

- (c) Write a program to Calculate the binomial coefficient using subroutine. Given

$${}^nC_r = \frac{n!}{(n-r)! r!} \quad (4,4,4)$$

7. (a) Write a program in BASIC to draw 10 concentric circles at the center of the SCREEN 1.
- (b) Explain trapezoidal rule for numerical integration. Write a program in BASIC using trapezoidal rule to find the enthalpy change by using

$$\Delta H = \int_{T_1}^{T_2} (A + BT + CT^2) dT$$

- (c) Distinguish between :

- (i) Bug and Virus
 - (ii) Operating System and Application software
 - (iii) RAM and ROM
 - (iv) CPU and ALU
- (4,4,4)

[This question paper contains 8 printed pages]

Your Roll No.

Sr. No. of Question Paper : 1189

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Name of the Paper : DSE-2 Applications of Computers in Chemistry

Name of the Course : B.Sc. (Hons.) Chemistry

Semester : V

Duration : 3 Hours

Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
 2. Attempt **six** questions in all.
 3. Question **1** is compulsory. Attempt any **five** questions out of remaining **six** questions.
 4. Attempt all parts of the question together.
 5. Use of calculator is allowed.
1. (a) Write the BASIC expression for the given algebraic expression (**any three**)

$$(i) \bar{v} = \frac{1}{2\pi c} \left(\frac{k}{\mu} \right)^{1/2}$$

$$(ii) r = \frac{k_1 k_2 I_a [A]}{k_2 [A] + k_3}$$

$$(iii) n = 2d \sin \theta / \lambda$$

$$(iv) K = Ae^{-E_a/RT}$$

(b) Identify the valid and invalid numeric and string variables giving reason.

- (i) A12
- (ii) CLS
- (iii) IB\$
- (iv) NUM 1
- (v) NAME\$12
- (vi) BA_C1

(c) Write the full form of the following (any three)

- (i) VLSI
- (ii) VDU
- (iii) BIT
- (iv) CAD

(d) What is the purpose of the following Library functions? Explain each with example (any three)

$\lambda_m = \lambda_m^\infty - k\sqrt{c}$ and calculate λ_m^∞ and k .

Concentration/M	17.2	10.8	2.6	1.3	0.8	0.2
Molar conductance(Sm ² /mol)	42.5	45.9	51.8	54.1	55.8	57.4

Given that

$$\text{slope} = \frac{N \sum x_i y_i - \sum x_i \sum y_i}{N \sum x_i^2 - \sum x_i^2}, \text{constant} = \frac{\sum x_i^2 \sum y_i - \sum x_i \sum x_i y_i}{N \sum x_i^2 - \sum x_i^2} \quad (5,2,5)$$

6. (a) Write a program to print the following output from given string "CHEMISTRY"

```
C
CH
CHE
CHEM
CHEMI
CHEMIS
CHEMIST
CHEMISTR
CHEMISTRY
```

(b) What is the difference between screen 0, 1 and 2? Explain.

```
(ii) READ A,B
      RESTORE
      READ C,D
      READ E,F,G,H
      PRINT A;B;C;D
      PRINT E,F,G,H
      DATA 3,5,7,8,9,12,15,18
```

```
(iii) PRINT STRING$(5,"*")
      For I= 2 to 4
      PRINT TAB(I);"*"
      NEXT I
      PRINT STRING$(5,"*")
      END
```

(6,6)

5. (a) Write a program in BASIC to calculate sine of an angle by using series summation.

$$\sin x = \sum_{m=0}^{\infty} (-1)^m x^{2m+1} / (2m+1)!$$

Value should be accurate till 4th decimal place.

- (b) What is the difference between interpreted and compiled program? Explain each term giving suitable examples.
- (c) Write a program in BASIC to fit λ_m and \sqrt{c} to a straight line using least square fit and equation:

- (i) FIX
(ii) SQR
(iii) ABS
(iv) RND

- (e) Identify the valid and invalid numeric and string constants giving reason.

- (i) 16,000
(ii) "1A2378"
(iii) Rs. 1000
(iv) 12E-40
(v) "CHEMISTRY"
(vi) 148.62

(5×3)

2. (a) Convert the following numbers :

- (i) $(10.625)_{10}$ to octal number
(ii) $(A12.21)_{16}$ to binary

- (b) Write the correct BASIC command for the following statements

- (i) Draw a box whose diagonal coordinates are (x_1, y_1) and (x_2, y_2)
(ii) Draw a semicircle of radius r and the center (x, y)

P.T.O.

- (iii) Locate the top right of screen and print "CHEMISTRY"
- (iv) To create a window of (0,0) to (50,100) in SCREEN 2
- (c) Write a program in BASIC to arrange given numbers in increasing order
- 3, 67, 8, 10, 85, 33, 17, 19, 99, 0 (4,4,4)
3. (a) Find the errors in following programs and write correct form
- (i) REM TO PRINT A MATRIX
FOR J=1 to 3
FOR I=1 to 3 STEP -1
READ A(I, J)
B(I, J)=A(I, J)+ 21 - J
PRINT B(J,I)
NEXT J
PRINT
NEXT I
DATA 1,2,3,4,5
- (ii) REM To FIND ROOTS OF QUADRATIC EQUATION
INPUT A,B,C\$
D=B^2-4AC

```

IF D<0 THEN ELSE 10
10 E=SQR(D)
R=-B+E/2*A
S=-B-E/(2*A)
PRINT "ROOTS ARE=";R,S
PRINT "NO REAL ROOTS"
END

```

- (b) Explain the binary bisection method to solve the polynomial.
- (c) Write a program in BASIC to find the root for the following equation using binary bisection method
- $$x^4 - 2x^3 + 4x^2 - 6 = 0 \quad (6,2,4)$$
4. (a) Write a program in BASIC to calculate multiplication of any two given matrices. Print all the three matrices.
- (b) What is the output of following programs :
- (i) A\$="DELHI UNIVERSITY"
B\$=LEFT\$(A\$,5)
C\$=RIGHT\$(A\$,7)
D\$=MID\$(A\$,7,3)
L=LEN(A\$)
PRINT B\$, C\$;
PRINT L, D\$