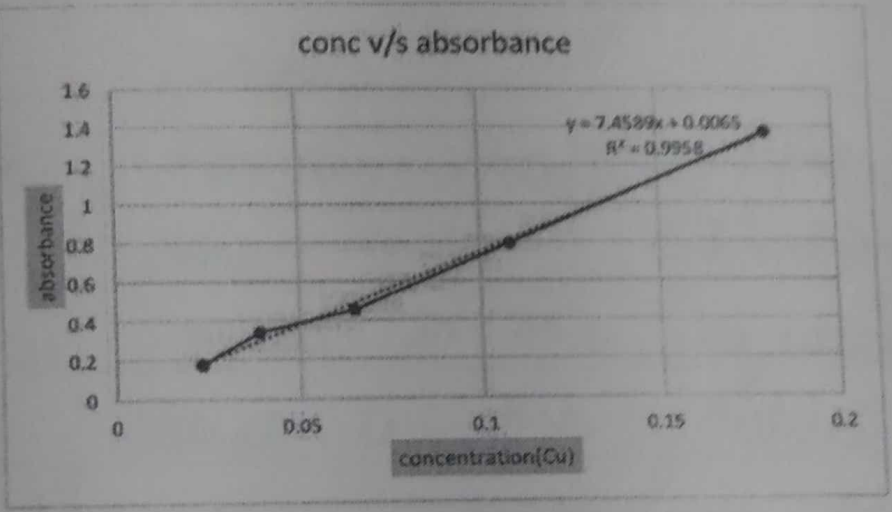
Exercise - 02

Concentration (g Cu/100ml)	Absorbance At 610 nm
0.1807	1.37
0.1084	0.796
0.0651	0.456
0.039	0.34
0.0234	0.178



slope= 0.0065
intercept= 7.4589

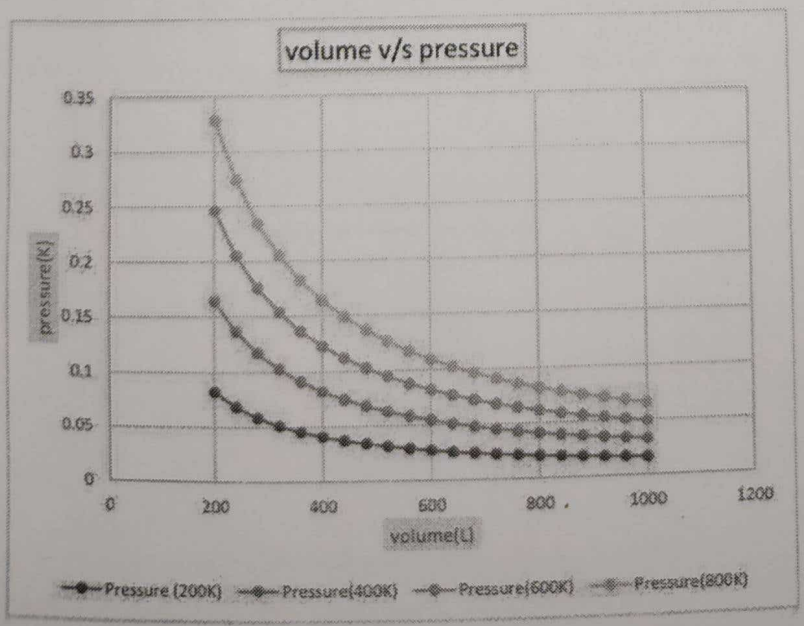
unknown sample absorbance y= 0.545
conc of unknown sample x= 0.072195632

Molar coeffiecient constant = 7.548933148
y/x

Exercise -03

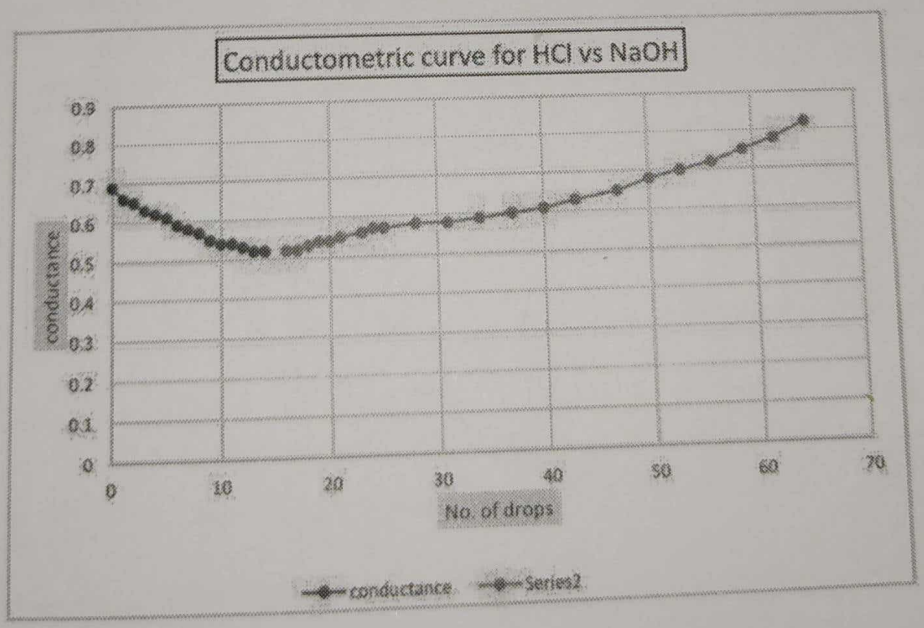
S.no.	Volume (L)	Pressure (200K)	Pressure(400K)	Pressure(600K)	Pressure(800K)
1	200	0.082	0.164	0.246	0.328
2	240	0.068333333	0.136666667	0.205	0.273333333
3	280	0.058571429	0.117142857	0.175714286	0.234285714
4	320	0.05125	0.1025	0.15375	0.205
5	360	0.045555556	0.091111111	0.136666667	0.182222222
6	400	0.041	0.082	0.123	0.164
7	440	0.037272727	0.074545455	0.111818182	0.149090909
8	480	0.034166667	0.068333333	0.1025	0.136666667
9	520	0.031538462	0.063076923	0.094615385	0.126153846
10	560	0.029285714	0.058571429	0.087857143	0.117142857
11	600	0.027333333	0.054666667	0.082	0.109333333
12	640	0.025625	0.05125	0.076875	0.1025
13	680	0.024117647	0.048235294	0.072352941	0.096470588
14	720	0.022777778	0.045555556	0.068333333	0.091111111
15	760	0.021578947	0.043157895	0.064736842	0.086315789
16	800	0.0205	0.041	0.0615	0.082
17	840	0.01952381	0.039047619	0.058571429	0.078095238
18	880	0.018636364	0.037272727	0.055909091	0.074545455
19	920	0.017826087	0.035652174	0.053478261	0.071304348
20	960	0.017083333	0.034166667	0.05125	0.068333333
21	1000	0.0164	0.0328	0.0492	0.0656

mole of an
800K. Us
an interval



Exercise -4

Drops	conductance	Drops	conductance
0	0.69	15	0.52
1	0.66	16	0.52
2	0.65	17	0.53
3	0.63	18	0.54
4	0.62	19	0.54
5	0.61	20	0.55
6	0.59	21	0.56
7	0.58	23	0.57
8	0.57	24	0.57
9	0.55	25	0.58
10	0.54	28	0.58
11	0.54	31	0.59
12	0.53	34	0.6
13	0.52	37	0.61
14	0.52	40	0.63
		43	0.65
		47	0.68
		50	0.7
		53	0.72
		56	0.75
		59	0.78
		62	0.82
		65	0.85



PROGRAM - 1

PROG :-

To calculate Sum, difference, product and quotie

```
10 Rem To add, subtract, multiply and divide two
20 Cls
30 Input "Enter two numbers"; A, B
40 Let C = A + B
50 Let D = A - B
60 Let E = A * B
70 Let F = A / B
80 Print " The sum of two numbers is "; C
```

PROGRAM :

