Y
1430 MAT X=Z
1440 NEXT K
1460 PRINT
1480 PRINT" I  X(I)            F(I)"
```

ALEQ (continued)

```
1490 PRINT
1500 FOR I=1 TO N
1510 LET A$=" "
1520 IF ABS(F(I))<=T THEN 1540
1530 LET A$="OUT OF TOLERANCE"
1540 LET V(I)=X(I)*Q(I)
1545 PRINT I;TAB(5);V(I);TAB(20);F(I);TAB(35);A$
1550 NEXT I
1560 PRINT
1570 PRINT "CONTINUE";
1580 INPUT A$
1590 IF A$><"YES" THEN 7100
1600 LET L=K+1
1610 GO TO 1160
1620 RETURN
6000 LET S = 0
6005 INPUT #1:H,P
6010 LET C = (.861735E-4)*H
6020 LET E = Q*X(2)*U2*EXP(X(1)/C)
6030 LET G = (X(3)*U3*E)/(H*(1+E^2))
6040 LET S = S+((G-P)*E)/(H*(1+E^2))
6050 IF MORE #1 THEN 6005
6060 LET F(1) = S
6070 RESET #1
6100 LET R=0
6105 INPUT #1:H,P
6110 LET C = (.861735E-4)*H
6120 LET E = Q*X(2)*U2*EXP(X(1)/C)
6130 LET G = (X(3)*E*U3)/(H*(1+E^2))
6140 LET R = R+((G-P)*X(3)*U3*E*(1-E^2))/(X(2)*U2*H*((1+E^2)^2))
6150 IF MORE #1 THEN 6105
6160 LET F(2)=R
6170 RESET #1
6200 LET V=0
6205 INPUT #1:H,P
6210 LET C = (.861735E-4)*H
6220 LET E = Q*X(2)*U2*EXP(X(1)/C)
6230 LET G = (X(3)*U3*E)/(H*(1+E^2))
6240 LET V = V+((G-P)*X(3)*U3*E*(1-E^2))/(C*H*((1+E^2)^2))
6250 IF MORE #1 THEN 6205
6260 LET F(3) =V
6270 RESET #1
7000 RETURN
7100 PRINT
7105 PRINT "TEMPERATURE","EXPERIMENTAL","THEORETICAL","DIFFERENCE"
7200 PRINT
7300 INPUT #1:H,P
7400 LET C = (.861735E-4)*H
7500 LET E = Q*X(2)*U2*EXP(X(1)/C)
7600 LET G = (X(3)*U3*E)/(H*(1+E^2))
```

ALEQ (continued)

```
7700 LET D = G-P
7800 PRINT H,P,G,D
7900 IF MORE #1 THEN 7300
8000 PRINT
8100 LET M = -X(1)/((.8617E-4)*LOG(Q*X(2)*U2))
8200 PRINT "THE POSITION OF THE MAXIMUM IS";M;"K"
8300 PRINT
8400 LET N = 1/M
8500 PRINT "1/T =";N
8600 PRINT
8700 LET P = LOG(Q)
8800 PRINT "LN(W) =";P
9000 END
```

```
CONTINUE? YES
NUMBER OF ITERATIONS? 40

 I  X(I)              F(I)

 1    0.193402        -4.76407 E-6
 2    2.18585 E-9      7.13829 E+9   OUT OF TOLERANCE
 3    420742.          1110.93       OUT OF TOLERANCE

CONTINUE? YES
NUMBER OF ITERATIONS? 50

 I  X(I)              F(I)

 1    0.193402        -2.41761 E-7
 2    2.18585 E-9     -1.30468 E+6   OUT OF TOLERANCE
 3    420742.          0.146445

CONTINUE? YES
NUMBER OF ITERATIONS? 60

 I  X(I)              F(I)

 1    0.193402        -6.95575 E-8
 2    2.18585 E-9     -4.93542 E+7   OUT OF TOLERANCE
 3    420742.         -7.57755       OUT OF TOLERANCE

CONTINUE? NO

TEMPERATURE     EXPERIMENTAL    THEORETICAL     DIFFERENCE

 185.553          523.001         525.785         2.78375
 178.698          811.927         798.644        -13.2835
 172.526         1090.25         1086.54         -3.70882
 166.437         1239.3          1263.85          24.55
 159.222         1132.33         1116.08         -16.249
 152.009          741.864         722.783        -19.0805
 144.845          351.016         387.347         36.3308

THE POSITION OF THE MAXIMUM IS 166.269 K

1/T = 6.01435 E-3

LN(W) = 6.44305
```

```
CONTINUE? YES
NUMBER OF ITERATIONS? 20

 I  X(I)              F(I)

 1    0.20341         -7.98639 E-8
 2    5.26778 E-10    -3.18786 E+8   OUT OF TOLERANCE
 3    461992.         -11.0848       OUT OF TOLERANCE

CONTINUE? YES
NUMBER OF ITERATIONS? 30

 I  X(I)              F(I)

 1    0.20341         -7.98639 E-8
 2    5.26778 E-10    -3.18786 E+8   OUT OF TOLERANCE
 3    461992.         -11.0848       OUT OF TOLERANCE

CONTINUE? YES
NUMBER OF ITERATIONS? 40

 I  X(I)              F(I)

 1    0.20341         -7.98639 E-8
 2    5.26778 E-10    -3.18786 E+8   OUT OF TOLERANCE
 3    461992.         -11.0848       OUT OF TOLERANCE

CONTINUE? NO

TEMPERATURE     EXPERIMENTAL    THEORETICAL     DIFFERENCE

 199.983          442.375         465.386         23.0111
 192.567          735.804         716.444        -19.3603
 185.553          1039.96         1026.68        -13.2839
 178.698          1259.59         1277.68         18.0917
 172.526          1268.48         1273.33         4.85329
 166.437          1037.75         1023.85        -13.9036
 159.222          647.651         637.777        -9.87386
 152.009          320.431         343.808         23.3765

THE POSITION OF THE MAXIMUM IS 176.652 K

1/T = 5.66085 E-3

LN(W) = 8.00199
```

```
 I  X(I)              F(I)

 1    0.209576       -1.61968 E-7
 2    3.78473 E-10   -101227762      OUT OF TOLERANCE
 3    501294.        -2.19503        OUT OF TOLERANCE

CONTINUE? YES
NUMBER OF ITERATIONS? 30

 I  X(I)              F(I)

 1    0.209576        1.61538 E-8
 2    3.78473 E-10   -127012535      OUT OF TOLERANCE
 3    501294.        -2.98985        OUT OF TOLERANCE

CONTINUE? YES
NUMBER OF ITERATIONS? 40

 I  X(I)              F(I)

 1    0.209576        8.042 E-10
 2    3.78473 E-10   -5.33793 E+8    OUT OF TOLERANCE
 3    501294.        -12.581         OUT OF TOLERANCE

CONTINUE? NO

TEMPERATURE     EXPERIMENTAL    THEORETICAL     DIFFERENCE

 214.733         414.021         443.166         29.1451
 207.331         670.93          657.085        -13.8447
 199.983         963.821         944.519        -19.3022
 192.567         1230.31         1237.79         7.47847
 185.553         1320.11         1334.2          14.0899
 178.698         1152.98         1143.95        -9.02774
 172.526         851.823         838.033        -13.7904
 166.437         536.198         551.15          14.9522

THE POSITION OF THE MAXIMUM IS 187.812 K

1/T = 5.32448 E-3

LN(W) = 8.74563

*
```

```
CONTINUE? YES
NUMBER OF ITERATIONS? 30

 I  X(I)              F(I)

 1    0.214934        -6.14538 E-8
 2    1.96875 E-10    -5.01551 E+8   OUT OF TOLERANCE
 3    542614.         -5.72135       OUT OF TOLERANCE

CONTINUE? YES
NUMBER OF ITERATIONS? 50

 I  X(I)              F(I)

 1    0.214934        -6.14538 E-8
 2    1.96875 E-10    -5.01551 E+8   OUT OF TOLERANCE
 3    542614.         -5.72135       OUT OF TOLERANCE

CONTINUE? NO

TEMPERATURE     EXPERIMENTAL    THEORETICAL     DIFFERENCE

 229.633          430.167         462.693         32.5264
 222.123          680.119         661.927        -18.1922
 214.733          944.597         921.936        -22.6612
 207.331         1195.56         1200.36          4.79639
 199.983         1335.01         1356.36         21.3532
 192.567         1254.61         1248.95         -5.66364
 185.553          973.918         954.451        -19.467
 178.698          641.435         641.844         0.40921
 172.526          395.234         415.809        20.5753

THE POSITION OF THE MAXIMUM IS 200.313 K

1/T = 4.99219 E-3

LN(W) = 9.89693
```

```
CONTINUE? YES
NUMBER OF ITERATIONS? 40

 I  X(I)              F(I)

 1    0.219112         5.2275 E-8
 2    1.11048 E-10  -6.03913 E+8    OUT OF TOLERANCE
 3    586031.       -3.72064        OUT OF TOLERANCE

CONTINUE? YES
NUMBER OF ITERATIONS? 50

 I  X(I)              F(I)

 1    0.219112       -6.92773 E-8
 2    1.11048 E-10  -1.57444 E+9    OUT OF TOLERANCE
 3    586031.       -9.5694         OUT OF TOLERANCE

CONTINUE? NO

TEMPERATURE     EXPERIMENTAL    THEORETICAL     DIFFERENCE

 244.501          495.628         521.836         26.2078
 237.06           725.328         713.198        -12.1296
 229.633          974.81          954.048        -20.762
 222.123          1207.6          1208.05          0.44754
 214.733          1344.76         1363.87          19.1102
 207.331          1310.96         1311.71          0.749039
 199.983          1081.82         1065.15        -16.6702
 192.567          755.715         751.412        -4.30288
 185.553          477.153         493.731          16.578

THE POSITION OF THE MAXIMUM IS 214.159 K

1/T = 4.66942 E-3

LN(W) = 11.0482

*
```

POLFIT

```
10' THIS IS A LINEAR LEAST SQUARES FOR CALCULATING ACTIVATION
20' ENERGIES AND RECIPROCAL FREQUENCY FACTORS.
300 DATA 5,1
310 READ M,N
320 DIM A(15),B(15),S(15),G(15),U(15)
330 DIM Q(400),P(400),X(400),Y(400),C(400)
340 LET Z=0
350 LET O=1
360 LET K=12
370 LET N=N+1
380 IF N> 12 THEN 1830
390 IF M<N THEN 2030
400 IF M>400 THEN 1800
410 LET T7=Z
420 LET T8=Z
430 LET W7=Z
440 FOR I=1 TO M
450 READ X(I),Y(I)
460 LET W7=W7+X(I)
470 LET T7=T7+Y(I)
480 LET T8=T8+Y(I)^2
490 NEXT I
500 LET T9=(M*T8-T7^2)/(M^2-M)
510 PRINT
670 FOR I=1 TO M
680 LET P(I) = Z
690 LET Q(I) = O
700 NEXT I
710 FOR I = 1 TO 11
720 LET A(I) = Z
730 LET B(I) = Z
740 LET S(I) = Z
750 NEXT I
760 LET E1=Z
770 LET F1=Z
780 LET W1=M
790 LET N4=K
800 LET I=1
810 LET K1=2
820 IF N=0 THEN 840
830 LET K1=N4
840 LET W=Z
850 FOR L=1 TO M
860 LET W=W+Y(L)*Q(L)
870 NEXT L
880 LET S(I)=W/W1
890 IF I-N4>=0 THEN 1090
900 IF I-M>=0 THEN 1090
910 LET E1=Z
920 FOR L=1 TO M
```

POLFIT (continued)

```
930 LET E1=E1+X(L)*Q(L)*Q(L)
940 NEXT L
950 LET E1=E1/W1
960 LET A(I+1)=E1
970 LET W=Z
980 FOR L=1 TO M
990 LET V=(X(L)-E1)*Q(L)-F1*P(L)
1000 LET P(L)=Q(L)
1010 LET Q(L)=V
1020 LET W=W+V*V
1030 NEXT L
1040 LET F1= W/W1
1050 LET B(I+2)=F1
1060 LET W1=W
1070 LET I=I+1
1080 GOTO 840
1090 FOR L = 0 TO 12
1100 LET G(L)=Z
1110 NEXT L
1120 LET G(1)=0
1130 FOR J=1 TO N
1140 LET S1 =Z
1150 FOR L=1 TO N
1160 IF L=1 THEN 1180
1170 LET G(L)=G(L)-A(L)*G(L-1)-B(L)*G(L-2)
1180 LET S1=S1+S(L)*G(L)
1190 NEXT L
1200 LET U(J)=S1
1210 LET L=N
1220 FOR I2=2 TO N
1230 LET G(L)=G(L-1)
1240 LET L=L-1
1250 NEXT I2
1260 LET G(1)=Z
1270 NEXT J
1280 PRINT
1290 LET T=Z
1300 FOR L=1 TO M
1310 LET C(L)=Z
1320 LET J=N
1330 FOR I2=1 TO N
1340 LET C(L)=C(L)*X(L)+U(J)
1350 LET J=J-1
1360 NEXT I2
1370 LET T3=Y(L)-C(L)
1380 LET T=T+T3^2
1390 NEXT L
1400 IF M<>N THEN 1430
1410 LET T5=0
1420 GOTO 1440
```

POLFIT (continued)

