

IMPORTANT INSTRUCTIONS FOR PAPER ID 53408

1. Attempt any 4 part out of the given 8 from question No. 1.
2. Unit IV (Question No. 8 & 9) be treated as deleted or null & void.
3. Attempt any 04 questions from question No. 2 to 7.

- (c) How high will a liquid rise in a capillary tube of 0.1 mm diameter if its density is 1.3 g cm^{-3} and surface tension is 65 dyne cm^{-1} ? ($g = 980 \text{ cm s}^{-2}$). 4

5. (a) Explain the following phenomena : 4
- (i) Drops are spherical in shape
 - (ii) Rise of liquid in capillary tube.
- (b) How does surface tension of water varies with : 8
- (i) Temperature
 - (ii) Addition of soluble substances (impurities)
- (c) What is Intrinsic Viscosity ? How is it related to molecular mass of polymer ? 4

Unit III

6. (a) Write a short note on Frenkel defect. 4
- (b) If Al^{3+} replaces Na^+ at the edge centre of NaCl lattice, then calculate vacancies in one mole NaCl ? 4

J-53408

4

Roll No.

Exam Code : J-21

Subject Code—53408

B. Sc. EXAMINATION

(Batch 2018 Onwards)

(Main & Re-appear)

(Fourth Semester)

CHEMISTRY

CCL-405

Physical Chemistry—III

(States of Matter & Chemical Kinetics)

Time : 3 Hours

Maximum Marks : 80

Note : Attempt *Five* questions in all, selecting *one* question from each Unit. Q. No. 1 is compulsory.

(Compulsory Question)

1. (a) Define Parachor. 2

(1-30-43-0821) J-53408

P.T.O.

- (b) How does viscosity vary with temperature ? 2
- (c) How does the addition of catalyst affect the rate of reaction and the equilibrium constant ? 2
- (d) State and explain Charles' Law. 2
- (e) Why air is less dense at hill station than the sea level ? 2
- (f) Identify the crystal system to which each of following belongs : 2
 - (i) $a = b \neq c$ $\alpha = \beta = \gamma = 120^\circ$
 - (ii) $a = b = c$ $\alpha = \beta = \gamma = 90^\circ$
- (g) What do you understand by *n*-type and *p*-type semiconductors ? 2
- (h) What is the difference between average and instantaneous rate of reaction ? 2

Unit I

- 2. (a) At what temperature root mean square velocity of Cl_2 gas will be equal to that of SO_2 at NTP. 4

J-53408

2

- (b) What are the postulates of Kinetic Theory of Gases ? Derive expression for the pressure exerted by the molecules of a gas. 8
- (c) State and explain Dalton law of partial pressure. 4
- 3. (a) Derive relationship between mean free path and coefficient of viscosity of a gas. Explain the effect of temperature and pressure on the coefficient of viscosity of a gas. 8
- (b) Explain Maxwell's distribution of velocities. Describe the effect of temperature. 8

Unit II

- 4. (a) Describe any *two* methods for the measurement of surface tension. 6
- (b) Describe the principle and apparatus used for the measurement of viscosity ? 6

(1-30-44-0821) J-53408

3

P.T.O.

- (b) What are the pseudo-unimolecular reactions ? Give *two* examples. 4
- (c) Write Arrhenius equation giving the effect of temperature on rate constant of a reaction ? 4
9. (a) Distinguish between order and molecularity of reaction. 6
- (b) Briefly explain different methods used for the determination of order of reaction. 6
- (c) A first order reaction is 40% complete in 50 minutes. Calculate the value of the rate constant. In what time will the reaction be 80% complete ? 4

- (c) What are the Bravais lattices of orthorhombic system ? Calculate the number of particles per unit cell in each of them. 8

7. (a) What do you understand by the point defects ? Briefly explain the different types of point defects in stoichiometric crystals. 8
- (b) Briefly explain the following terms with suitable examples : 4
- (i) Proper axis of symmetry
- (ii) Centre of symmetry.
- (c) What are the main points of difference between crystalline and amorphous solids ? 4

Unit IV

8. (a) What is a first order reaction ? Explain with suitable example. Describe expression for the rate constant and half-life period for reaction of first order. 8