INPUT

```
Rem TO CARRY OUT THE MATHEMATICAL OPERATIONS ON TWO NUMBERS
Cls
Input "ENTER TWO NUMBERS TO CARRY OUT MATHEMATICAL OPERATIONS ON"; A, B
Let C = A + B
Let D = A - B
Let E = A * B
Let F = A / B
Print "THE SUM OF"; A; "AND"; B; "IS"; C
Print "THE DIFFERENCE OF"; A; "AND"; B; "IS"; D
Print "THE PRODUCT OF"; A; "AND"; B; "IS"; E
Print "THE QUOTIENT OF"; A; "AND"; B; "IS"; F
End
```

OUTPUT

```
ENTER TWO NUMBERS TO CARRY OUT MATHEMATICAL OPERATIONS ON? 10,2
THE SUM OF 10 AND 2 IS 12
THE DIFFERENCE OF 10 AND 2 IS 8
THE PRODUCT OF 10 AND 2 IS 20
THE QUOTIENT OF 10 AND 2 IS 5
```

DATE
PAGE

PROGRAM - 2

Program -
To calculate pressure of 1 mole of an ideal gas (R= 0.

```
10 Rem to Calculate pressure of 1 mole of an ideal gas
20 Cls
30 Input "Enter temperature"; T
40 Input " Enter volume"; V
50 Let R= 0.0821
60 Let n= 1
70 Let P= (n*R*T)/V
80 Print " The Ideal gas pressure"; P
90 End
```

PROGRAM 1

INPUT

```
Rem TO FIND THE PRESSURE OF AN IDEAL GAS
Cls
Input "ENTER THE TEMPERATURE AND VOLUME"; T, V
Let R = 0.0821
Let n = 1
Let P = (n* R * T) / V
Print "THE PRESSURE OF ONE MOLE OF AN IDEAL GAS IS"; P
End
```

OUTPUT

```
ENTER THE TEMPERATURE AND VOLUME? 273.15,22.414
THE PRESSURE OF ONE MOLE OF AN IDEAL GAS IS 1.000518
```

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PAGE

PROGRAM - 3

Program -
To calculate (1 mole) pressure of vanderwaal's gas (Given $a = 4.17$, $b = 0.0371$, $R = 0.0821$ L atm mol^{-1})

```
10 Rem To CALCULATE PRESSURE OF VANDERWAALS GAS
20 Cls
30 Input " Enter Temperature "; T
40 Input " Enter Volume "; V
50 Let R = 0.0821
60 Let a = 4.17
70 Let b = 0.0371
80 Let P= ((R*T)/(V-b)) - (a/V^2)
90 Print "the Pressure of 1 mole of vanderwaal's gas is
100 end
```

PROGRAM 3

INPUT

```
Rem TO CALCULATE PRESSURE OF ONE MOLE OF A WANDERWAALS GAS
Cls
Input "ENTER THE TEMPERATURE AND VOLUME"; T, V
Let R = 0.0821
Let n = 1
Let a = 4.17
Let b = 0.0371
Let P = (n * R * T) / (V – n*b) - (a * n * n) / (V * V)
Print "THE PRESSURE OF 1 MOLE OF A WANDERWAALS GAS IS"; P; "atm"
End
```

OUTPUT

```
ENTER THE TEMPERATURE AND VOLUME? 273.15,22.414
THE PRESSURE OF 1 MOLE OF A WANDERWAALS GAS IS .9922178 atm
```

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PAGE

Program - 4

Program -
To find sum of first N- natural numbers.

```
10  Rem TO FIND THE SUM OF FIRST N NATURAL NUMBE
20  Cls
30  Input " ENTER THE NUMBERS TO FIND THE SUM"; N
40  S=0
50  J=0
60  J=J+1
70  S=S+J
80  If J<N Then GO TO 60
90  Print " THE SUM OF"; N; " NATURAL NUMBERS IS"; S
100 END
```

PROGRAM 4
INPUT

```
1 Cls
2 Rem TO FIND THE SUM OF FIRST N NATURAL NUMBERS
5 Input "ENTER ANY NUMBER N"; N
10 Let S = 0
20 Let I = 0
30 Let I = I + 1 ,
40 Let S = S + I
45 If I < N GoTo 30
50 Print "THE SUM OF FIRST"; N; "NATURAL NUMBERS IS"; S
60 End
```

OUTPUT

```
ENTER ANY NUMBER N? 10
THE SUM OF FIRST 10 NATURAL NUMBERS IS 55
```

Prabin
2/5/2

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PAGE

Program - 5

Program:
To find the product of first N Natural numbers.

```
10 Rem TO FIND THE PRODUCT OF FIRST N NATURAL NU
20 Cls
30 Input " ENTER THE NUMBERS TO FIND THE PRODUCT." ;N
40 P = 1
50 J = 0
60 J = J + 1
70 P = P * J
80 If J < N Then GO TO 60
90 Print " THE PRODUCT OF" ; N ; " NATURAL NUMBESR
100 END
```

PROGRAM-5

```
10 Rem TO FIND PRODUCT OF FIRST N NATURAL NUMBERS
20 Cls
30 Input "ENTER THE NUMBER TO FIND THE PRODUCT ", N
40 P = 1
50 J = 0
60 J = J + 1
70 P = P * J
80 If J < N Then GoTo 60
90 Print "THE PRODUCT OF"; N; "NATURAL NUMBER IS"; P
100 End
```

Done
2/5/24

OUTPUT: -

```
ENTER THE NUMBER TO FIND THE PRODUCT 5
THE PRODUCT OF 5 NATURAL NUMBER IS 120
```

Program 6

Program:

```
10 Rem "To find factorial of given number"
20 Cls
30 Input " ENTER THE NUMBER TO FIND THE FACTORIAL"; N
40 F = 1
50 I = N
60 F = F * I
70 I = I - 1
80 If I > 1 Then GO TO 60
90 Print " THE FACTORIAL OF"; N; "IS"; F
100 END
```

PROGRAM-6

```
10 Rem TO FIND FACTORIAL OF GIVEN NUMBER
20 Cls
30 Input "ENTER THE NUMBER TO FIND FACTORIAL"; N
40 F = 1,
50 I = N,
60 F = F * I
70 I = I - 1
80 If I > 1 Then GoTo 60
90 Print "THE FACTORIAL OF"; N; "IS"; F
100 End
```

OUTPUT: -

```
ENTER THE NUMBER TO FIND FACTORIAL? 5
THE FACTORIAL OF 5 IS 120
```

Shalu 24/7/24

DATE
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Program 7

Program:

```
10 Rem To find greater of two numbers
20 Cls
30 Input " ENTER FIRST NUMBER " ;A
40 Input " ENTER SECOND NUMBER" ; B
50 If A >B Then GO TO 60 Else Go To 80
60 Print " THE GREATER OF" ; A ; "AND" ; B ; " IS" ; A
70 END
80 Print " THE Greater of " ; A ; "AND" ; B ; "IS" ; B
90 END
```

PROGRAM 7

INPUT

```
10 Rem TO FIND THE GREATEST OUT OF THE TWO NUMBERS
20 Input "ENTER TWO NUMBERS"; A, B
30 If A > B Then GoTo 40 Else GoTo 50
40 Print "THE GREATEST OUT OF THE TWO NUMBERS IS"; A
50 GoTo 70
60 Print "THE GREATEST OUT OF THE TWO NUMBERS IS"; B
70 End
```

OUTPUT

```
ENTER TWO NUMBERS? 10,2
THE GREATEST OUT OF THE TWO NUMBERS IS 10
```

Dhalia
2/5/2

EXERCISE -8

Aim:-

To find the greatest out of the 3 numbers

Algorithm

10 CLS
20 REM TO FIND THE GREATEST OUT OF THE 3
30 Input " Enter any 3 numbers "; A, B, C
40 If A>B Then 50 Else GO To 60
50 If A>C Ther 80 Else Go to 90
60 If B>C Then 70 Else Go to 90
70 Print " The Greatest out of the 3number is
80 Print " THE Greatest out of the 3 number
90 Print " THE Greatest out of 3 number
100 End.