```
1430 LET T5=T/(M-N)
1440 LET Q7 = 1-T/(T9*(M-1))
1450 PRINT
1470 PRINT "INDEX OF DETERM =";Q7;
1480 GOSUB 2060
1490 PRINT
1500 PRINT
1510 IF R=0 THEN 2100
1520 IF R=3 THEN 1770
1530 PRINT "TERM","COEFFICIENT"
1540 PRINT
1550 FOR J=1 TO N
1560 LET I2=J-1
1570 PRINT I2,U(J)
1580 NEXT J
1590 IF R=1 THEN 1740
1600 PRINT
1610 PRINT "X-ACTUAL","Y-ACTUAL","Y-CALC","DIFF","PCT-DIFF"
1620 PRINT
1630 FOR L=1 TO M
1640 LET Q8=Y(L)-C(L)
1650 PRINT X(L),Y(L),C(L),Q8,
1660 IF C(L)=0 THEN 1690
1670 PRINT 100*Q8/C(L)
1680 GOTO 1700
1690 PRINT "INFINITE"
1700 NEXT L
1710 PRINT
1720 PRINT "          STD ERROR OF ESTIMATE FOR Y =";SQR(T5)
1730 LET C = EXP(-U(1))
1740 LET D = (.8617E-4)*(-U(2))
1750 PRINT
1760 PRINT "THE ACTIVATION ENERGY IS";D
1770 PRINT
1780 PRINT "THE RECIPROCAL FREQUENCY FACTOR IS ";C
1790 GO TO 2300
1800 PRINT
1810 PRINT "PROGRAM SIZE LIMIT IS 400 DATA POINTS"
1820 GOTO 2100
1830 PRINT "ELEVENTH DEGREE IS THE LIMIT."
1840 GOTO 2100
1850 PRINT
1860 PRINT "   YOU HAVE NOT SUPPLIED THE DATA IN STATEMENTS 300"
1870 PRINT "AND 2100.  YOU SHOULD LIST THIS PROGRAM FOR FURTHER"
1880 PRINT "DIRECTIONS."
1890 PRINT
1900 PRINT " TO USE YOU SHOULD HAVE TYPED:"
1950 PRINT
1960 PRINT "   300   DATA  N,D"
1970 PRINT "          (WHERE N = NUMBER OF DATA POINTS TO BE READ"
```

POLFIT (continued)

```
1980 PRINT "             AND D = INITIAL (LOWEST) DEGREE TO BE FIT)"
1990 PRINT "   2100  DATA  X(1),Y(1),X(2),Y(2),....,X(N),Y(N)"
2000 PRINT "          (CONTINUATION ON LINES 2101-2299 AS NEEDED)"
2010 PRINT "   RUN"
2020 GO TO 2300
2030 PRINT
2040 PRINT "TOO FEW POINTS FOR FITTING DEGREE";N-1
2050 GOTO 2100
2060 LET R = 2
2080 RETURN
2105 DATA 5.66085E-3,8.00199
2110 DATA 5.32448E-3,8.74563
2120 DATA 4.99219E-3,9.89693
2130 DATA 4.66942E-3,11.0482
2300 END
```

INDEX OF DETERM = 0.99195

TERM	COEFFICIENT
0	26.4678
1	-3308.28

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
6.01435 E-3	6.44305	6.57061	-0.127558	-1.94135
5.66085 E-3	8.00199	7.74009	0.261904	3.38324
5.32448 E-3	8.74563	8.85289	-0.107262	-1.2116
4.99219 E-3	9.89693	9.9522	-5.52707 E-2	-0.555361
4.66942 E-3	11.0482	11.02	2.81857 E-2	0.255768

STD ERROR OF ESTIMATE FOR Y = 0.182774

THE ACTIVATION ENERGY IS 0.285086

THE RECIPROCAL FREQUENCY FACTOR IS 3.20033 E-12

APPENDIX VIII

The computer program SCOPOL is listed followed by the fits of the temperature data for each sample. The samples are in the order $CdSe_{\perp}$, $CdSe_{//}$, $CdS_{\perp}$, $CdS_{//}$, AnSe, As_2S_3 (pure), As_2S_3 (impure), and As_2Se_3. Each page contains a different sample and is identifiable by the appropriate file name in the upper left hand corner of each page.

SCOPOL

```
100' NAME -- POLFIT
110' DESCRIPTION -- THIS PROGRAM FITS LEAST-SQUARES POLYNOMIALS TO
120' BIVARIATE DATA, USING AN ORTHOGONAL POLYNOMIAL METHOD.  LIMITS ARE
130' 11TH DEGREE FIT AND A MAX OF 100 DATA POINTS.  THE PROGRAM ALLOWS
140' THE USER TO SPECIFY THE LOWEST DEGREE POLYNOMIAL TO BE FIT, AND
150' THEN FITS THE POLYNOMIALS IN ORDER OF ASCENDING DEGREE.  AT EACH
160' STAGE, THE INDEX OF DETERMINATION IS PRINTED, AND THE USER HAS
170' THE CHOICE OF GOING TO THE NEXT HIGHER DEGREE FIT, SEEING EITHER
180' OF TWO SUMMARIES TO FIT AT THAT STAGE, OR OF STOPPING THE PROGRAM.
190'
200' SOURCE -- ACADEMIC COMPUTING CENTER STAFF, EXT. 3500
210'
220' INSTRUCTIONS -- TO USE YOU MUST HAVE A DATA FILE IN THE
230'                  FOLLOWING FORM:
240'
250'                  X(1),Y(1)
260'                  X(2),Y(2)
270'                    .    .
280'                    .    .
290'                  THE PROGRAM WILL ASK YOU FOR THE FILE'S NAME
300'                  AND FOR THE INITIAL (LOWEST) DEGREE TO BE FIT.
310'
320'-------------------------------PROGRAM---------------------------------
330'
340 PRINT "FILENAME";
350 LINPUT F$
360 FILE #1:F$
370 IF END #1 THEN 410
380 INPUT #1:X
390 LET M=M+1
400 GOTO 370
410 PRINT "INITIAL (LOWEST) DEGREE TO BE FIT";
420 INPUT N
430 RESET #1
440 DIM A(15),B(15),S(15),G(15),U(15)
450 DIM Q(400),P(400),X(400),Y(400),C(400)
460 LET Z=0
470 LET O=1
480 LET K=12
490 LET N=N+1
500 IF N> 12 THEN 1950
510 IF M<N THEN 2110
520 IF M>400 THEN 1920
530 LET T7=Z
540 LET T8=Z
550 LET W7=Z
560 FOR I=1 TO M
570 INPUT #1:X(I),Y(I)
580 LET W7=W7+X(I)
590 LET T7=T7+Y(I)
```

SCOPOL (continued)

```
600 LET T8=T8+Y(I)^2
610 NEXT I
620 LET T9=(M*T8-T7^2)/(M^2-M)
630 PRINT
770 PRINT
780 PRINT
790 FOR I=1 TO M
800 LET P(I) = Z
810 LET Q(I) = 0
820 NEXT I
830 FOR I = 1 TO 11
840 LET A(I) = Z
850 LET B(I) = Z
860 LET S(I) = Z
870 NEXT I
880 LET E1=Z
890 LET F1=Z
900 LET W1=M
910 LET N4=K
920 LET I=1
930 LET K1=2
940 IF N=0 THEN 960
950 LET K1=N4
960 LET W=Z
970 FOR L=1 TO M
980 LET W=W+Y(L)*Q(L)
990 NEXT L
1000 LET S(I)=W/W1
1010 IF I-N4>=0 THEN 1210
1020 IF I-M>=0 THEN 1210
1030 LET E1=Z
1040 FOR L=1 TO M
1050 LET E1=E1+X(L)*Q(L)*Q(L)
1060 NEXT L
1070 LET E1=E1/W1
1080 LET A(I+1)=E1
1090 LET W=Z
1100 FOR L=1 TO M
1110 LET V=(X(L)-E1)*Q(L)-F1*P(L)
1120 LET P(L)=Q(L)
1130 LET Q(L)=V
1140 LET W=W+V*V
1150 NEXT L
1160 LET F1= W/W1
1170 LET B(I+2)=F1
1180 LET W1=W
1190 LET I=I+1
1200 GOTO 960
1210 FOR L = 0 TO 12
1220 LET G(L)=Z
```

SCOPOL (continued)

```
1230 NEXT L
1240 LET G(1)=0
1250 FOR J=1 TO N
1260 LET S1 =Z
1270 FOR L=1 TO N
1280 IF L=1 THEN 1300
1290 LET G(L)=G(L)-A(L)*G(L-1)-B(L)*G(L-2)
1300 LET S1=S1+S(L)*G(L)
1310 NEXT L
1320 LET U(J)=S1
1330 LET L=N
1340 FOR I2=2 TO N
1350 LET G(L)=G(L-1)
1360 LET L=L-1
1370 NEXT I2
1380 LET G(1)=Z
1390 NEXT J
1400 PRINT
1410 LET T=Z
1420 FOR L=1 TO M
1430 LET C(L)=Z
1440 LET J=N
1450 FOR I2=1 TO N
1460 LET C(L)=C(L)*X(L)+U(J)
1470 LET J=J-1
1480 NEXT I2
1490 LET T3=Y(L)-C(L)
1500 LET T=T+T3^2
1510 NEXT L
1520 IF M<>N THEN 1550
1530 LET T5=0
1540 GOTO 1560
1550 LET T5=T/(M-N)
1560 LET Q7 = 1-T/(T9*(M-1))
1570 PRINT
1580 PRINT "POLYFIT OF DEGREE";N-1;
1590 PRINT "INDEX OF DETERM =";Q7;
1600 GOSUB 2140
1610 PRINT
1620 PRINT
1630 IF R=0 THEN 2180
1640 IF R=3 THEN 1890
1650 PRINT "TERM","COEFFICIENT"
1660 PRINT
1670 FOR J=1 TO N
1680 LET I2=J-1
1690 PRINT I2,U(J)
1700 NEXT J
1710 IF R=1 THEN 1860
1720 PRINT
```

SCOPOL (continued)

```
1730 PRINT "X-ACTUAL","Y-ACTUAL","Y-CALC","DIFF","PCT-DIFF"
1740 PRINT
1750 FOR L=1 TO M
1760 LET Q8=Y(L)-C(L)
1770 PRINT X(L),Y(L),C(L),Q8,
1780 IF C(L)=0 THEN 1810
1790 PRINT 100*Q8/C(L)
1800 GOTO 1820
1810 PRINT "INFINITE"
1820 NEXT L
1830 PRINT
1840 PRINT "          STD ERROR OF ESTIMATE FOR Y =";SQR(T5)
1850 IF K=N THEN 2180
1860 PRINT
1870 GOSUB 2140
1880 GOTO 1630
1890 LET N=N+1
1900 IF M<N THEN 2110
1910 GOTO 1210
1920 PRINT
1930 PRINT "PROGRAM SIZE LIMIT IS 400 DATA POINTS"
1940 GOTO 2180
1950 PRINT "ELEVENTH DEGREE IS THE LIMIT."
1960 GOTO 2180
1970 PRINT
1980 PRINT "   YOU HAVE NOT SUPPLIED THE DATA IN STATEMENTS 300"
1990 PRINT "AND 2100.  YOU SHOULD LIST THIS PROGRAM FOR FURTHER"
2000 PRINT "DIRECTIONS."
2010 PRINT
2020 PRINT " TO USE YOU SHOULD HAVE TYPED:"
2030 PRINT
2040 PRINT "   300   DATA  N,D"
2050 PRINT "          (WHERE N = NUMBER OF DATA POI@TS TO BE READ"
2060 PRINT "             AND D = INITIAL (LOWEST) DEGREE TO BE FIT)"
2070 PRINT "   2100  DATA  X(1),Y(1),X(2),Y(2),....,X(N),Y(N)"
2080 PRINT "          (CONTINUATION ON LINES 2101-2299 AS NEEDED)"
2090 PRINT "   RUN"
2100 GO TO 2180
2110 PRINT
2120 PRINT "TOO FEW POINTS FOR FITTING DEGREE";N-1
2130 GOTO 2180
2140 PRINT "   WHAT NEXT";
2150 INPUT R
2160 RETURN
2180 END
```

```
FILENAME? TCDSEC
INITIAL (LOWEST) DEGREE TO BE FIT? 1


POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999949    WHAT NEXT? 2

TERM            COEFFICIENT

 0               9.66157
 1               0.242549

X-ACTUAL        Y-ACTUAL        Y-CALC          DIFF            PCT-DIFF

 2.90583         10.3666         10.3664          2.23994 E-4     2.16078 E-3
 2.8256          10.3468         10.3469         -1.16467 E-4    -1.12562 E-3
 2.74775         10.3278         10.328          -2.33889 E-4    -2.2646 E-3
 2.67134         10.3094         10.3095         -1.00851 E-4    -9.78234 E-4
 2.59619         10.2915         10.2913          2.26736 E-4     2.20319 E-3

          STD ERROR OF ESTIMATE FOR Y = 2.44964 E-4

   WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 1.    WHAT NEXT? 2

TERM            COEFFICIENT

 0               9.80442
 1               0.138538
 2               1.89036 E-2

X-ACTUAL        Y-ACTUAL        Y-CALC          DIFF            PCT-DIFF

 2.90583         10.3666         10.3666         -2.38419 E-6    -2.29987 E-5
 2.8256          10.3468         10.3468          5.00679 E-6     4.83898 E-5
 2.74775         10.3278         10.3278         -7.7486 E-6     -7.50266 E-5
 2.67134         10.3094         10.3094          5.24521 E-6     5.0878 E-5
 2.59619         10.2915         10.2915         -4.76837 E-7    -4.63331 E-6

          STD ERROR OF ESTIMATE FOR Y = 7.69847 E-6

   WHAT NEXT? 0
```

```
FILENAME? TCDSEA
INITIAL (LOWEST) DEGREE TO BE FIT? 1


POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999958    WHAT NEXT? 2

TERM          COEFFICIENT

 0             8.87133
 1             0.192641

X-ACTUAL      Y-ACTUAL      Y-CALC        DIFF            PCT-DIFF

 2.90583       9.43128       9.43111       1.67966 E-4     1.78098 E-3
 2.8256        9.41556       9.41566      -9.64403 E-5    -1.02425 E-3
 2.74775       9.40048       9.40066      -1.79291 E-4    -1.90721 E-3
 2.67134       9.3859        9.38594      -3.95775 E-5    -4.21668 E-4
 2.59619       9.37161       9.37146       1.47462 E-4     1.57352 E-3

