

**BACHELOR OF SCIENCE (CBCS-2018 COURSE)**  
**F. Y. B. Sc. Sem-II : WINTER- 2022**  
**SUBJECT : CHEMISTRY : PHYSICAL & INORGANIC CHEMISTRY-II**

Day : Monday

Time : 02:00 PM-05:00 PM

Date : 12/12/2022

**W-18322-2022**

Max. Marks : 60

**N.B.:**

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the sections should be written in **SAME** answer book.
- 3) Draw neat and labelled diagrams wherever necessary.
- 4) Use of **log table/ scientific calculator** is allowed.

**SECTION-I (Physical Chemistry)**

**Q.1** Attempt any **TWO** of the following: **(12)**

- a) What are ideal and non-ideal gases? Distinguish between them.
- b) Explain the term vapour pressure.
- c) Describe the phenomenon of phosphorescence.

**Q.2** Attempt any **TWO** of the following: **(12)**

- a) Discuss in detail the term viscosity.
- b) What are the reasons for the high quantum yield?
- c) Describe the method for the measurement of vapour pressure.

**Q.3** Attempt any **THREE** of the following: **(12)**

- a) Elaborate on the first law of law of photochemistry.
- b) A substance absorbs  $2 \times 10^{16}$  quanta of radiation per second and 0.002 moles of it react in 20 minutes. Calculate quantum yield of the reaction.  
( $N = 6.0.23 \times 10^{23}$ )
- c) A solution of vitamin D<sub>2</sub> show 80% transmittance of wavelength 540nm. Express the measurement in terms of absorbance units.
- d) If  $P_c = 12.97 \times 10^5 \text{ Nm}^{-2}$   
 $V_c = 6.5 \times 10^{-5} \text{ m}^3 \text{ mol}^{-1}$   
 $T_c = 33.3 \text{ K}$

For hydrogen, calculate Van der waal's constants. ( $R = 8.314 \text{ JK}^{-1} \text{ mol}^{-1}$ )

**SECTION-II (Inorganic Chemistry)**

**Q.4** Attempt any **TWO** of the following: **(12)**

- a) Define a chemical bond. Explain bonding in O<sub>2</sub> molecule on the basis of VBT.
- b) What is hybridization? Discuss the bonding in BF<sub>3</sub> molecule using the concept of hybridization.
- c) Discuss the assumptions of VBT

**Q.5** Attempt any **FOUR** of the following: **(12)**

- a) Explain Metallic bond and Covalent bond.
- b) Explain the formation of F<sub>2</sub> molecule on the basis of atomic orbital overlap.
- c) Draw the structures of the following molecules using VSEPR theory and mention the types of hybridization:  
i) Cl<sub>2</sub>O                      ii) ClF<sub>3</sub>                      iii) BrF<sub>5</sub>
- d) Write assumptions of VSEPR theory.
- e) Explain hybridization in BeH<sub>2</sub> molecule.
- f) Explain coordinate bond formation with suitable example.