PROGRAM – 8

INPUT

```
10 Cls
20 Rem TO FIND THE GREATEST OUT OF THE 3 NUMBERS
30 Input "ENTER ANY 3 NUMBERS"; A, B, C
40 If A > B Then 50 Else GoTo 60
50 If A > C Then 80 Else GoTo 90
60 If B > C Then 70 Else GoTo 90
70 Print "THE GREATEST OUT OF THE 3 NUMBERS IS"; B: GoTo 100
80 Print "THE GREATEST OUT OF THE 3 NUMBERS IS"; A: GoTo 100
90 Print "THE GREATEST OUT OF THE 3 NUMBERS IS"; C: GoTo 100
100 End
```

OUTPUT

```
ENTER ANY 3 NUMBERSY 5,3,10
THE GREATEST OUT OF THE 3 NUMBERS IS 10
```

Exercise - 9

Aim :-
To find the sum of the series.

Algorithm

10 Cls
20 Rem "To find the sum of the series."
30 Input " Enter any number and the expone
Sum of the series ", X, N.
40 S=0
50 I=0
60 Let S= S + (X^I)
70 I = I + 1
80 If I<=N Then Go To 60 Else Go To 90
ies is"; S

PROGRAM – 9

INPUT

```
10 Cls
20 Rem TO FIND THE SUM OF THE SERIES
30 Input " ENTER ANY NUMBER AND THE EXPONENT TO FIND THE SUM OF THE SERIES"; X, N
40 S = 0
50 I = 0
60 Let S = S + (X ^ I)
70 I = I + 1
80 If I <= N Then GoTo 60 Else GoTo 90
90 Print "THE SUM OF THE SERIES IS"; S
100 End
```

OUTPUT

```
ENTER ANY NUMBER AND THE EXPONENT TO FIND THE SUM OF THE SERIES? 2,3
THE SUM OF THE SERIES IS 15
```

Exercise -10

Aim:- To find the value of Cavg, Cap an

Algorithm.

10 Clo

20 Rem To find the values of Cavg, Cap

30 Input "Molecular mass of the

35 Input "Enter the temperature in

40 Let R = 0.0821

50 Let P = 3.14

PROGRAM – 10

```
10 Cls
20 Rem To find the values of Cavg, Cmp and Crms for a gas
30 Input "MOLECULAR MASS OF THE GAS IN g/mol"; M
35 Input "ENTER THE TEMPERATURE IN KELVIN"; T
40 Let R = 0.0821
50 Let P = 3.14
60 Let Cavg = Sqr((8 * R * T) / (P * M))
70 Let Cmp = Sqr((2 * R * T) / M)
80 Let Crms = Sqr((3 * R * T) / M)
90 Print "THE AVERAGE SPEED (Cavg) OF THE MOLECULE IS"; Cavg; " m / s"
100 Print "THE MOST PROBABLE SPEED (Cmp) OF THE MOLECULE IS"; Cmp; "m / s"
110 Print "THE ROOT MEAN SQUARE SPEED (Crms) OF THE MOLECULE IS"; Crms; "m / s"
120 End
```

OUTPUT

```
MOLECULAR MASS OF THE GAS IN g/mol)? 16
ENTER THE TEMPERATURE IN KELVIN? 200
THE AVERAGE SPEED (Cavg) OF THE MOLECULE IS 1.616988  m / s
THE MOST PROBABLE SPEED (Cmp) OF THE MOLECULE IS 1.432655 m / s
THE ROOT MEAN SQUARE SPEED (Crms) OF THE MOLECULE IS 1.754637 m / s
```

Exercise 11.

140 Print "The Real and Unequ
150 Go To 180
160 R1 = (-B) / (2*A)
170 Print " equal roots Are
180 End.

PROGRAM – 11

INPUT

```
10 Cls
20 Rem TO DETERMINE THE SOLUTIONS OF QUADRATIC EQUATIONS
30 Input "THE COFFICIENTS OF THE QUADRATIC EQUATIONS"; A, B, C
40 Let D = ((B ^ 2) - (4 * A * C)) / (2 * A)
50 If D < 0 Then GoTo 80
60 If D = 0 Then GoTo 160
70 If D > 0 Then GoTo 120
80 R1 = (-B / (2 * A))
90 I = (Sqr((-D) / (2 * A)))
100 Print "IMAGINARY ROOTS ARE R1="; R1; "+i"; I; "AND R2="; R1; "-i"; I
110 GoTo 180
120 R1 = (-B + (Sqr(D))) / (2 * A)
130 R1 = (-B - (Sqr(D))) / (2 * A)
140 Print "THE REAL AND UNEQUAL ROOTS R1="; R1; "AND R2="; R2
150 GoTo 180
160 R1 = (-B) / (2 * A)
170 Print "EQUAL ROOTS ARE R="; R1
180 End
```

OUTPUT

```
THE COFFICIENTS OF THE QUADRATIC EQUATIONS? 7,8,9
IMAGINARY ROOTS ARE R1=-.5714286 +i .9793792 AND R2=-.5714286 -i .9793792
```

PROGRAM 12 (A)

INPUT

```
10 Rem TO FIND THE SUM OF FIRST N NATURAL NUMBER
20 Input "ENTER ANY NUMBER"; N
30 Let S = 0
40 For I = 1 To N
  50 S = S + I
60 Next I
70 Print "THE SUM OF FIRST"; N; "NATURAL NUMBERS IS"; S
80 END
```

OUTPUT

```
ENTER ANY NUMBER? 10
THE SUM OF FIRST 10 NATURAL NUMBERS IS 55
```

12 (B)

Aim :- To find the sum of firs

Algorithm :-

10 Rem To find the sum of first

20 Input " Enter any Number. "; N

PROGRAM 12(B)

INPUT

```
10 Rem TO FIND THE SUM OF FIRST N EVEN NATURAL NUMBERS
20 Input "ENTER ANY NUMBER"; N
30 Let S = 0
40 For I = 0 To N Step 2
  50 S = S + I
60 Next I
70 Print "THE SUM OF FIRST"; N; "EVEN NATURAL NUMBERS IS"; S
80 End
```

OUTPUT

```
ENTER ANY NUMBER? 6
THE SUM OF FIRST 6 EVEN NATURAL NUMBERS IS 12
```

PROGRAM 12 (C)

INPUT

```
10 Rem TO FIND THE SUM OF FIRST N ODD NATURAL NUMBERS
20 Input "ENTER ANY NUMBER"; N
30 Let S = 0
40 For I = 1 To N Step 2
  50 S = S + I
60 Next I
70 Print "THE SUM OF FIRST"; N; "ODD NATURAL NUMBERS IS"; S
80 End
```

OUTPUT

```
ENTER ANY NUMBER? 5
THE SUM OF FIRST 5 ODD NATURAL NUMBERS IS 9
```

12(D)

Aim:- To find the product

PROGRAM 12(D)

INPUT

```
10 Rem TO FIND THE PRODUCT OF FIRST N NATURAL NUMBERS
20 Input "ENTER ANY NUMBER"; N
30 Let P = 1
40 For I = 1 To N
  50 P = P * I
60 Next I
70 Print "THE PRODUCT OF FIRST"; N; " NATURAL NUMBERS IS"; P
80 End
```

OUTPUT

```
ENTER ANY NUMBER? 5
THE PRODUCT OF FIRST 5  NATURAL NUMBERS IS 120
```

To find Factorial of given Number.