        STD ERROR OF ESTIMATE FOR Y = 1.7604 E-4

   WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.999999    WHAT NEXT? 2

TERM          COEFFICIENT

 0             8.97292
 1             0.118667
 2             1.34445 E-2

X-ACTUAL      Y-ACTUAL      Y-CALC        DIFF            PCT-DIFF

 2.90583       9.43128       9.43127       6.91414 E-6     7.33108 E-5
 2.8256        9.41556       9.41557      -1.01328 E-5    -1.07617 E-4
 2.74775       9.40048       9.4005       -1.84774 E-5    -1.96558 E-4
 2.67134       9.3859        9.38586       3.5882 E-5      3.82298 E-4
 2.59619       9.37161       9.37162      -1.41859 E-5    -1.51371 E-4

        STD ERROR OF ESTIMATE FOR Y = 3.14694 E-5

   WHAT NEXT? 0
```

```
FILENAME? TCDSC
INITIAL (LOWEST) DEGREE TO BE FIT? 1


POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.99994    WHAT NEXT? 2

TERM            COEFFICIENT

 0               9.3993
 1               0.223221

X-ACTUAL        Y-ACTUAL        Y-CALC          DIFF            PCT-DIFF

 2.90583         10.0482         10.0479          2.58565 E-4     2.57331 E-3
 2.8256          10.0298         10.03           -2.32339 E-4    -2.31643 E-3
 2.74775         10.0125         10.0127         -1.54614 E-4    -1.54419 E-3
 2.67134          9.99555         9.9956         -4.8399 E-5     -4.84203 E-4
 2.59619          9.979           9.97882         1.76668 E-4     1.77043 E-3

        STD ERROR OF ESTIMATE FOR Y = 2.43787 E-4

  WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.999992    WHAT NEXT? 2

TERM            COEFFICIENT

 0               9.53184
 1               0.126711
 2               1.75404 E-2

X-ACTUAL        Y-ACTUAL        Y-CALC          DIFF            PCT-DIFF

 2.90583         10.0482         10.0482          4.86374 E-5     4.84043 E-4
 2.8256          10.0298         10.0299         -1.19686 E-4    -1.19329 E-3
 2.74775         10.0125         10.0124          5.51939 E-5     5.51253 E-4
 2.67134          9.99555         9.9955          5.01871 E-5     5.02097 E-4
 2.59619          9.979           9.97903        -3.42131 E-5    -3.42849 E-4

        STD ERROR OF ESTIMATE FOR Y = 1.08227 E-4

  WHAT NEXT?
```

```
FILENAME? TCDSA
INITIAL (LOWEST) DEGREE TO BE FIT? 1


POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.998809    WHAT NEXT? 2

TERM          COEFFICIENT

 0             8.12404
 1             0.315927

X-ACTUAL      Y-ACTUAL      Y-CALC        DIFF             PCT-DIFF

 2.90583       9.04367       9.04207       1.59907 E-3      1.76848 E-2
 2.8256        9.0154        9.01672      -1.32418 E-3     -1.46858 E-2
 2.74775       8.99071       8.99213      -1.41919 E-3     -1.57825 E-2
 2.67134       8.9683        8.96799       3.10779 E-4      3.46542 E-3
 2.59619       8.94508       8.94425       8.32796 E-4      9.31097 E-3

         STD ERROR OF ESTIMATE FOR Y = 1.53999 E-3

   WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.999739    WHAT NEXT? 2

TERM          COEFFICIENT

 0             8.91759
 1            -0.261889
 2             0.105016

X-ACTUAL      Y-ACTUAL      Y-CALC        DIFF             PCT-DIFF

 2.90583       9.04367       9.04333       3.41654 E-4      3.77797 E-3
 2.8256        9.0154        9.01605      -6.49929 E-4     -7.20858 E-3
 2.74775       8.99071       8.99087      -1.63078 E-4     -1.81382 E-3
 2.67134       8.9683        8.9674        9.00149 E-4      0.010038
 2.59619       8.94508       8.94551      -4.2963 E-4      -4.80275 E-3

         STD ERROR OF ESTIMATE FOR Y = 8.8334 E-4

   WHAT NEXT? 0
```

```
FILENAME? TZNSE
INITIAL (LOWEST) DEGREE TO BE FIT? 1


POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999283    WHAT NEXT? 2

TERM          COEFFICIENT

 0             8.57533
 1             0.180225

X-ACTUAL      Y-ACTUAL      Y-CALC        DIFF              PCT-DIFF

 2.90583       9.09967       9.09903       6.41108 E-4       7.04589 E-3
 2.8256        9.08421       9.08457      -3.59535 E-4      -3.95765 E-3
 2.74775       9.0699        9.07054      -6.39081 E-4      -7.04568 E-3
 2.67134       9.05651       9.05677      -2.58207 E-4      -2.85099 E-3
 2.59619       9.04384       9.04322       6.15835 E-4       6.80991 E-3

          STD ERROR OF ESTIMATE FOR Y = 6.81819 E-4

  WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.999999    WHAT NEXT? 2

TERM          COEFFICIENT

 0             8.97263
 1            -0.109067
 2             5.25777 E-2

X-ACTUAL      Y-ACTUAL      Y-CALC        DIFF              PCT-DIFF

 2.90583       9.09967       9.09966       1.15633 E-5       1.27074 E-4
 2.8256        9.08421       9.08423      -2.19345 E-5      -2.41457 E-4
 2.74775       9.0699        9.06991      -1.01328 E-5      -1.11719 E-4
 2.67134       9.05651       9.05647       3.69549 E-5       4.08049 E-4
 2.59619       9.04384       9.04386      -1.62125 E-5      -1.79265 E-4

          STD ERROR OF ESTIMATE FOR Y = 3.42492 E-5

  WHAT NEXT? 0
```

```
FILENAME? TAS2S3
INITIAL (LOWEST) DEGREE TO BE FIT? 1


POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999545    WHAT NEXT? 2

TERM          COEFFICIENT

 0             7.79173
 1             3.91198 E-2

X-ACTUAL      Y-ACTUAL       Y-CALC         DIFF            PCT-DIFF

 2.90583       7.90551        7.90541        1.00195 E-4     1.26743 E-3
 2.8256        7.90222        7.90227       -5.12004 E-5    -6.4792 E-4
 2.74775       7.89913        7.89923       -9.57847 E-5    -1.21258 E-3
 2.67134       7.89617        7.89624       -6.65784 E-5    -8.43166 E-4
 2.59619       7.89341        7.8933         1.13249 E-4     1.43475 E-3

         STD ERROR OF ESTIMATE FOR Y = 1.14154 E-4

   WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.999994    WHAT NEXT? 2

TERM          COEFFICIENT

 0             7.85791
 1            -9.06377 E-3
 2             8.7572 E-3

X-ACTUAL      Y-ACTUAL       Y-CALC         DIFF            PCT-DIFF

 2.90583       7.90551        7.90551       -4.64916 E-6    -5.88091 E-5
 2.8256        7.90222        7.90222        5.00679 E-6     6.33593 E-5
 2.74775       7.89913        7.89912        9.0003 E-6      1.13941 E-4
 2.67134       7.89617        7.89619       -1.74642 E-5    -2.21172 E-4
 2.59619       7.89341        7.8934         7.98702 E-6     1.01186 E-4

         STD ERROR OF ESTIMATE FOR Y = 1.57556 E-5

   WHAT NEXT? 0
```

FILENAME? AS2S3KDF
INITIAL (LOWEST) DEGREE TO BE FIT? 1

POLYFIT OF DEGREE 1 INDEX OF DETERM = 7.96119 E-2 WHAT NEXT? 2

TERM	COEFFICIENT
0	7.45335
1	1.58113 E-3

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
3.07414	7.46204	7.45822	3.82459 E-3	5.12803 E-2
0.8496	7.45509	7.4547	3.91841 E-4	5.2563 E-3
2.94812	7.45797	7.45802	-4.61936 E-5	-6.19382 E-4
2.9001	7.45654	7.45794	-1.40029 E-3	-1.87759 E-2
2.8496	7.45509	7.45786	-2.77042 E-3	-3.71477 E-2

STD ERROR OF ESTIMATE FOR Y = 2.85302 E-3

WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.999998 WHAT NEXT? 2

TERM	COEFFICIENT
0	7.48876
1	-5.14509 E-2
2	1.39092 E-2

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
3.07414	7.46204	7.46204	-2.08616 E-6	-2.7957 E-5
0.8496	7.45509	7.45509	0	0
2.94812	7.45797	7.45797	1.19209 E-7	1.59841 E-6
2.9001	7.45654	7.45653	5.54323 E-6	7.43406 E-5
2.8496	7.45509	7.45509	-4.05312 E-6	-5.43671 E-5

STD ERROR OF ESTIMATE FOR Y = 5.0755 E-6

WHAT NEXT? 0

```
FILENAME? TAS2SE3
INITIAL (LOWEST) DEGREE TO BE FIT? 1


POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.997284    WHAT NEXT? 2

TERM            COEFFICIENT

 0               7.1545
 1               0.100285

X-ACTUAL        Y-ACTUAL        Y-CALC          DIFF            PCT-DIFF

 2.90583         7.4466          7.44591         6.88612 E-4     9.2482 E-3
 2.8256          7.43749         7.43787        -3.75569 E-4    -5.04942 E-3
 2.74775         7.42936         7.43006        -6.98388 E-4    -9.39949 E-3
 2.67134         7.42211         7.4224         -2.85566 E-4    -3.84735 E-3
 2.59619         7.41553         7.41486         6.7085 E-4      9.04738 E-3

         STD ERROR OF ESTIMATE FOR Y = 7.38145 E-4

   WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.999997    WHAT NEXT? 2

TERM            COEFFICIENT

 0               7.58478
 1              -0.213016
 2               5.69412 E-2

X-ACTUAL        Y-ACTUAL        Y-CALC          DIFF            PCT-DIFF

 2.90583         7.4466          7.44659         6.79493 E-6     9.12488 E-5
 2.8256          7.43749         7.4375         -1.00136 E-5    -1.34636 E-4
 2.74775         7.42936         7.42938        -1.7345 E-5     -2.33464 E-4
 2.67134         7.42211         7.42208         3.40343 E-5     4.58554 E-4
 2.59619         7.41553         7.41554        -1.36495 E-5    -1.84066 E-4

