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**GA—31—2023**

**FACULTY OF SCIENCE AND TECHNOLOGY**

**B.Sc. (First Year) (Second Semester) EXAMINATION**

**APRIL/MAY, 2023**

**(New Course)**

**CHEMISTRY**

**Paper IV**

**(Physical and Inorganic Chemistry)**

**(Saturday, 27-4-2023)**

**Time : 10.00 a.m. to 12.00 noon**

*Time— Two Hours*

*Maximum Marks—40*

*N.B. :—* (i) Attempt All questions.

(ii) Use of logarithmic table is allowed.

1. Solve any *three* of the following : 15

- (i) Define metallic bond. Explain free electron theory of metallic bond.
- (ii) Explain Valence bond theory for the formation of covalent bond.
- (iii) Define van der Waals bond. Explain types of van der waal's forces responsible for van der Waals bond.
- (iv) (a) Draw molecular orbital diagram of oxygen molecule and calculate its bond order.  
(b) Give the limitation of VSEPR theory.
- (v) Define and explain the types of  $Sp^3d^3$  hybridization with suitable example.

2. Solve any *three* of the following : 15

- (i) What are gels ? How are they classified ? Give their properties.
- (ii) Explain acid-base catalysis with example.

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- (iii) State the postulates of Bohr's atomic model.
- (iv) In an experiment with Ostwald's Viscometer, the times of flow of water and ethanol are 80 sec and 175 sec at 20°C. The densities of water = 0.998 g/cm<sup>3</sup> and ethanol = 0.790 g/cm<sup>3</sup>. The viscosity of water at 20°C is 0.01008 poise. Calculate viscosity of ethanol.
- (v) Explain :
- (1) Auto Catalysis
  - (2) Hund's Rule of Maximum multiplicity.
3. Solve any *two* of the following : 10
- (i) Explain Enzyme Catalysis with example.
  - (ii) Discuss optical and kinetic properties of sol.
  - (iii) What is parachor ? Give the relation between Parachor and Surface tension.
  - (iv) Calculate radius of third Bohr's orbit of H-atom.