PROGRAM 12(E)

INPUT

```
10 Rem TO FIND THE FACTORIAL OF FIRST N NATURAL NUMBERS
20 Input "ENTER ANY NUMBER"; N
30 Let F = 1
40 For I = 1 To N
  50 F = F * I
60 Next I
70 Print "THE FACTORIAL OF FIRST"; N; " NATURAL NUMBERS IS"; F
80 End
```

OUTPUT

```
ENTER ANY NUMBER? 5
THE FACTORIAL OF FIRST 5  NATURAL NUMBERS IS 120
```

Program - 17

To find Sum of Series.

```
10 REM "TO FIND SUM OF SERIES"
20 INPUT "ENTER THE VALUE OF NUMBER AN
80 LET S=0
```

PROGRAM 12 (F)

INPUT

```
10 Rem TO FIND THE SUM OF THE SERIES
20 Input "ENTER ANY NUMBER AND THE EXPONENT TO FIND THE SUM OF THE SERIES"; X, N
30 Let S = 0
40 For I = 0 To N
  50 S = S + (X ^ I)
60 Next I
70 Print "THE SUM OF THE SERIES IS"; S
80 End
```

OUTPUT

```
ENTER ANY NUMBER AND THE EXPONENT TO FIND THE SUM OF THE SERIES? 2,3
THE SUM OF THE SERIES IS 15
```

PROGRAM 18

INPUT

```
10 Rem TO READ AND PRINT A SINGLE DIMENSIONAL ARRAY
20 Dim A(10)
30 For I = 1 To 3
  40 Input A(I)
  50 Print A(I)
60 Next (I)
70 End
```

OUTPUT

```
? 3
 3
? 4
 4
? 5
 5
```

Program - 19

PROGRAM 19

INPUT

```
10 Rem TO READ AND PRINT A TWO DIMENSIONAL ARRAY
20 Dim A(2, 2)
30 For I = 1 To 2
  40 For J = 1 To 2
    50 Read A(I, J)
  60 Next J
70 Next I
80 For I = 1 To 2
  90 For J = 1 To 2
    100 Print A(I, J);
  110 Next J
  120 Print
130 Next I
135 Data 1,2,3,4
140 End
```

OUTPUT

```
 1  2
 3  4
```

PROGRAM 1520

INPUT

```
10 Rem TO FIND THE SUM OF TWO MATRICES
20 Dim A(3, 3), B(3, 3)
25 Print "MATRIX A=":
30 For I = 1 To 3
  40 For J = 1 To 3
    50 Read A(I, J)
    55 Print A(I, J);
  60 Next J
  70 Print
80 Next I
90 Print
95 Print "MATRIX B=":
100 For I = 1 To 3
  110 For J = 1 To 3
    120 Read B(I, J)
    130 Print B(I, J);
  140 Next J
  150 Print
160 Next I
170 Print
175 Print "MATRIX C=":
180 For I = 1 To 3
  190 For J = 1 To 3
    200 C(I, J) = A(I, J) + B(I, J)
    205 Print C(I, J);
  210 Next J
  220 Print
230 Next I
240 Data 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18
250 End
```

OUTPUT

```
MATRIX A=
 1  2  3
 4  5  6
 7  8  9

MATRIX B=
 10  11  12
 13  14  15
 16  17  18

MATRIX C=
 11  13  15
 17  19  21
 23  25  27
```

Program 21

two matrices.

of two matrices

PROGRAM 16 21

INPUT

```
10 Rem TO FIND THE DIFFERENCE OF TWO MATRICES
20 Dim A(3, 3), B(3, 3)
25 Print "MATRIX A=":
30 For I = 1 To 3
  40 For J = 1 To 3
    50 Read A(I, J)
    55 Print A(I, J);
  60 Next J
  70 Print
80 Next I
83 Print
85 Print "MATRIX B=":
90 For I = 1 To 3
  100 For J = 1 To 3
    110 Read B(I, J)
    115 Print B(I, J);
  120 Next J
  130 Print
140 Next I
145 Print
147 Print "MATRIX C=":
150 For I = 1 To 3
  160 For J = 1 To 3
    170 C(I, J) = A(I, J) - B(I, J)
    175 Print C(I, J);
  180 Next J
  190 Print
200 Next I
215 Data 19,18,17,16,15,14,13,12,11,10,9,8,7,6,5,4,3,2,1
220 End
```

OUTPUT

```
MATRIX A=
 19  18  17
 16  15  14
 13  12  11

MATRIX B=
 10  9  8
 7  6  5
 4  3  2

MATRIX C=
 9  9  9
 9  9  9
 9  9  9
```

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PAGE

Program - 22

To Read and Print the Product of two Matrices.

```
10 Rem TO READ AND PRINT PRODUCT OF TWO MATRICES
30 Dim A(3, 3), B(3, 3)
35 Print "MATRIX A="
40 For I = 1 To 3
  50 For J = 1 To 3
    60 Read A(I, J)
    70 Print A(I, J);
  80 Next J
  90 Print
100 Next I
110 Print
115 Print "MATRIX B="
120 For I = 1 To 3
  130 For J = 1 To 3
    140 Read B(I, J)
    150 Print B(I, J);
  160 Next J
  170 Print
180 Next I
190 Print
195 Print "MATRIX C=A*B"
200 C(I, J) = 0
210 For I = 1 To 3
  220 For J = 1 To 3
    230 For K = 1 To 3
      240 C(I, J) = C(I, J) + A(I, K) * B(K, J)
    250 Next K
    260 Print C(I, J);
    270 Print
  280 Next J
290 Next I
300 Data 1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1,1
310 End
```

OUTPUT

```
MATRIX A=
 1   1   1
 1   1   1
 1   1   1

MATRIX B=
 1   1   1
 1   1   1
 1   1   1

MATRIX C=A*B
 3   3   3
 3   3   3
 3   3   3
```

280 Print
290 Next I
300 Data 1,1,1,
1,1,1,
310 End

To find Transpose of a matrix

```
10 Rem "To find Transpose of matrix A"
20 Dim A(3,3), B(3,3)
25 Print "matrix A="
30 For I = 1 to 3
35 For J = 1 to 3
40 Read A(I,J)
```

```
10 Rem TO FIND THE TRANSPOSE OF MATRIX
20 Cls
30 Dim A(3, 3), C(3, 3)
40 Print "MATRIX A="
50 For I = 1 To 3
  60 For J = 1 To 3
    70 Read A(I, J)
    80 Print A(I, J);
  90 Next J
  100 Print
110 Next I
120 Print
130 Print "TRANSPOSE OF MATRIX A ="
140 For I = 1 To 3
  150 For J = 1 To 3
    160 B(I, J) = A(J, I)
    170 Print B(I, J);
  180 Next J
  190 Print
  195 Data 1,2,3,4,5,6,7,8,9
200 Next I
210 End
```

6, 17, 18, 19

OUTPUT

```
MATRIX A=
 1  2  3
 4  5  6
 7  8  9

TRANSPOSE OF MATRIX A =
 1  4  7
 2  5  8
 3  6  9
```

DATE 8-4-24
PAGE

Program-24

To find mean, Variance and Standard Variance

```
10 Rem " To find Mean, Variance and Standard Variance"
20 Dim X(10)
30 S=0
40 For I = 1 to 5
50 Read X(I)
60 S= S + X(I)
70 Next I
80 S1 5
90 Print "The Mean of the Numbers IS"; M
95 Print
100 V=0
```

```
10 Rem TO FIND THE MEAN, VARIANCE AND STANDARD DEVIATION
20 Dim X(10)
30 S = 0
40 For I = 1 To 5
  50 Read X(I)
  60 S = S + X(I)
70 Next I
80 M = S / 5
90 Print "THE MEAN OF THE NUMBERS IS="; M
95 Print
100 Let V = O
110 For I = 1 To 5
  120 V = V + (X(I) - M) ^ 2
130 Next I
140 V = V / 5
150 Print "THE VARIANCE OF THE NUMBERS IS="; V
155 Print
160 SD = Sqr(V)
165 Print "THE STANDARD DEVIATION OF THE NUMBERS IS="; SD
170 Data 1,2,3,4,5
180 END
```

OUTPUT

```
THE MEAN OF THE NUMBERS IS= 3

THE VARIANCE OF THE NUMBERS IS= 2

THE STANDARD DEVIATION OF THE NUMBERS IS= 1.414214
```

Date

Expt. No. Page No.