         STD ERROR OF ESTIMATE FOR Y = 2.99327 E-5

   WHAT NEXT? 0
```

APPENDIX IX

The quadratic fits obtained for the pressure variation of ε' are listed. These were obtained using the program SCOPOL, listed in Appendix VIII. Each page is identifiable by the fact that the name of the material is printed in the upper left hand corner.

FILENAME? 11CDSEC
INITIAL (LOWEST) DEGREE TO BE FIT? 1

POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999353 WHAT NEXT? 2

TERM	COEFFICIENT
0	10.3897
1	-1.32249 E-2

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	10.3901	10.3897	3.89338 E-4	3.74734 E-3
0.97216	10.3763	10.3769	-5.67198 E-4	-5.46598 E-3
1.44193	10.3705	10.3707	-1.54495 E-4	-1.48973 E-3
1.98431	10.3637	10.3635	2.18391 E-4	2.10732 E-3
2.99718	10.3502	10.3501	1.13606 E-4	1.09764 E-3

STD ERROR OF ESTIMATE FOR Y = 4.31187 E-4

WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.999587 WHAT NEXT? 2

TERM	COEFFICIENT
0	10.39
1	-1.38174 E-2
2	1.96747 E-4

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	10.3901	10.39	1.40905 E-4	1.35617 E-3
0.97216	10.3763	10.3767	-4.26173 E-4	-4.10701 E-3
1.44193	10.3705	10.3705	4.17233 E-5	4.02328 E-4
1.98431	10.3637	10.3633	3.70502 E-4	3.57513 E-3
2.99718	10.3502	10.3503	-1.26958 E-4	-1.22661 E-3

STD ERROR OF ESTIMATE FOR Y = 4.22261 E-4

WHAT NEXT? 0

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FILENAME? 11AS2S3
INITIAL (LOWEST) DEGREE TO BE FIT? 1


POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999933    WHAT NEXT? 2

TERM          COEFFICIENT

 0             7.9105
 1             0.104118

X-ACTUAL      Y-ACTUAL      Y-CALC        DIFF             PCT-DIFF

 0.001         7.90953       7.91061      -1.07902 E-3     -1.36402 E-2
 0.97216       8.01238       8.01172       6.56009 E-4      8.18811 E-3
 1.44193       8.06148       8.06064       8.44598 E-4      1.04781 E-2
 1.98431       8.11769       8.11711       5.83172 E-4      7.18448 E-3
 2.99718       8.22156       8.22256      -1.00458 E-3     -1.22173 E-2

        STD ERROR OF ESTIMATE FOR Y = 1.10412 E-3

   WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 1.    WHAT NEXT? 2

TERM          COEFFICIENT

 0             7.90944
 1             0.106642
 2            -8.38139 E-4

X-ACTUAL      Y-ACTUAL      Y-CALC        DIFF             PCT-DIFF

 0.001         7.90953       7.90955      -2.04444 E-5     -2.58477 E-4
 0.97216       8.01238       8.01232       5.54323 E-5      6.91838 E-4
 1.44193       8.06148       8.06147       8.82149 E-6      1.09428 E-4
 1.98431       8.11769       8.11775      -6.41346 E-5     -7.90053 E-4
 2.99718       8.22156       8.22154       2.0504 E-5       2.49394 E-4

        STD ERROR OF ESTIMATE FOR Y = 6.36482 E-5

   WHAT NEXT? 0
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FILENAME? 11ZNSE
INITIAL (LOWEST) DEGREE TO BE FIT? 1


POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999903    WHAT NEXT? 2

TERM            COEFFICIENT

 0               9.11987
 1              -1.81213 E-2

X-ACTUAL        Y-ACTUAL        Y-CALC          DIFF            PCT-DIFF

 0.001           9.12005         9.11985         2.00868 E-4     2.20253 E-3
 0.97216         9.10203         9.10225        -2.20299 E-4    -2.42027 E-3
 1.44193         9.09376         9.09374         2.25306 E-5     2.47759 E-4
 1.98431         9.08372         9.08391        -1.88828 E-4    -2.0787 E-3
 2.99718         9.06574         9.06555         1.85728 E-4     2.04872 E-3

          STD ERROR OF ESTIMATE FOR Y = 2.30606 E-4

   WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.999971    WHAT NEXT? 2

TERM            COEFFICIENT

 0               9.12005
 1              -0.018563
 2               1.46643 E-4

X-ACTUAL        Y-ACTUAL        Y-CALC          DIFF            PCT-DIFF

 0.001           9.12005         9.12003         1.57356 E-5     1.72539 E-4
 0.97216         9.10203         9.10215        -1.15156 E-4    -1.26515 E-3
 1.44193         9.09376         9.09359         1.688 E-4       1.85626 E-3
 1.98431         9.08372         9.0838         -7.55787 E-5    -8.32017 E-4
 2.99718         9.06574         9.06573         6.4373 E-6      7.1007 E-5

          STD ERROR OF ESTIMATE FOR Y = 1.54525 E-4

   WHAT NEXT? 0
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FILENAME? 12CDSEC
INITIAL (LOWEST) DEGREE TO BE FIT? 1

POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.935276 WHAT NEXT? 2

TERM	COEFFICIENT
0	10.3479
1	-2.46102 E-2

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	10.3408	10.3479	-7.05087 E-3	-6.81385 E-2
0.466848	10.3339	10.3364	-2.48623 E-3	-2.40532 E-2
0.950893	10.3275	10.3245	3.02613 E-3	2.93102 E-2
1.14907	10.3249	10.3196	5.30338 E-3	5.13914 E-2
1.81946	10.3124	10.3031	9.30178 E-3	9.02814 E-2
3.05487	10.2646	10.2727	-8.09443 E-3	-7.87956 E-2

STD ERROR OF ESTIMATE FOR Y = 7.82979 E-3

WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.995619 WHAT NEXT? 2

TERM	COEFFICIENT
0	10.3391
1	-4.50876 E-3
2	-6.43066 E-3

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	10.3408	10.3391	1.69408 E-3	1.63852 E-2
0.466848	10.3339	10.3356	-1.7041 E-3	-1.64876 E-2
0.950893	10.3275	10.329	-1.50859 E-3	-1.46054 E-2
1.14907	10.3249	10.3254	-5.38826 E-4	-5.21843 E-3
1.81946	10.3124	10.3096	2.78127 E-3	2.69774 E-2
3.05487	10.2646	10.2653	-7.24316 E-4	-7.05595 E-3

STD ERROR OF ESTIMATE FOR Y = 2.35232 E-3

WHAT NEXT? 0

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FILENAME? 12AS2S3
INITIAL (LOWEST) DEGREE TO BE FIT? 1


POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999949    WHAT NEXT? 2

TERM            COEFFICIENT

 0               7.9022
 1               0.102475

X-ACTUAL        Y-ACTUAL        Y-CALC          DIFF              PCT-DIFF

 0.001           7.90123         7.9023         -1.06847 E-3      -0.013521
 0.466848        7.94999         7.95004        -4.63724 E-5      -5.83298 E-4
 0.950893        8.00018         7.99964         5.41091 E-4       6.76394 E-3
 1.14907         8.02068         8.01995         7.3278 E-4        9.13696 E-3
 1.81946         8.08933         8.08865         6.845 E-4         8.46248 E-3
 3.05487         8.2144          8.21524        -8.44359 E-4      -0.010278

         STD ERROR OF ESTIMATE FOR Y = 8.88118 E-4

   WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 1.    WHAT NEXT? 2

TERM            COEFFICIENT

 0               7.90117
 1               0.104831
 2              -7.53785 E-4

X-ACTUAL        Y-ACTUAL        Y-CALC          DIFF              PCT-DIFF

 0.001           7.90123         7.90127        -4.34518 E-5      -5.49934 E-4
 0.466848        7.94999         7.94994         4.53591 E-5       5.70559 E-4
 0.950893        8.00018         8.00017         9.53674 E-6       1.19207 E-4
 1.14907         8.02068         8.02063         4.80413 E-5       5.98972 E-4
 1.81946         8.08933         8.08941        -7.98702 E-5      -9.87343 E-4
 3.05487         8.2144          8.21438         1.95503 E-5       2.38001 E-4

         STD ERROR OF ESTIMATE FOR Y = 6.60956 E-5

   WHAT NEXT? 0
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FILENAME? 12ZNSE
INITIAL (LOWEST) DEGREE TO BE FIT? 1

POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999907 WHAT NEXT? 2

TERM	COEFFICIENT
0	9.07862
1	-1.79006 E-2

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	9.07885	9.0786	2.49863 E-4	2.75222 E-3
0.466848	9.07028	9.07026	1.87159 E-5	2.06343 E-4
0.950893	9.06143	9.0616	-1.66535 E-4	-1.83781 E-3
1.14907	9.05791	9.05805	-1.38998 E-4	-1.53453 E-3
1.81946	9.04589	9.04605	-1.58668 E-4	-0.001754
3.05487	9.02413	9.02393	1.9598 E-4	2.17178 E-3

STD ERROR OF ESTIMATE FOR Y = 2.08218 E-4

WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.999999 WHAT NEXT? 2

TERM	COEFFICIENT
0	9.07886
1	-1.84501 E-2
2	1.75797 E-4

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	9.07885	9.07884	1.0848 E-5	1.19487 E-4
0.466848	9.07028	9.07028	-2.6226 E-6	-2.89143 E-5
0.950893	9.06143	9.06147	-4.25577 E-5	-4.69656 E-4
1.14907	9.05791	9.05789	2.06232 E-5	2.27682 E-4
1.81946	9.04589	9.04587	1.96695 E-5	2.17442 E-4
3.05487	9.02413	9.02414	-5.48363 E-6	-6.07662 E-5

STD ERROR OF ESTIMATE FOR Y = 3.04302 E-5

WHAT NEXT? 0

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FILENAME? 13CDSEC
INITIAL (LOWEST) DEGREE TO BE FIT? 1


POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.971793    WHAT NEXT? 2

TERM            COEFFICIENT

 0               10.3019
 1              -3.91523 E-2

X-ACTUAL        Y-ACTUAL        Y-CALC          DIFF            PCT-DIFF

 0.001           10.2933         10.3019        -8.5628 E-3     -0.083119
 0.966765        10.2705         10.2641         6.4491 E-3      0.062832
 1.47589         10.2488         10.2441         4.68254 E-3     4.57096 E-2
 2.00201         10.2288         10.2235         5.28133 E-3     5.16586 E-2
 3.0203          10.1758         10.1837        -7.85041 E-3    -7.70884 E-2

          STD ERROR OF ESTIMATE FOR Y = 8.68639 E-3

   WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.999123    WHAT NEXT? 2

TERM            COEFFICIENT

 0               10.2937
 1              -1.97284 E-2
 2              -6.40956 E-3

X-ACTUAL        Y-ACTUAL        Y-CALC          DIFF            PCT-DIFF

 0.001           10.2933         10.2937        -4.00782 E-4    -3.89346 E-3
 0.966765        10.2705         10.2687         1.84262 E-3     1.79441 E-2
 1.47589         10.2488         10.2506        -1.84202 E-3    -1.79698 E-2
 2.00201         10.2288         10.2285         2.65598 E-4     2.59664 E-3
 3.0203          10.1758         10.1757         1.3423 E-4      1.31912 E-3

          STD ERROR OF ESTIMATE FOR Y = 1.87583 E-3

   WHAT NEXT? 0
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FILENAME? 13AS2S3
INITIAL (LOWEST) DEGREE TO BE FIT? 1


POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999719    WHAT NEXT? 2

TERM          COEFFICIENT

 0             7.89553
 1             9.99978 E-2

X-ACTUAL      Y-ACTUAL       Y-CALC         DIFF             PCT-DIFF

 0.001         7.89378        7.89563       -1.84804 E-3     -2.34059 E-2
 0.966765      7.99299        7.9922         7.87616 E-4      9.8548 E-3
 1.47589       8.04437        8.04311        1.25623 E-3      1.56187 E-2
 2.00201       8.09771        8.09572        1.98531 E-3      0.024523
 3.0203        8.19537        8.19755       -2.18141 E-3     -2.66105 E-2

         STD ERROR OF ESTIMATE FOR Y = 2.18432 E-3

   WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.999983    WHAT NEXT? 2

TERM          COEFFICIENT

 0             7.8935
 1             0.104805
 2            -1.58642 E-3

X-ACTUAL      Y-ACTUAL       Y-CALC         DIFF             PCT-DIFF

 0.001         7.89378        7.89361        1.72138 E-4      2.18073 E-3
 0.966765      7.99299        7.99334       -3.52502 E-4     -4.40994 E-3
 1.47589       8.04437        8.04473       -3.58582 E-4     -4.45735 E-3
 2.00201       8.09771        8.09697        7.43866 E-4      9.18697 E-3
 3.0203        8.19537        8.19558       -2.05159 E-4     -2.50329 E-3

         STD ERROR OF ESTIMATE FOR Y = 6.62532 E-4

   WHAT NEXT? 0
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FILENAME? 13ZNSE
INITIAL (LOWEST) DEGREE TO BE FIT? 1

POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999298 WHAT NEXT?, 2

TERM	COEFFICIENT
0	9.04385
1	-1.73914 E-2

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	9.04429	9.04384	4.54545 E-4	5.02602 E-3
0.966765	9.0269	9.02704	-1.39356 E-4	-1.54376 E-3
1.47589	9.0179	9.01819	-2.85029 E-4	-3.16061 E-3
2.00201	9.0084	9.00903	-6.35028 E-4	-7.04879 E-3
3.0203	8.99193	8.99133	6.0451 E-4	6.72326 E-3

STD ERROR OF ESTIMATE FOR Y = 5.98878 E-4

WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.9999 WHAT NEXT? 2

TERM	COEFFICIENT
0	9.04438
1	-1.86513 E-2
2	4.15725 E-4

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	9.04429	9.04436	-7.48634 E-5	-8.27736 E-4
0.966765	9.0269	9.02674	1.59502 E-4	1.76699 E-3
1.47589	9.0179	9.01776	1.38283 E-4	1.53345 E-3
2.00201	9.0084	9.00871	-3.09706 E-4	-3.43785 E-3
