

**19/185****B.Sc. (Part-I) Examination, 2019****Chemistry****Third Paper****(Physical Chemistry)*****Time : Three Hours ]******[ Maximum Marks : 50***

**Note :** Attempt questions from **all** sections as per instructions.

**Section-A****(Very Short Answer Type Questions)**

**Note :** Attempt **all** parts of this question. Give answer of each part in about 50 words.

$$1 \times 10 = 10$$

1. (i) Evaluate  $\log_3^{243}$ .

(ii) Find  $\left(\frac{\partial Z}{\partial x}\right)_y$ , When  $Z = \sin^2 x^2 y$ .

(iii) Distinguish between Hardware and Software.

**P.T.O.**

(2)

- (iv) What is ASCII Code?
- (v) What is electrophoresis?
- (vi)  $\text{CH}_4$  has higher polarizability than water, but boiling point of water is higher, why?
- (vii) Define 'Critical temperature'.
- (viii) What is instantaneous reaction? Give example.
- (ix) What is 'autocatalysis'?
- (x) Who gave the relation  $n\lambda = 2d \sin \theta$  ( $n\lambda = 2d \sin \theta$ )? What are the various term?

### Section-B

#### (Short Answer Type Questions)

**Note :** Attempt **all** questions. Give answer of each question in about 200 words.  $5 \times 5 = 25$

2. ✓ Evaluate :

(i)  $\tan^2 x \, dx$

(ii)  $\int e^{-\ln x} \, dx$

**OR**

Find  $\frac{8}{5}$  and  $\frac{14}{4 \times 10}$

3. ✓ If Collision diameter of  $\text{N}_2$  molecules is 374 pm. Find collision number in the above example of gas.

(3)

**OR**

Derive Vander Waals gas equation for an ideal gas.

4. What are Colloidal electrolytes? Explain.

**OR**

Lyphobic Sols show electrophoresis. Explain.

5. Derive the rate Law of II<sup>nd</sup> order reaction  $2A \rightarrow P$ .

**OR**

(100) and (110) Planes of NaCl Crystal give maximum reflection of X-rays at angles  $\theta_1$  and  $\theta_2$ . Using Bragg's equation determine the ratio  $d_{100}/d_{110}$ .

6. What are Miller Indices? How are they determined? Give example.

**OR**

What are radial distribution function? How it is used for elucidation of structure of liquid?

### **Section-C**

#### **(Long Answer Type Questions)**

**Note :** Attempt any **two** questions. Give answer of each question in about 500 words.

$$7\frac{1}{2} \times 2 = 15$$

7. Briefly describe the high level languages Viz., FORTRAN, BASIC, PASCAL and COBOL.

(4)

8. What is half life of a reaction? Derive expression for the half life of zero order and 1<sup>st</sup> order reaction. How do the  $t_{1/2}$  values depends upon the initial concentration of these reaction.
9. Derive Bragg's equation for X-ray diffraction and discuss the determine of the Crystal Structure of NaCl.
10. Short Notes on:
  - (i) Dipole-Dipole Interaction.
  - (ii) Maxwell distribution of molecular velocities.
  - (iii) Poisoning of Catalysts
11. What is Kinetic theory of gases. Write down the important Postulates of gases and derive the relationship  $Pv = \frac{1}{3}mNu^2$ .

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