PROGRAM - 25

To find the Binomial Coefficient

```
10 Rem To find the Binomial Coefficient
20 Input " Enter the value of N and R = ";N,R
30 Let A = N
40 GoSub 150
```

PROGRAM -20

```
10 Rem TO FIND THE BIONOMIAL COEFFICIENT
20 Input N, R
30 A = N
40 GoSub 140
50 NFAC = P
60 A = R
70 GoSub 140
80 RFAC = P
90 A = N - R
100 GoSub 140
110 NRFAC = P
120 NCR = NFAC / (RFAC * NRFAC)
130 Print "C("; N; ","; R; ")="; NCR
135 End
140 Rem SUBROUTINE
150 P = 1
160 For I = 1 To A
  170 P = P * I
180 Next I
200 Return
```

OUTPUT

```
? 5,2
C( 5 , 2 )= 10
```

Date

Expt. No. Page No:

PROGRAM-26

PROGRAM -21

```
10 Rem TO SOLVE ROOT OF EQUATION BY ITERATIVE METHOD
20 Input "ENTER INITIAL GUESS="; X
30 Print "I"; "X1"
40 For I = 1 To 5
   50 X1 = (10 - 3 * X ^ 2) ^ 0.2
   60 If Abs(X - X1) <= 0.0001 Then 130
   70 Print I, X1
   80 Let X = X1
90 Next I
100 Print "TRIED 20 ITERARTIONS, NO CONVERGENECE"
120 GoTo 140
130 Print "ROOT OF "; X; " IS"; X1; "AFTER"; I; "ITERATION"
140 End
```

OUTPUT

```
ENTER INITIAL GUESS=? 1
 IX1
 1             1.475773
 2             1.28225
 3             1.383435
 4             1.336127
 5             1.359515
 6             1.348257
 7             1.353747
 8             1.351086
 9             1.35238
 10            1.351752
 11            1.352057
 12            1.351909
ROOT OF  1.351909  IS 1.351981 AFTER 13 ITERATION
```

Program - 27

To Calculate Volume of Vanderwaals Gas by Iteration

```
10 Rem To Calculate Volume of Vanderwaals Gas by Itera
20 Input "Enter Value of N,T,P"; N,T,P
30 R = 0.0821
40 Input "Enter Value of A and B"; A,B
450 For I = 1 To 10
50 V0 = (N*R*T)/P
60 VR = ((N*R*T) / (P+(A*(N^2))/(V0^2))) + (N*B)
70 If Abs (VR-V0) < 0.0001 Then V0=VR
80 Next I
```

PROGRAM -22

```
10 Rem TO CALCULATE VOLUME OF VANDERWAALS GAS BY ITERATION METHOD
20 Input "ENTER VALUE OF N,T,P"; N, T, P
30 R = 0.0821
40 Input "ENTER VALUE OF A AND B"; A, B
45 For I = 1 To 10
   50 V0 = (N * R * T) / P
   60 VR = ((N * R * T) / (P + (A * (N ^ 2)) / (V0 ^ 2))) + (N * B)
   70 If Abs(VR - V0) < 0.0001 Then V0 = VR
80 Next I
90 Print " VOLUME OF VANDERWAALS GAS USING ITERATIVE METHOD IS="; VR
100 End
```

OUTPUT

```
ENTER VALUE OF N,T,P? 1,298,80
ENTER VALUE OF A AND B? 0.4,0.0427
VOLUME OF VANDERWAALS GAS USING ITERATIVE METHOD IS= .3330328
```

PROGRAM 23

INPUT

```
 10 Rem TO SOLVE THE ROOTS OF AN EQUATION BY NEWTON RAPHSONS METHOD
20 Input "INITIAL GUESS="; X0
30 For I = 1 To 10
   40 X1 = X0 - ((Y(X0)) / (D(X0)))
   50 If Abs(X1 - X0) <= 0.0001 Then 90
   60 X0 = X1
   70 Print "ITERATIONS="; I; "VALUE="; X0
80 Next I
90 Print "THE ROOTS OF THE EQUATION IS="; X1
100 End
Function Y (A)
   Y = (A ^ 3) + (913 * (A ^ 2)) - 1023
End Function
Function D (B)
   D = (3 * (B ^ 2) + (1826 * B))
End Function
```

OUTPUT

```
INITIAL GUESS=? 1
ITERATIONS= 1 VALUE= 1.059595
ITERATIONS= 2 VALUE= 1.057917
THE ROOTS OF THE EQUATION IS= 1.057915
```

PROGRAM 24

INPUT

```
10 Rem TO SOLVE THE ROOTS OF AN EQUATION BY NEWTON RAPHSONS METHOD
21 Let A1 = 4.17
22 Let B1 = 0.0371
23 Let P1 = 10
24 Let R1 = 0.0821
25 Let T1 = 300
26 V0 = (R1 * T1) / P1
27 Print V0
30 For I = 1 To 50
   40 V1 = V0 - ((VG(P1, V1, B1, R1, T1, A1)) / (VGG(P1, V1, B1, R1, T1, A1)))
   50 If Abs(V1 - V0) <= 0.0001 Then 80
   60 V0 = V1
   70 Print "ITERATIONS="; I; "VALUE="; V0
80 Next I
90 Print "THE ROOTS OF THE EQUATION IS="; V1
100 End
Function VG (P, V, B, R, T, A)
   VG = P * V ^ 3 - V ^ 2 * (P * B + R * T) + A * V - A * B
End Function
Function VGG (P, V, B, R, T, A)
   VGG = 3 * P * (V ^ 2) - (2 * V) * (P * B + R * T) + A
End Function
```

OUTPUT

```
 2.463
ITERATIONS= 1 VALUE= 2.5001
ITERATIONS= 2 VALUE= 2.346059
ITERATIONS= 3 VALUE= 2.323937
ITERATIONS= 4 VALUE= 2.323495
THE ROOTS OF THE EQUATION IS= 2.323495
```

PROGRAM 25

INPUT

```
10 Rem TO FIND THE LINE OF BESTFIT
20 Input "ENTER THE VALUE OF N="; N
30 SX = 0: SY = 0: SXX = 0: SXY = 0
40 For I = 1 To N
   50 Read X(I), Y(I)
   60 SX = SX + X(I)
   70 SY = SY + Y(I)
   80 SXX = SXX + (X(I) * X(I))
   90 SXY = SXY + (X(I) * Y(I))
100 Next I
110 Let D = (N * SXX) - (SX * SX)
120 Let M = ((N * SXY) - (SX * SY)) / (D)
130 Let C = ((SXX * SY) - (SX * SXY)) / (D)
140 Print "THE SLOPE OF THE LINE,M IS"; M
150 Print "THE INTERCEPT,C IS"; C
160 Print "Y="; M; "X+"; C
170 Data 1,1.5,2,3.5,3,6,4,7.5,5,9.5,6,11
180 END
```

OUTPUT

```
ENTER THE VALUE OF N=? 6
THE SLOPE OF THE LINE,M IS 1.914286
THE INTERCEPT,C IS-.2
Y= 1.914286 X+-.2
```

PROGRAM 26

INPUT

```
10 Rem TO FIND THE AREA UNDER THE CURVE USING TRAPEZOIDAL RULE
20 Input "ENTER LOWER LIMIT="; A
30 Input "ENTER UPPER LIMIT="; B
40 Input "ENTER NUMBER OF INTERVALS="; N
50 Let H = (B - A) / N
60 Y1 = (H / 2) * TRAPEZOIDAL(A)
70 Y2 = (H / 2) * TRAPEZOIDAL(B)
80 Y = Y1 + Y2
90 S = 0
100 For I = 1 To N - 1
   110 S = S + TRAPEZOIDAL(A + I * H)
115 Next I
120 Z = H * S
130 C = Abs(Z + Y)
140 Print " THE AREA UNDER THE CURVE USING TRAPEZOIDAL RULE IS="; C
150 End
Function TRAPEZOIDAL (X)
   TRAPEZOIDAL = (3 * (X ^ 3)) - (4 * (X ^ 2)) + (8 * X) + 15
End Function
```

OUTPUT

```
ENTER LOWER LIMIT=? 1
ENTER UPPER LIMIT=? 50
ENTER NUMBER OF INTERVALS=? 300
 THE AREA UNDER THE CURVE USING TRAPEZOIDAL RULE IS= 4531611
```

PROGRAM 27

INPUT

```
10 REM TO FIND THE AREA UNDER THE CURVE USING SIMPSON RULE
20 Input "LOWER LIMIT, UPPERLIMIT, NUMBER OF INTERVALS="; A, B, N
30 Let H = (B - A) / N
40 S1 = SIMPSON(A) + SIMPSON(B)
50 S2 = 0: S4 = 0
60 For J = 1 To (N - 2) Step 2
   70 S2 = S2 + SIMPSON(A + (J + 1) * H)
   80 S4 = S4 + SIMPSON(A + J * H)
90 Next J
100 AR = (H / 3) * (S1 + 2 * S2 + 4 * S4)
110 Print "THE AREA UNDER THE CURVE USING SIMPSONS RULE="; AR
120 End
130 Function SIMPSON (x)
   140 SIMPSON = (x + 3) ^ 2
150 End Function
```