3.0203	8.99193	8.99184	8.66652 E-5	9.6382 E-4

STD ERROR OF ESTIMATE FOR Y = 2.77125 E-4

WHAT NEXT? 0

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FILENAME? 14CDSEC
INITIAL (LOWEST) DEGREE TO BE FIT? 1


POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.995458     WHAT NEXT? 2

TERM            COEFFICIENT

 0               10.4369
 1              -1.27817 E-2

X-ACTUAL        Y-ACTUAL        Y-CALC          DIFF             PCT-DIFF

 0.001           10.438          10.4369          1.10674 E-3      1.06041 E-2
 0.964902        10.4239         10.4246         -6.72817 E-4     -6.45415 E-3
 1.46172         10.4171         10.4182         -1.12271 E-3     -1.07764 E-2
 1.98746         10.4113         10.4115         -2.02894 E-4     -1.94875 E-3
 3.01975         10.3992         10.3983          8.91566 E-4      8.57415 E-3

         STD ERROR OF ESTIMATE FOR Y = 1.12162 E-3

   WHAT NEXT? 3


POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.999624     WHAT NEXT? 2

TERM            COEFFICIENT

 0               10.4379
 1              -1.52217 E-2
 2               8.04307 E-4

X-ACTUAL        Y-ACTUAL        Y-CALC          DIFF             PCT-DIFF

 0.001           10.438          10.4379          7.689 E-5        7.36641 E-4
 0.964902        10.4239         10.424          -9.97782 E-5     -9.57197 E-4
 1.46172         10.4171         10.4174         -3.07083 E-4     -2.94779 E-3
 1.98746         10.4113         10.4109          4.37021 E-4      4.19774 E-3
 3.01975         10.3992         10.3993         -1.07169 E-4     -1.03054 E-3

         STD ERROR OF ESTIMATE FOR Y = 3.95374 E-4

   WHAT NEXT? 0
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FILENAME? 14AS2S3
INITIAL (LOWEST) DEGREE TO BE FIT? 1

POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999939    WHAT NEXT? 2

TERM          COEFFICIENT

 0             7.91463
 1             0.105468

X-ACTUAL      Y-ACTUAL      Y-CALC        DIFF             PCT-DIFF

 0.001         7.91371       7.91473     -1.02347 E-3     -1.29312 E-2
 0.964902      8.01728       8.01639      8.85248 E-4      0.011043
 1.46172       8.06908       8.06879      2.86579 E-4      3.5517 E-3
 1.98746       8.12504       8.12424      7.97629 E-4      9.81789 E-3
 3.01975       8.23217       8.23312     -9.46403 E-4     -1.14951 E-2

          STD ERROR OF ESTIMATE FOR Y = 1.07163 E-3

   WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.999993    WHAT NEXT? 2

TERM          COEFFICIENT

 0             7.91366
 1             0.10776
 2            -7.55403 E-4

X-ACTUAL      Y-ACTUAL      Y-CALC        DIFF             PCT-DIFF

 0.001         7.91371       7.91377     -5.62072 E-5     -7.10246 E-4
 0.964902      8.01728       8.01693      3.47018 E-4      4.32857 E-3
 1.46172       8.06908       8.06956     -4.7946 E-4      -5.94159 E-3
 1.98746       8.12504       8.12484      1.96695 E-4      2.42091 E-3
 3.01975       8.23217       8.23218     -8.46386 E-6     -1.02814 E-4

          STD ERROR OF ESTIMATE FOR Y = 4.42845 E-4

   WHAT NEXT? 0
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FILENAME? 14ZNSE
INITIAL (LOWEST) DEGREE TO BE FIT? 1

POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999185 WHAT NEXT? 2

TERM	COEFFICIENT
0	9.2044
1	-1.64587 E-2

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	9.20424	9.20438	-1.41144 E-4	-1.53344 E-3
0.964902	9.18919	9.18852	6.73532 E-4	7.33015 E-3
1.46172	9.17957	9.18034	-7.69496 E-4	-0.008382
1.98746	9.17192	9.17169	2.33412 E-4	2.54492 E-3
3.01975	9.1547	9.1547	3.69549 E-6	4.03671 E-5

STD ERROR OF ESTIMATE FOR Y = 6.11061 E-4

WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.999186 WHAT NEXT? 2

TERM	COEFFICIENT
0	9.20438
1	-1.64239 E-2
2	-1.14918 E-5

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	9.20424	9.20437	-1.26362 E-4	-1.37285 E-3
0.964902	9.18919	9.18852	6.65426 E-4	7.24193 E-3
1.46172	9.17957	9.18035	-7.81178 E-4	-8.50924 E-3
1.98746	9.17192	9.1717	2.24352 E-4	2.44613 E-3
3.01975	9.1547	9.15468	1.80006 E-5	1.96627 E-4

STD ERROR OF ESTIMATE FOR Y = 7.48217 E-4

WHAT NEXT? 0

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FILENAME? 21AS2S3
INITIAL (LOWEST) DEGREE TO BE FIT? 1


POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999918    WHAT NEXT? 2

TERM          COEFFICIENT

 0             7.45915
 1             0.101679

X-ACTUAL      Y-ACTUAL      Y-CALC        DIFF              PCT-DIFF

 0.001         7.45807       7.45926     -1.18649 E-3     -1.59063 E-2
 0.984077      7.55989       7.55922      6.74903 E-4      8.92822 E-3
 1.47102       7.60962       7.60873      8.92937 E-4      1.17357 E-2
 1.96726       7.65991       7.65918      7.25627 E-4      9.47395 E-3
 3.07459       7.77067       7.77178     -1.10692 E-3     -1.42428 E-2

        STD ERROR OF ESTIMATE FOR Y = 1.21276 E-3

  WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 1.    WHAT NEXT? 2

TERM          COEFFICIENT

 0             7.45798
 1             0.104371
 2            -8.69423 E-4

X-ACTUAL      Y-ACTUAL      Y-CALC        DIFF              PCT-DIFF

 0.001         7.45807       7.45808     -1.34706 E-5     -1.80618 E-4
 0.984077      7.55989       7.55985      4.33326 E-5      5.73194 E-4
 1.47102       7.60962       7.60963     -1.01924 E-5     -1.33941 E-4
 1.96726       7.65991       7.65994     -2.99811 E-5     -3.91402 E-4
 3.07459       7.77067       7.77066      1.04308 E-5      1.34233 E-4

        STD ERROR OF ESTIMATE FOR Y = 3.98166 E-5

  WHAT NEXT? 0
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FILENAME? 21AS2SE3
INITIAL (LOWEST) DEGREE TO BE FIT? 1


POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999951    WHAT NEXT? 2

TERM            COEFFICIENT

 0               9.38008
 1               0.16604

X-ACTUAL        Y-ACTUAL        Y-CALC          DIFF            PCT-DIFF

 0.001           9.3787          9.38025        -1.54805 E-3    -1.65033 E-2
 0.984077        9.54469         9.54348         1.21164 E-3     0.012696
 1.47102         9.6251          9.62433         7.69615 E-4     7.99656 E-3
 1.96726         9.70762         9.70673         3.93831 E-4     9.20837 E-3
 3.07459         9.88926         9.89059        -1.32751 E-3    -0.013422

         STD ERROR OF ESTIMATE FOR Y = 1.5295 E-3

   WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.999998    WHAT NEXT? 2

TERM            COEFFICIENT

 0               9.37863
 1               0.169358
 2              -1.07155 E-3

X-ACTUAL        Y-ACTUAL        Y-CALC          DIFF            PCT-DIFF

 0.001           9.3787          9.3788         -1.02401 E-4    -1.09183 E-3
 0.984077        9.54469         9.54426         4.33207 E-4     4.53892 E-3
 1.47102         9.6251          9.62544        -3.43561 E-4    -3.5693 E-3
 1.96726         9.70762         9.70766        -3.75509 E-5    -3.86818 E-4
 3.07459         9.88926         9.88921         4.95911 E-5     5.01466 E-4

         STD ERROR OF ESTIMATE FOR Y = 4.00036 E-4

   WHAT NEXT? 0
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FILENAME? 22CDSEA
INITIAL (LOWEST) DEGREE TO BE FIT? 1

POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999558 WHAT NEXT? 2

TERM	COEFFICIENT
0	9.48921
1	-1.63526 E-2

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	9.48962	9.48919	4.30107 E-4	4.5326 E-3
0.983546	9.47275	9.47312	-3.72648 E-4	-3.93374 E-3
1.45445	9.46528	9.46542	-1.42097 E-4	-1.50123 E-3
1.9993	9.4562	9.45651	-3.12448 E-4	-3.30405 E-3
3.01684	9.44027	9.43987	3.96967 E-4	4.20521 E-3

STD ERROR OF ESTIMATE FOR Y = 4.46937 E-4

WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.999958 WHAT NEXT? 2

TERM	COEFFICIENT
0	9.48962
1	-0.017319
2	3.18907 E-4

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	9.48962	9.4896	2.21729 E-5	2.33655 E-4
0.983546	9.47275	9.47289	-1.39594 E-4	-1.47362 E-3
1.45445	9.46528	9.4651	1.80006 E-4	1.90179 E-3
1.9993	9.4562	9.45626	-6.38962 E-5	-6.75702 E-4
3.01684	9.44027	9.44027	1.07288 E-6	1.1365 E-5

STD ERROR OF ESTIMATE FOR Y = 1.68024 E-4

WHAT NEXT? 0

FILENAME? 22AS2S3
INITIAL (LOWEST) DEGREE TO BE FIT? 1

POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999911 WHAT NEXT? 2

TERM	COEFFICIENT
0	7.46556
1	0.10325

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	7.46443	7.46566	-1.23286 E-3	-1.65138 E-2
0.983546	7.5679	7.56711	7.89404 E-4	0.010432
1.45445	7.6166	7.61573	8.68559 E-4	1.14048 E-2
1.9993	7.67273	7.67199	7.42912 E-4	9.68344 E-3
3.01684	7.77588	7.77705	-1.16801 E-3	-1.50187 E-2

STD ERROR OF ESTIMATE FOR Y = 1.26671 E-3

WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 1. WHAT NEXT? 2

TERM	COEFFICIENT
0	7.46434
1	0.106122
2	-9.47799 E-4

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	7.46443	7.46445	-2.05636 E-5	-2.75487 E-4
0.983546	7.5679	7.5678	9.64999 E-5	1.27514 E-3
1.45445	7.6166	7.61669	-8.86917 E-5	-1.16444 E-3
1.9993	7.67273	7.67273	4.29153 E-6	5.59323 E-5
3.01684	7.77588	7.77587	8.46386 E-6	1.08848 E-4

STD ERROR OF ESTIMATE FOR Y = 9.40515 E-5

WHAT NEXT? 0

FILENAME? 22AS2SE3
INITIAL (LOWEST) DEGREE TO BE FIT? 1

POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999934 WHAT NEXT? 2

TERM	COEFFICIENT
0	9.41565
1	0.170081

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	9.4141	9.41582	-1.71661 E-3	-1.82312 E-2
0.983546	9.58432	9.58293	1.39081 E-3	1.45135 E-2
1.45445	9.66369	9.66302	6.68883 E-4	6.92209 E-3
1.9993	9.75697	9.75569	1.28031 E-3	1.31237 E-2
3.01684	9.92713	9.92875	-1.62411 E-3	-1.63576 E-2

STD ERROR OF ESTIMATE FOR Y = 1.78936 E-3

WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.999995 WHAT NEXT? 2

TERM	COEFFICIENT
0	9.41399
1	0.173999
2	-1.29274 E-3

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	9.4141	9.41416	-6.31809 E-5	-6.71126 E-4
0.983546	9.58432	9.58387	4.45724 E-4	4.65077 E-3
1.45445	9.66369	9.66433	-6.36816 E-4	-6.58935 E-3
1.9993	9.75697	9.7567	2.7287 E-4	2.79675 E-3
3.01684	9.92713	9.92715	-1.94311 E-5	-1.95737 E-4

STD ERROR OF ESTIMATE FOR Y = 5.84394 E-4

WHAT NEXT? 0

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FILENAME? 23CDSEA
INITIAL (LOWEST) DEGREE TO BE FIT? 1


POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999742    WHAT NEXT? 2

TERM          COEFFICIENT

 0             9.41158
 1            -1.61979 E-2

X-ACTUAL      Y-ACTUAL       Y-CALC         DIFF            PCT-DIFF

 0.001         9.4119         9.41157        3.33905 E-4     3.54782 E-3
 1.01148       9.39494        9.3952        -2.58446 E-4    -2.75083 E-3
 1.47449       9.38749        9.3877        -2.08735 E-4    -2.2235 E-3
 1.99144       9.37916        9.37933       -1.65105 E-4    -1.76031 E-3
 3.01029       9.36312        9.36282        2.98023 E-4     3.18305 E-3

         STD ERROR OF ESTIMATE FOR Y = 3.35626 E-4

   WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.999994    WHAT NEXT? 2

TERM          COEFFICIENT

 0             9.4119
 1            -1.69479 E-2
 2             2.4852 E-4

X-ACTUAL      Y-ACTUAL       Y-CALC         DIFF            PCT-DIFF

 0.001         9.4119         9.41188        1.77622 E-5     1.88721 E-4
 1.01148       9.39494        9.39501       -7.09295 E-5    -7.5497 E-4
 1.47449       9.38749        9.38745        4.00543 E-5     4.26679 E-4
 1.99144       9.37916        9.37913        2.59876 E-5     2.77079 E-4
 3.01029       9.36312        9.36313       -1.3113 E-5     -1.4005 E-4

         STD ERROR OF ESTIMATE FOR Y = 6.24426 E-5

   WHAT NEXT? 0
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FILENAME? 23AS2S3
INITIAL (LOWEST) DEGREE TO BE FIT? 1

POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999899    WHAT NEXT? 2

TERM          COEFFICIENT

 0             7.45388
 1             0.100214

X-ACTUAL      Y-ACTUAL      Y-CALC        DIFF              PCT-DIFF

 0.001         7.45273       7.45398      -1.2511 E-3       -1.67843 E-2
 1.01148       7.55602       7.55525       7.74264 E-4       0.010248
 1.47449       7.6026        7.60165       9.53913 E-4       1.25488 E-2
 1.99144       7.65419       7.65345       7.38084 E-4       9.64381 E-3
 3.01029       7.75434       7.75556      -1.21534 E-3      -1.56706 E-2