OUTPUT

```
LOWER LIMIT, UPPERLIMIT, NUMBER OF INTERVALS=? 5,10,10
THE AREA UNDER THE CURVE USING SIMPSONS RULE= 457.5
```

PROGRAM 28

INPUT

```
10 Rem TO FIND THE ENTHALPY USING SIMPSON RULE
20 Input "LOWER LIMIT, UPPERLIMIT, NUMBER OF INTERVALS="; A, B, N
30 Let H = (B - A) / N
40 S1 = SIMPSON(A) + SIMPSON(B)
50 S2 = 0: S4 = 0
60 For J = 1 To (N - 2) Step 2
   70 S2 = S2 + SIMPSON(A + (J + 1) * H)
   80 S4 = S4 + SIMPSON(A + J * H)
90 Next J
100 AR = (H / 3) * (S1 + 2 * S2 + 4 * S4)
110 Print "THE ENTHALPY USING SIMPSONS RULE="; AR
120 End
130 Function SIMPSON (T)
   140 SIMPSON = 3.381 + (1.804 * 10 ^ (-2) * T) - (4.3 * 10 ^ (-6) * T ^ 2)
150 End Function
```

OUTPUT

```
LOWER LIMIT, UPPERLIMIT, NUMBER OF INTERVALS=? 400,600,200
THE ENTHALPY USING SIMPSONS RULE= 2245.475
```

EXERCISE - 5

2 To plot the P-V Vander Whals Isotherms for the given gases with following values of vanderwaal constants a & b use R = 0.08205 L atm K^{-1} and volume from 5 - 100 dm^3 at interval of 5 dm^3

Make a P-V table and plot P-V graph for the gases at 300K

To study the effect of temperature (200, 400, 600 & 1000) on P-V isotherm for CO_2 gas.

Gas	a (atm dm^6mol^-2)	b(10^-2dm^3mol^-1)
Argon	1.337	3.2
Carbon Dioxide	3.61	4.29
Helium	0.0341	2.38
Xenon	4.137	5.16

T(K)	300
n(mol)	1
R	0.082057

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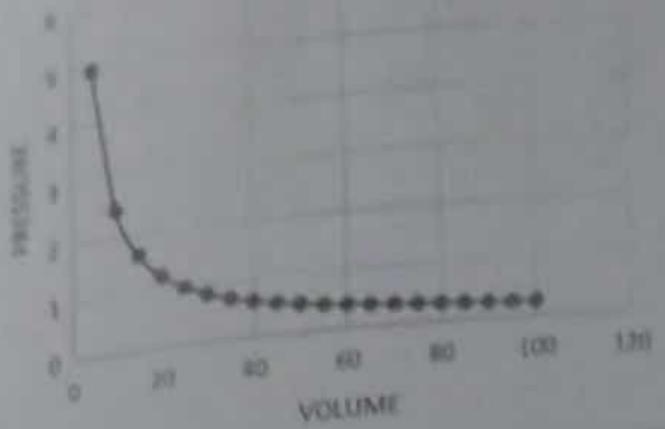
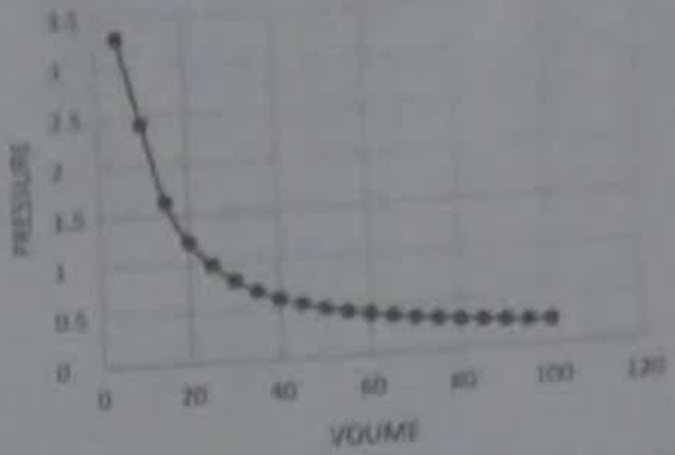
Volume(dm^3)	Ar	CO2	He	Xe
5	4.90165285	3.296614377	4.945603566	4.809279518
10	2.456242761	2.431482847	2.467241847	2.433108308
15	1.638706361	1.630760565	1.643596525	1.628418343
20	1.229485024	1.22183	1.232236213	1.22369632
25	0.983806811	0.978908	0.985567752	0.980101391
30	0.819960654	0.816558889	0.821183614	0.817387145
35	0.702897933	0.700398776	0.703796478	0.701007035
40	0.615084611	0.61317125	0.615772585	0.613636802
45	0.546775708	0.545263951	0.547319307	0.545631704
50	0.492122501	0.491320792	0.492562826	0.491195822
55	0.447402217	0.446658683	0.447766129	0.446636342
60	0.410132547	0.409448556	0.410438339	0.409488982
65	0.378594707	0.377965218	0.378855267	0.378046332
70	0.351560838	0.350997517	0.351785507	0.351087996
75	0.328130415	0.327629068	0.328326129	0.32771851
80	0.307627979	0.307181099	0.307799994	0.307265947
85	0.289536961	0.289137153	0.289689336	0.289216265
90	0.273455559	0.273096291	0.273591474	0.273169503
95	0.259066539	0.258742242	0.259188525	0.258809799
100	0.2461161	0.245822095	0.246226193	0.24588439