          STD ERROR OF ESTIMATE FOR Y = 1.30339 E-3

   WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 1.     WHAT NEXT? 2

TERM          COEFFICIENT

 0             7.45264
 1             0.10316
 2            -9.7593 E-4

X-ACTUAL      Y-ACTUAL      Y-CALC        DIFF              PCT-DIFF

 0.001         7.45273       7.45274      -9.59635 E-6      -1.28763 E-4
 1.01148       7.55602       7.55598       3.80278 E-5       5.0328 E-4
 1.47449       7.6026        7.60262      -2.27094 E-5      -2.98704 E-4
 1.99144       7.65419       7.6542       -1.2517 E-5       -1.63531 E-4
 3.01029       7.75434       7.75433       6.49691 E-6       8.37842 E-5

          STD ERROR OF ESTIMATE FOR Y = 3.35619 E-5

   WHAT NEXT? 0
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FILENAME? 23AS2SE3
INITIAL (LOWEST) DEGREE TO BE FIT? 1


POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999948    WHAT NEXT? 2

TERM          COEFFICIENT

 0             9.35339
 1             0.162467

X-ACTUAL      Y-ACTUAL      Y-CALC        DIFF            PCT-DIFF

 0.001         9.35209       9.35355      -1.46091 E-3    -1.56188 E-2
 1.01148       9.51869       9.51772       9.69291 E-4     1.01841 E-2
 1.47449       9.59393       9.59294       9.85384 E-4     0.010277
 1.99144       9.67786       9.67693       9.28044 E-4     9.59027  -3
 3.01029       9.84104       9.84246      -1.42169 E-3    -1.44445 E-2

         STD ERROR OF ESTIMATE FOR Y = 1.51956 E-3

   WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 1.    WHAT NEXT? 2

TERM          COEFFICIENT

 0             9.35194
 1             0.165892
 2            -1.13483 E-3

X-ACTUAL      Y-ACTUAL      Y-CALC        DIFF            PCT-DIFF

 0.001         9.35209       9.35211      -1.72853 E-5    -1.84828 E-4
 1.01148       9.51869       9.51858       1.13249 E-4     1.18977 E-3
 1.47449       9.59393       9.59408      -1.50204 E-4    -1.56559 E-3
 1.99144       9.67786       9.6778        5.51939 E-5     5.70314 E-4
 3.01029       9.84104       9.84104      -8.34465 E-7    -8.47944 E-6

         STD ERROR OF ESTIMATE FOR Y = 1.39162 E-4

   WHAT NEXT? 0
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FILENAME? 24CDSEA
INITIAL (LOWEST) DEGREE TO BE FIT? 1


POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.9995     WHAT NEXT? 2

TERM            COEFFICIENT

 0               9.44916
 1              -1.60353 E-2

X-ACTUAL        Y-ACTUAL        Y-CALC          DIFF            PCT-DIFF

 0.001           9.4496          9.44914         4.58002 E-4     4.84702 E-3
 0.991698        9.43287         9.43326        -3.8588 E-4     -4.09064 E-3
 1.47299         9.4253          9.42554        -2.3818 E-4     -2.52697 E-3
 1.99986         9.41685         9.41709        -2.3973 E-4     -2.54569 E-3
 2.98924         9.40163         9.40122         4.05431 E-4     4.31253 E-3

         STD ERROR OF ESTIMATE FOR Y = 4.60885 E-4

   WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.999977     WHAT NEXT? 2

TERM            COEFFICIENT

 0               9.44959
 1              -1.70639 E-2
 2               3.43473 E-4

X-ACTUAL        Y-ACTUAL        Y-CALC          DIFF            PCT-DIFF

 0.001           9.4496          9.44957         3.06368 E-5     3.24214 E-4
 0.991698        9.43287         9.433          -1.31965 E-4    -1.39897 E-3
 1.47299         9.4253          9.4252          1.03354 E-4     1.09658 E-3
 1.99986         9.41685         9.41683         1.52588 E-5     1.62037 E-4
 2.98924         9.40163         9.40165        -1.74046 E-5    -1.85122 E-4

         STD ERROR OF ESTIMATE FOR Y = 1.21596 E-4

   WHAT NEXT? 0
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FILENAME? 24AS2S3
INITIAL (LOWEST) DEGREE TO BE FIT? 1


POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999908    WHAT NEXT? 2

TERM          COEFFICIENT

 0             7.46079
 1             0.101774

X-ACTUAL      Y-ACTUAL       Y-CALC         DIFF            PCT-DIFF

 0.001         7.45968        7.46089      -1.20705 E-3    -1.61784 E-2
 0.991698      7.56248        7.56171       7.65562 E-4     1.01242 E-2
 1.47299       7.61161        7.6107        9.12547 E-4     1.19903 E-2
 1.99986       7.66502        7.66432       7.00891 E-4     9.14486 E-3
 2.98924       7.76384        7.76501      -1.1723 E-3     -1.50973 E-2

         STD ERROR OF ESTIMATE FOR Y = 1.25716 E-3

   WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 1.     WHAT NEXT? 2

TERM          COEFFICIENT

 0             7.45959
 1             0.104646
 2            -9.59068 E-4

X-ACTUAL      Y-ACTUAL       Y-CALC         DIFF            PCT-DIFF

 0.001         7.45968        7.45969      -1.38283 E-5    -1.85373 E-4
 0.991698      7.56248        7.56242       5.67436 E-5     7.50336 E-4
 1.47299       7.61161        7.61165      -4.08888 E-5    -5.37187 E-4
 1.99986       7.66502        7.66503      -1.09076 E-5    -1.42304 E-4
 2.98924       7.76384        7.76383       8.46386 E-6     1.09017 E-4

         STD ERROR OF ESTIMATE FOR Y = 5.13496 E-5

   WHAT NEXT? 0
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FILENAME? 24AS2SE3
INITIAL (LOWEST) DEGREE TO BE FIT? 1


POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999947    WHAT NEXT? 2

TERM            COEFFICIENT

 0               9.39086
 1               0.166443

X-ACTUAL        Y-ACTUAL        Y-CALC          DIFF              PCT-DIFF

 0.001           9.38953         9.39103        -1.50096 E-3      -0.015983
 0.991698        9.55709         9.55593         1.16432 E-3       1.21842 E-2
 1.47299         9.63679         9.63603         7.56502 E-4       7.85076 E-3
 1.99986         9.72475         9.72373         1.0227 E-3        1.05175 E-2
 2.98924         9.88696         9.8884         -1.44279 E-3      -1.45907 E-2

          STD ERROR OF ESTIMATE FOR Y = 1.56081 E-3

   WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.999998    WHAT NEXT? 2

TERM            COEFFICIENT

 0               9.38941
 1               0.169942
 2              -1.16826 E-3

X-ACTUAL        Y-ACTUAL        Y-CALC          DIFF              PCT-DIFF

 0.001           9.38953         9.38958        -4.74453 E-5      -5.05297 E-4
 0.991698        9.55709         9.55679         3.00884 E-4       3.14838 E-3
 1.47299         9.63679         9.63719        -4.04835 E-4      -4.20075 E-3
 1.99986         9.72475         9.72459         1.55687 E-4       1.60096 E-3
 2.98924         9.88696         9.88696        -4.41074 E-6      -4.46117 E-5

          STD ERROR OF ESTIMATE FOR Y = 3.74788 E-4

   WHAT NEXT? 0
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FILENAME? 31AS2S31
INITIAL (LOWEST) DEGREE TO BE FIT? 1

POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999908 WHAT NEXT? 2

TERM	COEFFICIENT
0	7.44842
1	0.101711

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	7.44726	7.44852	-1.25736 E-3	-1.68807 E-2
0.986325	7.54948	7.54874	7.43806 E-4	9.85339 E-3
1.44124	7.59595	7.59501	9.4378 E-4	1.24263 E-2
1.99994	7.65257	7.65183	7.37607 E-4	9.63962 E-3
3.05484	7.75796	7.75913	-1.16777 E-3	-1.50503 E-2

STD ERROR OF ESTIMATE FOR Y = 1.28227 E-3

WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 1. WHAT NEXT? 2

TERM	COEFFICIENT
0	7.44717
1	0.104591
2	-9.35987 E-4

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	7.44726	7.44728	-1.69873 E-5	-2.28101 E-4
0.986325	7.54948	7.54942	5.73397 E-5	7.59524 E-4
1.44124	7.59595	7.59597	-1.90735 E-5	-2.511 E-4
1.99994	7.65257	7.6526	-3.45707 E-5	-4.51751 E-4
3.05484	7.75796	7.75795	1.32322 E-5	1.70564 E-4

STD ERROR OF ESTIMATE FOR Y = 5.15288 E-5

WHAT NEXT? 0

FILENAME? 30AS2S32
INITIAL (LOWEST) DEGREE TO BE FIT? 0

POLYFIT OF DEGREE 0 INDEX OF DETERM = 0.99991 WHAT NEXT? 2

TERM	COEFFICIENT
0	7.4599
1	0.10172

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	7.45876	7.46	-1.23906 E-3	-1.66094 E-2
0.986325	7.56096	7.56023	7.33972 E-4	9.70833 E-3
1.44124	7.60742	7.6065	9.20177 E-4	1.20972 E-2
1.99994	7.66407	7.66333	7.39396 E-4	9.64849 E-3
3.05484	7.76948	7.77063	-1.15478 E-3	-1.48608 E-2

STD ERROR OF ESTIMATE FOR Y = 1.26503 E-3

WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 1. WHAT NEXT? 2

TERM	COEFFICIENT
0	7.45867
1	0.104561
2	-9.23408 E-4

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	7.45876	7.45878	-1.52588 E-5	-2.04575 E-4
0.986325	7.56096	7.5609	5.67436 E-5	7.50487 E-4
1.44124	7.60742	7.60745	-2.96831 E-5	-3.90185 E-4
1.99994	7.66407	7.66409	-2.24113 E-5	-2.9242 E-4
3.05484	7.76948	7.76947	1.03712 E-5	1.33487 E-4

STD ERROR OF ESTIMATE FOR Y = 4.97171 E-5

WHAT NEXT? 0

FILENAME? 31AS2S33
INITIAL (LOWEST) DEGREE TO BE FIT? 1

POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999909 WHAT NEXT? 2

TERM	COEFFICIENT
0	7.4484
1	0.101568

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	7.44726	7.44851	-1.24556 E-3	-1.67223 E-2
0.986325	7.54932	7.54858	7.36713 E-4	9.75962 E-3
1.44124	7.59572	7.59479	9.31859 E-4	1.22697 E-2
1.99994	7.65227	7.65153	7.3576 E-4	9.61585 E-3
3.05484	7.75752	7.75868	-1.15854 E-3	-1.49321 E-2

STD ERROR OF ESTIMATE FOR Y = 1.27097 E-3

WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 1. WHAT NEXT? 2

TERM	COEFFICIENT
0	7.44717
1	0.104423
2	-9.27768 E-4

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	7.44726	7.44728	-1.60336 E-5	-2.15295 E-4
0.986325	7.54932	7.54926	5.63264 E-5	7.46118 E-4
1.44124	7.59572	7.59574	-2.2471 E-5	-2.95836 E-4
1.99994	7.65227	7.6523	-2.96235 E-5	-3.87119 E-4
3.05484	7.75752	7.75751	1.20997 E-5	1.55975 E-4

STD ERROR OF ESTIMATE FOR Y = 4.97928 E-5

WHAT NEXT? 0

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FILENAME? 32AS2S31
INITIAL (LOWEST) DEGREE TO BE FIT? 1


POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999902    WHAT NEXT? 2

TERM            COEFFICIENT

 0               7.44219
 1               0.100046

X-ACTUAL        Y-ACTUAL        Y-CALC          DIFF              PCT-DIFF

 0.001           7.44108         7.44229        -1.21248 E-3      -1.62917 E-2
 0.963307        7.5393          7.53857         7.32243 E-4       9.71329 E-3
 1.45898         7.58909         7.58816         9.31919 E-4       1.22812 E-2
 2.00563         7.64359         7.64285         7.41541 E-4       9.70242 E-3
 2.97553         7.73869         7.73988        -1.19334 E-3      -1.54181 E-2

          STD ERROR OF ESTIMATE FOR Y = 1.27131 E-3

   WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 1.    WHAT NEXT? 2

TERM            COEFFICIENT

 0               7.44098
 1               0.102983
 2              -9.8474 E-4

X-ACTUAL        Y-ACTUAL        Y-CALC          DIFF              PCT-DIFF

 0.001           7.44108         7.44108        -3.8147 E-6       -5.12653 E-5
 0.963307        7.5393          7.53927         2.83122 E-5       3.7553 E-4
 1.45898         7.58909         7.58914        -4.55379 E-5      -6.00041 E-4
 2.00563         7.64359         7.64357         2.35438 E-5       3.08022 E-4
 2.97553         7.73869         7.73869        -2.6226 E-6       -3.38895 E-5

          STD ERROR OF ESTIMATE FOR Y = 4.15393 E-5

   WHAT NEXT? 0
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FILENAME? 32AS2S32
INITIAL (LOWEST) DEGREE TO BE FIT? 1


POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999896     WHAT NEXT? 2

TERM            COEFFICIENT

 0               7.45366
 1               0.100002

X-ACTUAL        Y-ACTUAL        Y-CALC          DIFF              PCT-DIFF

 0.001           7.45251         7.45376        -1.24991 E-3      -1.67688 E-2
 0.963307        7.55074         7.54999         7.47383 E-4       9.89912 E-3
 1.45898         7.60052         7.59956         9.59039 E-4       1.26197 E-2
 2.00563         7.65501         7.65423         7.82847 E-4       1.02276 E-2
 2.97553         7.74998         7.75122        -1.23918 E-3      -1.59869 E-2

          STD ERROR OF ESTIMATE FOR Y = 1.31517 E-3

   WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 1.     WHAT NEXT? 2

TERM            COEFFICIENT

 0               7.45241
 1               0.10304
 2              -1.01858 E-3

X-ACTUAL        Y-ACTUAL        Y-CALC          DIFF              PCT-DIFF

 0.001           7.45251         7.45251         2.98023 E-7       3.99896 E-6
 0.963307        7.55074         7.55072         1.92523 E-5       2.54973 E-4
 1.45898         7.60052         7.60057        -5.20349 E-5      -6.84618 E-4
 2.00563         7.65501         7.65497         4.01735 E-5       5.24803 E-4
 2.97553         7.74998         7.74999        -7.56979 E-6      -9.76749 E-5

          STD ERROR OF ESTIMATE FOR Y = 4.87318 E-5

   WHAT NEXT? 0
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FILENAME? 32AS2S33
INITIAL (LOWEST) DEGREE TO BE FIT? 1

POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999901 WHAT NEXT? 2

TERM	COEFFICIENT
0	7.44213
1	9.99018 E-2

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	7.44101	7.44223	-1.22052 E-3	-0.0164
0.963307	7.5391	7.53837	7.33316 E-4	9.72778 E-3
1.45898	7.58883	7.58789	9.44734 E-4	1.24506 E-2
2.00563	7.64324	7.6425	7.43389 E-4	9.72705 E-3
2.97553	7.73819	7.73939	-1.20127 E-3	-1.55215 E-2

STD ERROR OF ESTIMATE FOR Y = 1.28006 E-3

WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 1. WHAT NEXT? 2

TERM	COEFFICIENT
0	7.44091
1	0.102859
2	-9.91586 E-4

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	7.44101	7.44101	-3.45707 E-6	-4.64597 E-5
0.963307	7.5391	7.53908	2.44975 E-5	3.2494 E-4
1.45898	7.58883	7.58887	-3.95179 E-5	-5.20735 E-4
2.00563	7.64324	7.64322	2.03848 E-5	2.66704 E-4
2.97553	7.73819	7.73819	-2.26498 E-6	-2.92701 E-5

STD ERROR OF ESTIMATE FOR Y = 3.60167 E-5

WHAT NEXT? 0

FILENAME? 33AS2S31
INITIAL (LOWEST) DEGREE TO BE FIT? 1

POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999795 WHAT NEXT? 2

TERM	COEFFICIENT
0	7.43824
1	9.82419 E-2

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	7.4367	7.43834	-1.64205 E-3	-2.20755 E-2
0.965866	7.53394	7.53313	8.07762 E-4	1.07228 E-2
1.45958	7.5827	7.58164	1.06436 E-3	1.40387 E-2
1.99829	7.63613	7.63456	1.57046 E-3	2.05704 E-2
3.03798	7.7349	7.7367	-1.8006 E-3	-2.32734 E-2

STD ERROR OF ESTIMATE FOR Y = 1.84302 E-3

WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.999992 WHAT NEXT? 2

TERM	COEFFICIENT
0	7.4365
1	0.102331
2	-1.33876 E-3

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	7.4367	7.4366	9.62019 E-5	1.29363 E-3
0.965866	7.53394	7.53409	-1.50323 E-4	-1.99524 E-3
1.45958	7.5827	7.58301	-3.09348 E-4	-4.07949 E-3
1.99829	7.63613	7.63564	4.87864 E-4	6.3893 E-3
3.03798	7.7349	7.73502	-1.24454 E-4	-1.60897 E-3

STD ERROR OF ESTIMATE FOR Y = 4.36491 E-4

WHAT NEXT? 0

FILENAME? 33AS2S32
INITIAL (LOWEST) DEGREE TO BE FIT? 1

POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999832 WHAT NEXT? 2

TERM	COEFFICIENT
0	7.44951
1	9.84018 E-2

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	7.44809	7.44961	-1.51557 E-3	-2.03443 E-2
0.965866	7.54533	7.54455	7.79927 E-4	1.03376 E-2
1.45958	7.59413	7.59313	9.97543 E-4	1.31374 E-2
1.99829	7.6475	7.64614	1.35756 E-3	1.77548 E-2
3.03798	7.74683	7.74845	-1.61976 E-3	-2.09043 E-2

STD ERROR OF ESTIMATE FOR Y = 1.67002 E-3

WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.999995 WHAT NEXT? 2

TERM	COEFFICIENT
0	7.44792
1	0.102127
2	-1.21973 E-3

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	7.44809	7.44802	6.81877 E-5	9.15514 E-4
0.965866	7.54533	7.54542	-9.29832 E-5	-1.23231 E-3
1.45958	7.59413	7.59438	-2.53975 E-4	-3.34425 E-3
1.99829	7.6475	7.64713	3.71218 E-4	4.85434 E-3
3.03798	7.74683	7.74692	-9.26256 E-5	-1.19564 E-3

STD ERROR OF ESTIMATE FOR Y = 3.34799 E-4

WHAT NEXT? 0

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    RUN
FILENAME? 33AS2S33
INITIAL (LOWEST) DEGREE TO BE FIT? 1


POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999815    WHAT NEXT? 2

TERM            COEFFICIENT

 0               7.43807
 1               9.81945 E-2

X-ACTUAL        Y-ACTUAL        Y-CALC          DIFF            PCT-DIFF

 0.001           7.43659         7.43817        -1.57857 E-3    -2.12226 E-2
 0.965866        7.5337          7.53291         7.86781 E-4     1.04446 E-2
 1.45958         7.58245         7.58139         1.05679 E-3     1.39393 E-2
 1.99829         7.63573         7.63429         1.43844 E-3     1.88418 E-2
 3.03798         7.73468         7.73638        -1.7035 E-3     -2.20193 E-2

         STD ERROR OF ESTIMATE FOR Y = 1.75107 E-3

   WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.999995    WHAT NEXT? 2

TERM            COEFFICIENT

 0               7.43641
 1               0.102097
 2              -1.27782 E-3

X-ACTUAL        Y-ACTUAL        Y-CALC          DIFF            PCT-DIFF

 0.001           7.43659         7.43651         8.05259 E-5     1.08285 E-3
 0.965866        7.5337          7.53383        -1.27673 E-4    -1.69467 E-3
 1.45958         7.58245         7.5827         -2.54393 E-4    -3.35491 E-3
 1.99829         7.63573         7.63532         4.05073 E-4     5.30525 E-3
 3.03798         7.73468         7.73478        -1.03652 E-4    -1.34008 E-3

         STD ERROR OF ESTIMATE FOR Y = 3.62166 E-4

   WHAT NEXT? 0
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FILENAME? 34AS2S31
INITIAL (LOWEST) DEGREE TO BE FIT? 1

POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999911 WHAT NEXT? 2

TERM	COEFFICIENT
0	7.45482
1	0.103274

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	7.45369	7.45492	-1.23405 E-3	-1.65536 E-2
0.988692	7.55771	7.55693	7.83205 E-4	1.03641 E-2
1.49484	7.6101	7.6092	9.01282 E-4	1.18446 E-2
1.99735	7.66182	7.66109	7.2515 E-4	9.46536 E-3
3.0347	7.76705	7.76823	-1.17594 E-3	-1.51378 E-2

STD ERROR OF ESTIMATE FOR Y = 1.27244 E-3

WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 1. WHAT NEXT? 2

TERM	COEFFICIENT
0	7.45361
1	0.106132
2	-9.39169 E-4

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	7.45369	7.45371	-2.3365 E-5	-3.13468 E-4
0.988692	7.55771	7.55762	8.9407 E-5	0.001183
1.49484	7.6101	7.61016	-5.83529 E-5	-7.66777 E-4
1.99735	7.66182	7.66184	-2.24113 E-5	-2.92506 E-4
3.0347	7.76705	7.76704	1.44839 E-5	1.86479 E-4

STD ERROR OF ESTIMATE FOR Y = 7.95508 E-5

WHAT NEXT? 0

FILENAME? 34AS2S32
INITIAL (LOWEST) DEGREE TO BE FIT? 1

POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999911 WHAT NEXT? 2

TERM	COEFFICIENT
0	7.46632
1	0.103265

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	7.46519	7.46642	-1.23131 E-3	-1.64913 E-2
0.988692	7.5692	7.56842	7.84636 E-4	1.03672 E-2
1.49484	7.62157	7.62068	8.87334 E-4	1.16438 E-2
1.99735	7.67331	7.67257	7.35641 E-4	9.58792 E-3
3.0347	7.77852	7.7797	-1.1763 E-3	-1.51201 E-2

STD ERROR OF ESTIMATE FOR Y = 1.27069 E-3

WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 1. WHAT NEXT? 2

TERM	COEFFICIENT
0	7.46511
1	0.106118
2	-9.37729 E-4

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	7.46519	7.46521	-2.2471 E-5	-3.01009 E-4
0.988692	7.5692	7.56911	9.19104 E-5	1.21428 E-3
1.49484	7.62157	7.62164	-7.08699 E-5	-9.29851 E-4
1.99735	7.67331	7.67332	-1.07884 E-5	-1.40597 E-4
3.0347	7.77852	7.77851	1.23382 E-5	1.58619 E-4

STD ERROR OF ESTIMATE FOR Y = 8.43908 E-5

WHAT NEXT? 0

FILENAME? 34AS2S33
INITIAL (LOWEST) DEGREE TO BE FIT? 1

POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999911 WHAT NEXT? 2

TERM	COEFFICIENT
0	7.45483
1	0.103133

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	7.4537	7.45493	-1.22893 E-3	-1.64848 E-2
0.988692	7.55757	7.55679	7.76947 E-4	1.02814 E-2
1.49484	7.60989	7.60899	8.96156 E-4	1.17776 E-2
1.99735	7.66155	7.66082	7.30574 E-4	9.5365 E-3
3.0347	7.76663	7.7678	-1.17487 E-3	-1.51248 E-2

STD ERROR OF ESTIMATE FOR Y = 0.001269

WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 1. WHAT NEXT? 2

TERM	COEFFICIENT
0	7.45362
1	0.105984
2	-9.36718 E-4

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	7.4537	7.45372	-2.13981 E-5	-2.87079 E-4
0.988692	7.55757	7.55749	8.49366 E-5	1.12387 E-3
1.49484	7.60989	7.60995	-6.09756 E-5	-8.01261 E-4
1.99735	7.66155	7.66157	-1.50204 E-5	-1.96048 E-4
3.0347	7.76663	7.76662	1.24574 E-5	1.60396 E-4

STD ERROR OF ESTIMATE FOR Y = 7.67168 E-5

WHAT NEXT? 0

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FILENAME? 41CDSA
INITIAL (LOWEST) DEGREE TO BE FIT? 1


POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.998736    WHAT NEXT? 2

TERM          COEFFICIENT

 0             9.07939
 1            -1.15069 E-2

X-ACTUAL      Y-ACTUAL       Y-CALC         DIFF            PCT-DIFF

 0.001         9.07975        9.07938        3.68237 E-4     4.05576 E-3
 0.997955      9.06797        9.06791        6.02007 E-5     6.63887 E-4
 1.44669       9.06204        9.06275       -7.06315 E-4    -7.79361 E-3
 1.99717       9.05628        9.05641       -1.31965 E-4    -1.45714 E-3
 2.9906        9.04539        9.04498        4.09365 E-4     4.52588 E-3

         STD ERROR OF ESTIMATE FOR Y = 5.238 E-4

   WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.999613    WHAT NEXT? 2

TERM          COEFFICIENT

 0             9.07981
 1            -1.25043 E-2
 2             3.32332 E-4

X-ACTUAL      Y-ACTUAL       Y-CALC         DIFF            PCT-DIFF

 0.001         9.07975        9.0798        -4.87566 E-5    -5.36979 E-4
 0.997955      9.06797        9.06766        3.06606 E-4     3.38132 E-3
 1.44669       9.06204        9.06242       -3.7694 E-4     -4.15937 E-3
 1.99717       9.05628        9.05616        1.16467 E-4     1.28606 E-3
 2.9906        9.04539        9.04539        1.90735 E-6     2.10864 E-5

         STD ERROR OF ESTIMATE FOR Y = 3.54991 E-4

   WHAT NEXT? 0
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FILENAME? 42CDSA
INITIAL (LOWEST) DEGREE TO BE FIT? 1

POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.999293 WHAT NEXT? 2

TERM	COEFFICIENT
0	9.00546
1	-9.35983 E-3

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	9.00572	9.00545	2.70009 E-4	2.99828 E-3
1.00095	8.99584	8.99609	-2.50697 E-4	-2.78673 E-3
1.46062	8.99145	8.99179	-3.38316 E-4	-3.7625 E-3
2.01218	8.98684	8.98663	2.14219 E-4	2.38375 E-3
3.01217	8.97737	8.97727	1.03951 E-4	1.15793 E-3

STD ERROR OF ESTIMATE FOR Y = 3.19847 E-4

WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.999598 WHAT NEXT? 2

TERM	COEFFICIENT
0	9.00566
1	-9.83695 E-3
2	1.57864 E-4

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	9.00572	9.00565	6.93798 E-5	7.70403 E-4
1.00095	8.99584	8.99597	-1.32442 E-4	-1.47223 E-3
1.46062	8.99145	8.99163	-1.79291 E-4	-1.99397 E-3
2.01218	8.98684	8.98651	3.34024 E-4	3.71696 E-3
3.01217	8.97737	8.97746	-9.2268 E-5	-1.02777 E-3

STD ERROR OF ESTIMATE FOR Y = 2.95453 E-4

WHAT NEXT? 0

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FILENAME? 43CDSA
INITIAL (LOWEST) DEGREE TO BE FIT? 1


POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.986643    WHAT NEXT? 2

TERM          COEFFICIENT

 0             8.94756
 1            -1.01494 E-2

X-ACTUAL      Y-ACTUAL      Y-CALC        DIFF            PCT-DIFF

 0.001         8.94705       8.94755     -4.97818 E-4    -5.56374 E-3
 0.964717      8.9398        8.93777      2.03335 E-3     2.27501 E-2
 1.45911       8.9313        8.93275     -1.44875 E-3    -1.62184 E-2
 1.9973        8.92686       8.92729     -4.26531 E-4    -4.77783 E-3
 2.96045       8.91785       8.91751      3.38912 E-4     3.80052 E-3

        STD ERROR OF ESTIMATE FOR Y = 1.50311 E-3

   WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.986646    WHAT NEXT? 2

TERM          COEFFICIENT

 0             8.94758
 1            -1.01977 E-2
 2             1.62874 E-5

X-ACTUAL      Y-ACTUAL      Y-CALC        DIFF            PCT-DIFF

 0.001         8.94705       8.94757     -5.17488 E-4    -5.78356 E-3
 0.964717      8.9398        8.93775      2.04504 E-3     2.28809 E-2
 1.45911       8.9313        8.93273     -1.43278 E-3    -1.60396 E-2
 1.9973        8.92686       8.92727     -4.14848 E-4    -4.64698 E-3
 2.96045       8.91785       8.91753      3.19362 E-4     3.58128 E-3

        STD ERROR OF ESTIMATE FOR Y = 1.84077 E-3

   WHAT NEXT? 0
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FILENAME? 44CDSA
INITIAL (LOWEST) DEGREE TO BE FIT? 1


POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.986558    WHAT NEXT? 2