plot

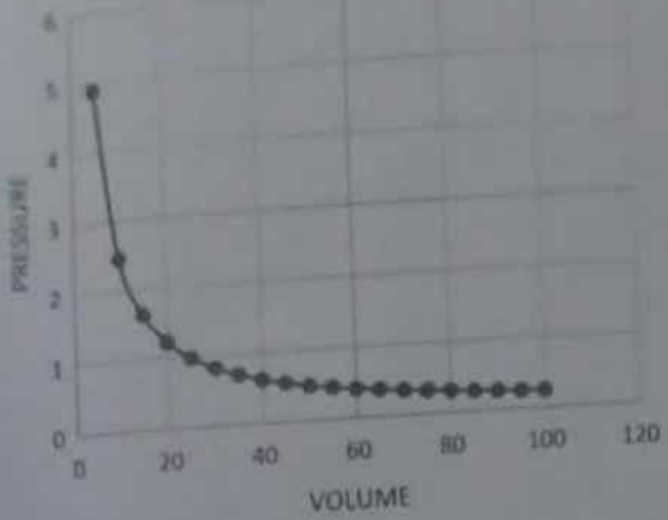
He



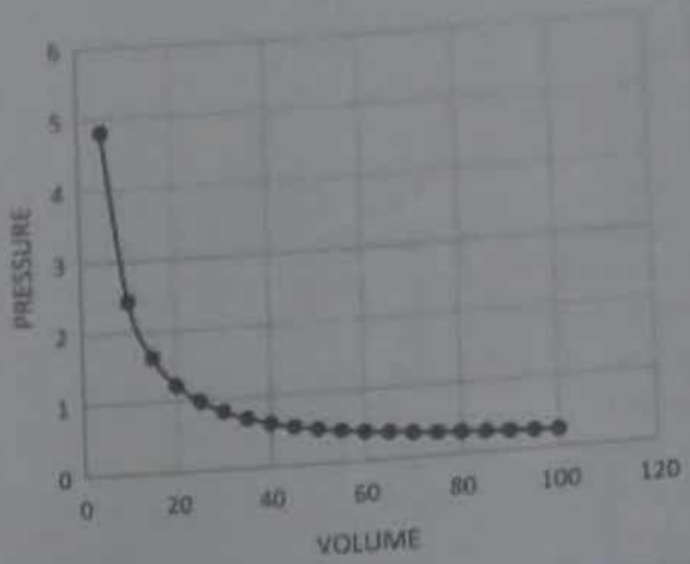
CO2

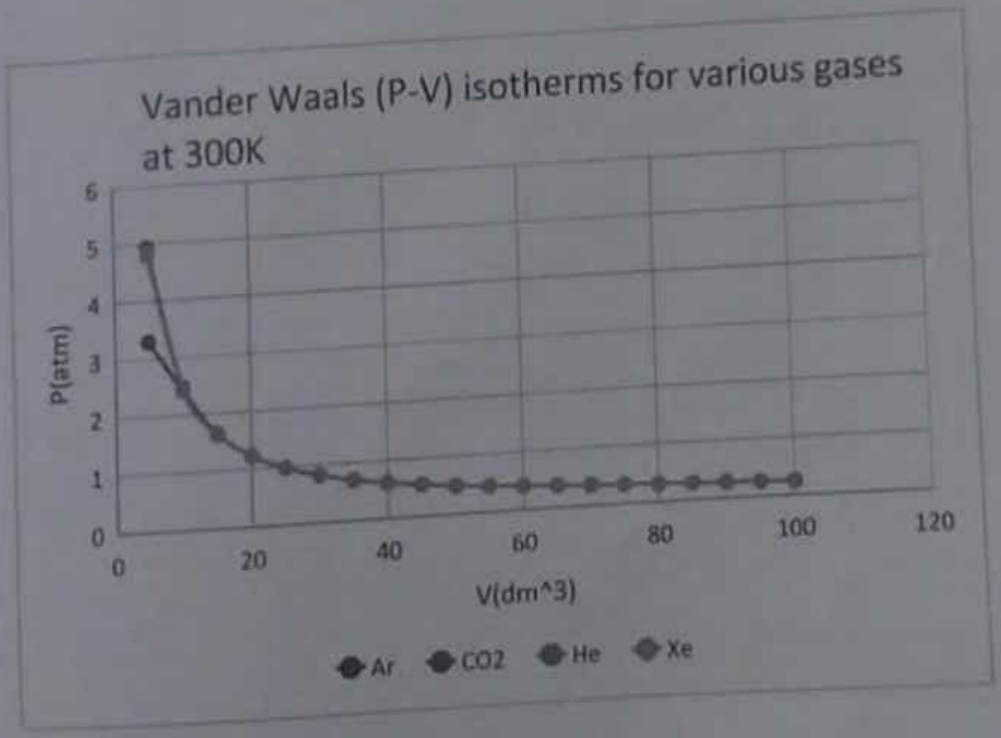


Ar



Xe





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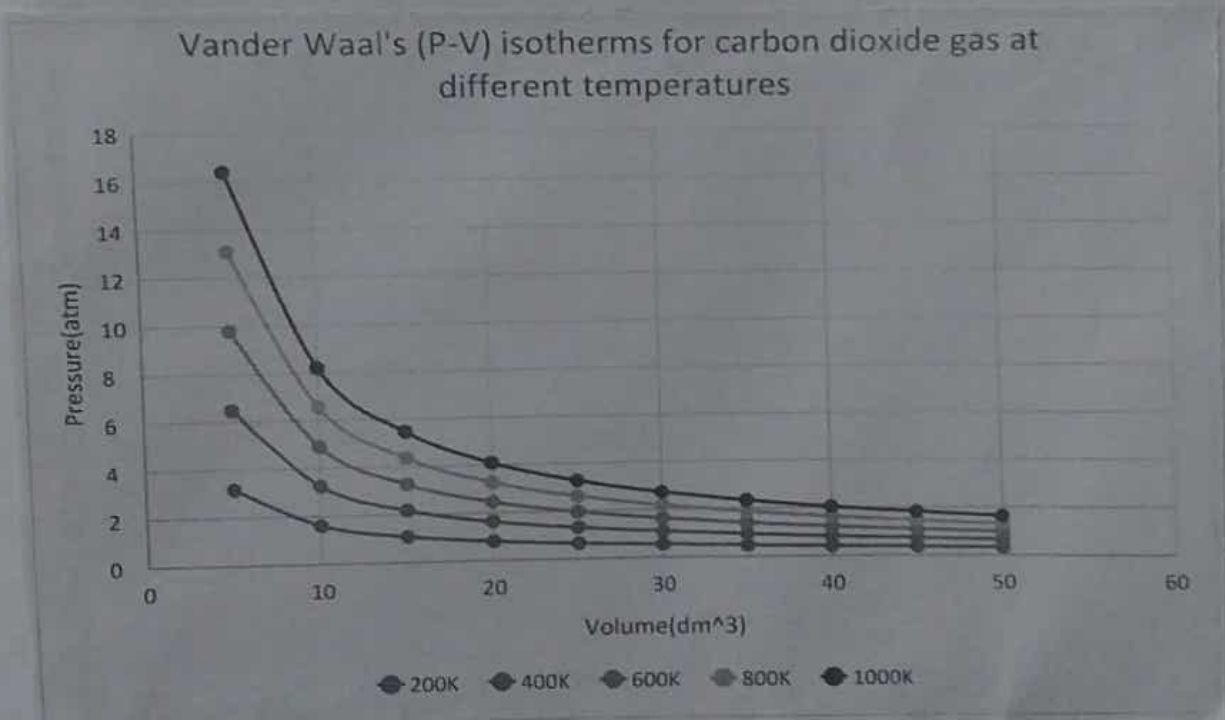
EXERCISE - 05

plot the P-V Vanderwaals isotherm for the given with the following values vanderwaal constants.

b.

study the effect of temperature (200, 400, 600 & K) on P-V isotherm of CO_2 gas.

Volume(dm^3)	200K	400K	600K	800K	1000K
5	3.166285683	6.476971366	9.787657049	13.09834273	16.40902842
10	1.612110824	3.260321649	4.908532473	6.556743298	8.204954122
15	1.081186971	2.178418386	3.275649801	4.372881216	5.470112631
20	0.813308906	1.635642812	2.457976719	3.280310625	4.102644531
25	0.651808415	1.30939283	1.966977245	2.624561659	3.282146074
30	0.543818953	1.091649016	1.63947908	2.187309144	2.735139207
35	0.466525643	0.935998225	1.405470808	1.87494339	2.344415972
40	0.408469253	0.819194756	1.229920259	1.640645762	2.051371266
45	0.363263072	0.72830886	1.093354648	1.458400436	1.823446224
50	0.327065861	0.655575723	0.984085584	1.312595446	1.641105307



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EXERCISE - 6

Maxwell-Boltzmann distribution in terms of number of particles having a certain velocity:

$$dN/N = 4\pi \left(\frac{M}{2\pi RT}\right)^{3/2} v^2 e^{(-Mv^2/2RT)}\, dv$$

$$dN/N = (\text{coeff.})\, v^2 \exp 1\, dv$$

where, $\text{coeff} = 4\pi \left(M/2\pi RT\right)^{3/2}$; $\exp 1 = e^{(-Mv^2/2RT)}$

Here,

M = Molecular weight in kg/mol dV = 50 m/s

R = Gas constant (J/K mol)

T = Temperature (K)

v = Velocity (m/s)

N_v = No. of molecules having velocity v.