TERM            COEFFICIENT

 0               9.11173
 1              -1.17343 E-2

X-ACTUAL        Y-ACTUAL        Y-CALC          DIFF            PCT-DIFF

 0.001           9.11212         9.11172         4.02927 E-4     4.42208 E-3
 0.528141        9.10609         9.10553         5.58496 E-4     6.13359 E-3
 1.31304         9.09395         9.09632        -2.37119 E-3    -2.60676 E-2
 1.58382         9.09394         9.09314         7.96199 E-4     8.75603 E-3
 2.53889         9.08255         9.08194         6.13213 E-4     0.006752

         STD ERROR OF ESTIMATE FOR Y = 1.53913 E-3

   WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.98964    WHAT NEXT? 2

TERM            COEFFICIENT

 0               9.11239
 1              -1.37682 E-2
 2               8.07378 E-4

X-ACTUAL        Y-ACTUAL        Y-CALC          DIFF            PCT-DIFF

 0.001           9.11212         9.11237        -2.52247 E-4    -2.76818 E-3
 0.528141        9.10609         9.10534         7.50303 E-4     8.24026 E-3
 1.31304         9.09395         9.0957         -1.74963 E-3    -1.92358 E-2
 1.58382         9.09394         9.0926          1.33514 E-3     1.46838 E-2
 2.53889         9.08255         9.08263        -8.41618 E-5    -9.26623 E-4

         STD ERROR OF ESTIMATE FOR Y = 1.65492 E-3

   WHAT NEXT? 0
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FILENAME? 51CDSCF
INITIAL (LOWEST) DEGREE TO BE FIT? 1


POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.941634    WHAT NEXT? 2

TERM          COEFFICIENT

 0             10.0701
 1            -4.79893 E-3

X-ACTUAL      Y-ACTUAL      Y-CALC        DIFF           PCT-DIFF

 0.001         10.0691       10.0701      -9.51767 E-4   -9.45146 E-3
 0.96809       10.0659       10.0654       4.89235 E-4    4.86056 E-3
 1.98904       10.0624       10.0605       1.88863 E-3    1.87727 E-2
 2.96528       10.0544       10.0558      -1.42646 E-3   -1.41854 E-2

          STD ERROR OF ESTIMATE FOR Y = 1.8367 E-3

   WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.990692    WHAT NEXT? 2

TERM          COEFFICIENT

 0             10.0689
 1            -1.14955 E-3
 2            -1.22995 E-3

X-ACTUAL      Y-ACTUAL      Y-CALC        DIFF           PCT-DIFF

 0.001         10.0691       10.0689       2.40445 E-4    2.38801 E-3
 0.96809       10.0659       10.0666      -6.95229 E-4   -6.90629 E-3
 1.98904       10.0624       10.0617       6.91772 E-4    6.87529 E-3
 2.96528       10.0544       10.0546      -2.37346 E-4   -2.36056 E-3

          STD ERROR OF ESTIMATE FOR Y = 1.03732 E-3

   WHAT NEXT? 0
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FILENAME? 53CDSC
INITIAL (LOWEST) DEGREE TO BE FIT? 1

POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.783928 WHAT NEXT? 2

TERM	COEFFICIENT
0	10.0606
1	-5.40847 E-2

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	10.0234	10.0605	-3.71404 E-2	-0.369169
0.95814	10.0196	10.0088	1.08262 E-2	0.108167
0.951544	10.0195	10.0091	1.03695 E-2	0.103601
1.43807	10.0085	9.98282	0.025683	0.257273
1.9924	9.97959	9.95284	2.67539 E-2	0.268807
3.0264	9.86042	9.89691	-3.64926 E-2	-0.368727

STD ERROR OF ESTIMATE FOR Y = 0.03283

WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.994442 WHAT NEXT? 2

TERM	COEFFICIENT
0	10.0203
1	2.96973 E-2
2	-2.69953 E-2

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	10.0234	10.0204	3.0396 E-3	3.03342 E-2
0.95814	10.0196	10.024	-4.40228 E-3	-4.39174 E-2
0.951544	10.0195	10.0241	-4.64642 E-3	-4.63523 E-2
1.43807	10.0085	10.0072	1.29008 E-3	1.28915 E-2
1.9924	9.97959	9.97234	7.25257 E-3	7.27269 E-2
3.0264	9.86042	9.86295	-2.53403 E-3	-2.56924 E-2

STD ERROR OF ESTIMATE FOR Y = 6.07985 E-3

WHAT NEXT? 0

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FILENAME? 53CDSC
INITIAL (LOWEST) DEGREE TO BE FIT? 1


POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.783928    WHAT NEXT? 2

TERM          COEFFICIENT

 0             10.0606
 1            -5.40847 E-2

X-ACTUAL      Y-ACTUAL      Y-CALC        DIFF           PCT-DIFF

 0.001         10.0234       10.0605      -3.71404 E-2   -0.369169
 0.95814       10.0196       10.0088       1.08262 E-2    0.108167
 0.951544      10.0195       10.0091       1.03695 E-2    0.103601
 1.43807       10.0085        9.98282      0.025683       0.257273
 1.9924         9.97959       9.95284      2.67539 E-2    0.268807
 3.0264         9.86042       9.89691     -3.64926 E-2   -0.368727

         STD ERROR OF ESTIMATE FOR Y = 0.03283

   WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.994442    WHAT NEXT? 2

TERM          COEFFICIENT

 0             10.0203
 1             2.96973 E-2
 2            -2.69953 E-2

X-ACTUAL      Y-ACTUAL      Y-CALC        DIFF           PCT-DIFF

 0.001         10.0234       10.0204       3.0396 E-3     3.03342 E-2
 0.95814       10.0196       10.024       -4.40228 E-3   -4.39174 E-2
 0.951544      10.0195       10.0241      -4.64642 E-3   -4.63523 E-2
 1.43807       10.0085       10.0072       1.29008 E-3    1.28915 E-2
 1.9924         9.97959       9.97234      7.25257 E-3    7.27269 E-2
 3.0264         9.86042       9.86295     -2.53403 E-3   -2.56924 E-2

         STD ERROR OF ESTIMATE FOR Y = 6.07985 E-3

   WHAT NEXT? 0
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FILENAME? 54CDSC
INITIAL (LOWEST) DEGREE TO BE FIT? 1

POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.964776 WHAT NEXT? 2

TERM	COEFFICIENT
0	10.0125
1	-9.12251 E-2

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	9.97974	10.0124	-3.26251 E-2	-0.325848
0.318128	9.9774	9.98344	-6.03509 E-3	-0.060451
0.649211	9.97136	9.95323	0.018128	0.182132
0.915863	9.94471	9.92891	1.58035 E-2	0.159166
0.932318	9.94563	9.92741	1.82245 E-2	0.183577
1.57456	9.87258	9.86882	3.76308 E-3	0.038131
1.97062	9.82762	9.83269	-5.06628 E-3	-5.15248 E-2
2.31612	9.80399	9.80117	2.82192 E-3	2.87917 E-2
2.91435	9.73158	9.74659	-1.50144 E-2	-0.154048

STD ERROR OF ESTIMATE FOR Y = 1.80655 E-2

WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.987178 WHAT NEXT? 2

TERM	COEFFICIENT
0	9.99195
1	-4.28152 E-2
2	-0.016776

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	9.97974	9.99191	-1.21696 E-2	-0.121795
0.318128	9.9774	9.97663	7.66039 E-4	7.67833 E-3
0.649211	9.97136	9.95709	1.42744 E-2	0.143359
0.915863	9.94471	9.93867	6.04224 E-3	6.07953 E-2
0.932318	9.94563	9.93745	8.17692 E-3	8.22839 E-2
1.57456	9.87258	9.88295	-1.03655 E-2	-0.104883
1.97062	9.82762	9.84243	-1.48128 E-2	-0.1505
2.31612	9.80399	9.80279	1.19627 E-3	1.22033 E-2
2.91435	9.73158	9.72469	6.8922 E-3	7.08733 E-2

STD ERROR OF ESTIMATE FOR Y = 1.17729 E-2

WHAT NEXT? 0

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FILENAME? 55CDSC
INITIAL (LOWEST) DEGREE TO BE FIT? 1

POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.772606 WHAT NEXT? 2

TERM	COEFFICIENT
0	10.0765
1	-4.23848 E-2

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	10.0466	10.0765	-2.98578 E-2	-0.296312
0.596945	10.0408	10.0512	-1.03989 E-2	-0.103459
1.26799	10.0345	10.0228	1.17433 E-2	0.117166
1.94472	10.0282	9.99407	3.41264 E-2	0.341466
2.28675	10.0076	9.97958	2.80232 E-2	0.280806
2.63934	9.99788	9.96463	3.32477 E-2	0.333657
2.94817	9.94577	9.95154	-5.77259 E-3	-0.058007
3.31311	9.91464	9.93607	-2.14348 E-2	-0.215727
3.49875	9.88853	9.92821	-3.96763 E-2	-0.399632

STD ERROR OF ESTIMATE FOR Y = 2.99042 E-2

WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.970577 WHAT NEXT? 2

TERM	COEFFICIENT
0	10.0369
1	3.59387 E-2
2	-0.021908

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	10.0466	10.0369	9.68564 E-3	9.65001 E-2
0.596945	10.0408	10.0505	-9.72521 E-3	-9.67632 E-2
1.26799	10.0345	10.0472	-1.27248 E-2	-0.126649
1.94472	10.0282	10.0239	4.28545 E-3	4.27523 E-2
2.28675	10.0076	10.0045	3.10051 E-3	3.09912 E-2
2.63934	9.99788	9.97912	1.87607 E-2	0.187999
2.94817	9.94577	9.95241	-6.64401 E-3	-6.67578 E-2
3.31311	9.91464	9.91547	-8.29935 E-4	-8.3701 E-3
3.49875	9.88853	9.89444	-5.90777 E-3	-0.059708

STD ERROR OF ESTIMATE FOR Y = 1.16188 E-2

WHAT NEXT? 0

FILENAME? 56CDSC
INITIAL (LOWEST) DEGREE TO BE FIT? 1

POLYFIT OF DEGREE 1 INDEX OF DETERM = 0.947433 WHAT NEXT? 2

TERM	COEFFICIENT
0	10.0588
1	-8.97523 E-2

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	10.0014	10.0587	-5.73063 E-2	-0.569718
0.243391	9.99897	10.037	-3.79812 E-2	-0.378413
0.436856	9.99689	10.0196	-2.26973 E-2	-0.22653
0.605923	9.9953	10.0044	-9.11307 E-3	-9.10905 E-2
0.776354	9.99307	9.98912	3.95346 E-3	3.95776 E-2
0.95394	9.98904	9.97318	1.58622 E-2	0.159049
1.13339	9.98186	9.95707	2.47884 E-2	0.248953
1.315	9.97061	9.94077	2.98382 E-2	0.30016
1.47115	9.95707	9.92676	0.030313	0.305367
1.64033	9.93708	9.91157	2.55073 E-2	0.257349
1.67517	9.91984	9.90845	1.13943 E-2	0.114995
1.67129	9.92306	9.90879	1.42661 E-2	0.143974
1.79301	9.92092	9.89787	2.30507 E-2	0.232885
1.88781	9.91078	9.88936	2.14192 E-2	0.216588
2.1712	9.87796	9.86393	0.014034	0.142276
2.28547	9.86551	9.85367	1.18401 E-2	0.120159
2.51241	9.83577	9.8333	2.46847 E-3	2.51031 E-2
2.68655	9.81375	9.81767	-3.92199 E-3	-3.99482 E-2
2.72261	9.81592	9.81444	1.48439 E-3	1.51246 E-2
2.8354	9.79526	9.80431	-9.0524 E-3	-9.23308 E-2
3.06078	9.77007	9.78408	-1.40141 E-2	-0.143234
3.18724	9.75588	9.77273	-1.68539 E-2	-0.172459
3.31651	9.74156	9.76113	-1.95717 E-2	-0.200506
3.50037	9.72412	9.74463	-2.05098 E-2	-0.210473
3.65536	9.71152	9.73072	-1.91991 E-2	-0.197304

STD ERROR OF ESTIMATE FOR Y = 2.29227 E-2

WHAT NEXT? 3

POLYFIT OF DEGREE 2 INDEX OF DETERM = 0.990443 WHAT NEXT? 2

TERM	COEFFICIENT
0	10.0133
1	-1.93029 E-2
2	-1.88246 E-2

X-ACTUAL	Y-ACTUAL	Y-CALC	DIFF	PCT-DIFF
0.001	10.0014	10.0132	-1.18423 E-2	-0.118266
0.243391	9.99897	10.0074	-8.47816 E-3	-8.47185 E-2
0.436856	9.99689	10.0012	-4.34649 E-3	-4.34595 E-2
0.605923	9.9953	9.99465	6.45876 E-4	6.46221 E-3
0.776354	9.99307	9.98693	6.14035 E-3	6.14839 E-2
0.95394	9.98904	9.97772	1.13227 E-2	0.11348
1.13339	9.98186	9.9672	1.46577 E-2	0.14706
1.315	9.97061	9.95533	1.52837 E-2	0.153523
1.47115	9.95707	9.94412	1.29477 E-2	0.130204
1.64033	9.93708	9.93095	6.1326 E-3	6.17524 E-2
1.67517	9.91984	9.9281	-8.26049 E-3	-8.32031 E-2
1.67129	9.92306	9.92842	-5.35965 E-3	-5.39829 E-2
1.79301	9.92092	9.91813	2.78771 E-3	2.81072 E-2
1.88781	9.91078	9.90973	1.04618 E-3	1.05571 E-2
2.1712	9.87796	9.88261	-4.64988 E-3	-4.70511 E-2
2.28547	9.86551	9.87082	-5.30744 E-3	-0.053769
2.51241	9.83577	9.84594	-0.01017	-0.103291
2.68655	9.81375	9.82554	-1.17859 E-2	-0.119951
2.72261	9.81592	9.82117	-5.24795 E-3	-5.34351 E-2
2.8354	9.79526	9.80719	-1.19299 E-2	-0.121644
3.06078	9.77007	9.77782	-7.75373 E-3	-7.92991 E-2
3.18724	9.75588	9.76051	-4.6289 E-3	-4.74247 E-2
3.31651	9.74156	9.74219	-6.27041 E-4	-6.43635 E-3
3.50037	9.72412	9.71504	9.07588 E-3	9.34209 E-2
3.65536	9.71152	9.69117	2.03453 E-2	0.209937

STD ERROR OF ESTIMATE FOR Y = 9.99338 E-3

WHAT NEXT? 0

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13. ABSTRACT

The complex dielectric constant has been measured for single crystal CdS and CdSe, and amorphous As_2S_3, As_2Se_3, and ZnSe at five audio frequencies (10^2 - 10^4 Hz) over the temperature range 4.2 - 300K at 1 atmosphere and over the pressure range 1 - 3000 atmospheres at temperatures from 260 - 320K.

Anomalies are noted in the temperature variation of the real part of the dielectric constant for the As glasses. One anomaly is attributable to a Debye-type impurity while the other remains unexplained. The volume independent temperature derivative and temperature independent volume derivative of the real part of the dielectric constant are calculated for each material. These are used in conjunction with Clausius-Mossotti equation to evaluate the various contributions to the pressure and temperature derivatives of the dielectric constant. For CdS, the Lyddane-Sachs-Teller relation is found to hold and the Szigeti effective charge is calculated.

All figures of the calculations are given in the paper.

Finally, the possible use of the materials as a pressure transducer is discussed.

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