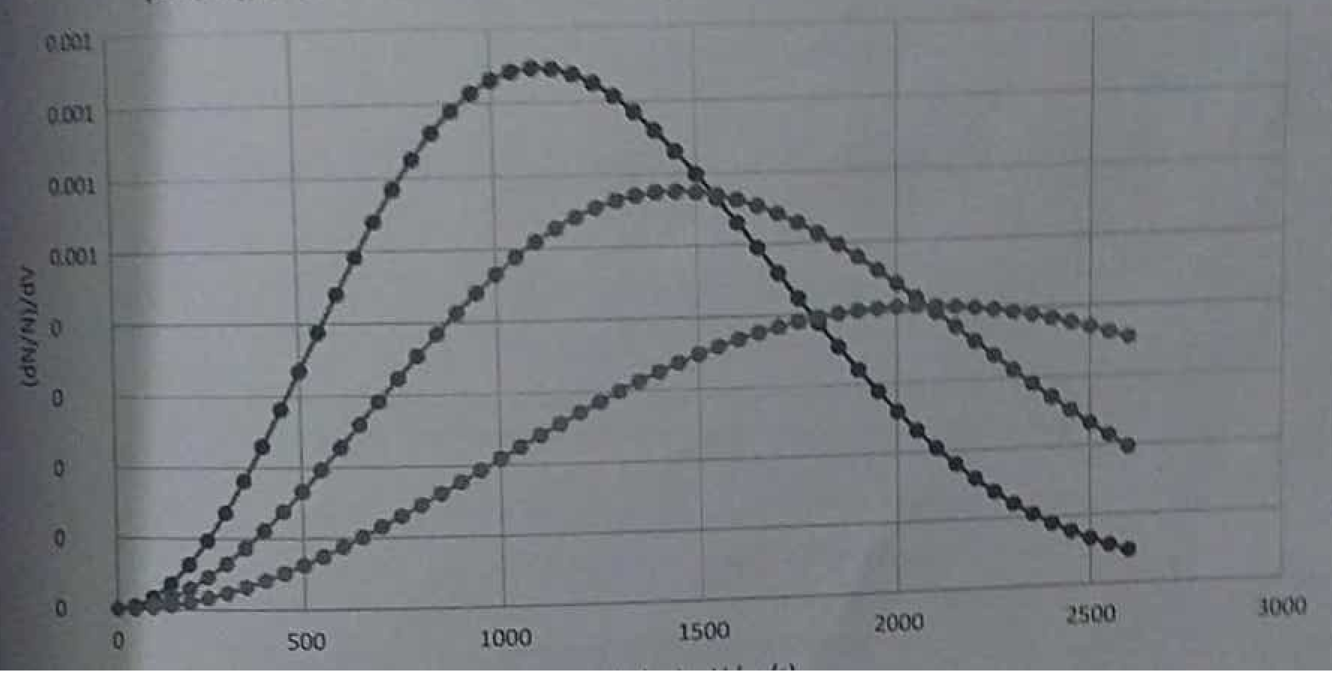
1) Plot dN/N v/s v at different temperature for ^4He gas.

Molecular Weight(Kg/mol)		0.004				
	R(J/K mol)	8.314				
	P	3.14				
	dv(m/s)	50				
	e	2.718281828				
	Temperature					
	T	298	T	500	T	1000
	Coeff	1.6372E-09	Coeff	7.53304E-10	Coeff	2.66333E-10
V(m/s)	EXP	(dN/N)/dV(298)	EXP	(dN/N)/dV(500)	EXP	(dN/N)/dV(1000)
0	0.917043002	0	1	0	1	0
50	0.99798393	4.08474E-06	0.998797933	1.881E-06	0.999398786	6.65432E-07
100	0.991960075	1.62403E-05	0.995200393	7.49688E-06	0.997597314	2.65693E-06
150	0.982001009	3.61739E-05	0.989233266	1.67668E-05	0.994602064	5.96015E-06
200	0.968226068	6.3407E-05	0.980939348	2.95578E-05	0.990423823	1.05513E-05
250	0.950798976	9.72903E-05	0.970377836	4.56868E-05	0.985077579	1.63974E-05
300	0.929924598	0.000137022	0.957623622	6.49243E-05	0.978582455	2.34566E-05
350	0.905844939	0.000181673	0.942766413	8.69982E-05	0.970961592	3.16784E-05
400	0.878834476	0.000230212	0.925909677	0.000111599	0.962242005	4.10043E-05
450	0.849194955	0.000281536	0.907169444	0.000138383	0.952454431	5.13682E-05
500	0.817249797	0.0003345	0.886672978	0.000166984	0.941633144	6.2697E-05
550	0.78333825	0.00038795	0.864557341	0.00019701	0.929815757	7.49113E-05

600	0.747809439	0.000440752	0.840967867	0.000728062	0.91704306	
650	0.711016449	0.000491821	0.816056578	0.000259727	2	8.79264-05
700	0.673310597	0.000540147	0.789980567	0.000291597	0.90135849	
750	0.635036002	0.000584819	0.762900352	0.000323266	9	0.000101651
800	0.596524578	0.000625042	0.734978258	0.000354344	0.88880851	0.000115992
850	0.558091532	0.000660152	0.706376818	0.000384454	0.87344167	
900	0.520031464	0.000689629	0.677257236	0.000413246	1	0.000130852
950	0.482615098	0.000713097	0.647777918	0.000440396	0.85730873	0.000146131
1000	0.44608671	0.000730331	0.618093098	0.000465612	0.84046226	
1050	0.41066223	0.000741249	0.588351572	0.000488636	5	0.000161727
1100	0.37652805	0.000745905	0.558695549	0.00050925	0.8229564	0.000177536
1150	0.34384048	0.000744481	0.529259637	0.000527272	0.80484651	
1200	0.312725842	0.000737271	0.500169963	0.000542563	8	0.000193457
1250	0.283281121	0.000724667	0.471543442	0.000555024	0.78618897	
1300	0.255575131	0.000707141	0.443487191	0.000564596	1	0.000209388
1350	0.229650104	0.000685228	0.416098089	0.000571259	0.76704078	
1400	0.205523647	0.000659506	0.389462486	0.000575032	9	0.000225228
1450	0.183190963	0.000630581	0.363656045	0.000575966	0.74745939	
1500	0.162627277	0.000599069	0.338743727	0.000574148	6	0.000240879
1550	0.14379038	0.00056558	0.31477989	0.000569692	0.72750232	
1600	0.126623225	0.000530706	0.29180852	0.00056274	8	0.000256245
1650	0.111056505	0.000495008	0.269863548	0.000553455	0.70722695	
1700	0.097011168	0.000459008	0.248969274	0.000542018	3	0.000271235
1750	0.084400799	0.000423178	0.229140866	0.000528626	0.68669020	
1800	0.073133858	0.00038794	0.210384924	0.000513487	8	0.000285763
1850	0.063115714	0.000353657	0.192700105	0.000496816	0.66594833	
1900	0.054250484	0.000320635	0.176077781	0.000478831	9	0.000299745
1950	0.046442633	0.000289126	0.160502733	0.00045975	0.64505665	
					6	0.000313105
					0.62406929	
					6	0.000325772
					0.60303900	
					8	0.000337681
					0.58201694	
					7	0.000348773
					0.56105248	
					4	0.000358998
					0.54019304	0.00036831
					0.51948392	
					5	0.000376674
					0.49896820	
					9	0.000384057
					0.47868660	
					5	0.000390438
					0.45867736	
					4	0.000395802
					0.43897620	
					1	0.000400138
					0.41961623	
					1	0.000403445
					0.40062792	
					3	0.000405729

2000	0.039598354	0.000259421	0.145954855	0.00043870	0.383039037	0.000406699
2050	0.033626723	0.000231363	0.132404879	0.000418163	0.363874813	0.000407373
2100	0.028440619	0.000205442	0.119825064	0.000398067	0.346157573	0.000406573
2150	0.023957453	0.000181309	0.108179912	0.000376698	0.328907148	0.000404976
2200	0.020099689	0.000159271	0.097431827	0.000355235	0.312140716	0.000402366
2250	0.016795198	0.000139204	0.087540765	0.000333845	0.295872886	0.000398929
2300	0.013977452	0.000121055	0.078464841	0.000312681	0.280115763	0.000394656
2350	0.011585586	0.00010475	0.070160896	0.000291878	0.264879022	0.000389591
2400	0.009564342	9.01941E-05	0.062585025	0.000271558	0.250169992	0.00038378
2450	0.007863923	7.72809E-05	0.055693049	0.000251828	0.235991748	0.000377275
2500	0.006439773	6.58948E-05	0.049440953	0.000232775	0.222353217	0.000370125
2550	0.005252292	5.59152E-05	0.043785261	0.000214476	0.20924928	0.000362384
2600	0.004266526	4.72195E-05	0.038683372	0.000196989	0.196680888	0.000354107

(dN/N)/V vs V curve for Helium gas at different temperatures



Time (sec)	Ethyl chloride (M)	ln[Ethyl chloride]	1/[Ethyl chloride]
0	0.101	-2.292634762	9.900990099
10	0.081	-2.513306124	12.34567901
20	0.0532	-2.933696883	18.79699248
30	0.0422	-3.165335058	23.69668246
40	0.0282	-3.568433301	35.46099291
50	0.0206	-3.882464203	48.54368932