

JV-003-001505 Seat No. _____

Third Year B. Sc. Examination

September / October - 2019

Chemistry: C-501

(Inorganic & Industrial Chemistry)

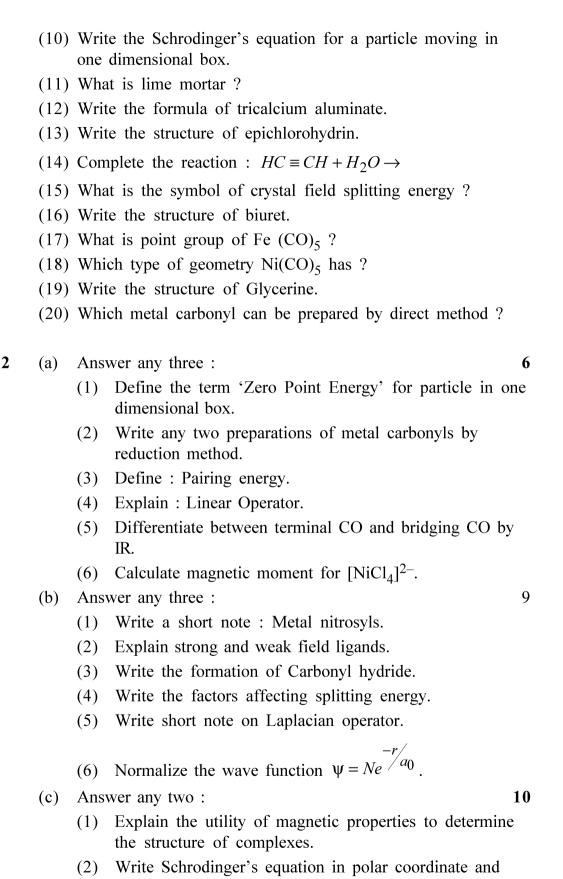
Faculty Code : 003

Subject Code: 001505

Time: $2\frac{1}{2}$ Hours] [Total Marks: 70]

Instructions:

- (1) Question one contains 20 short questions of one mark each. All are compulsory.
- (2) Question 2 and 3 carries 25 marks each with internal options.
- (3) Write answers of all questions in answer book.
- 1 Answer the following questions: 20
 - (1) Which orbitals are denoted as t_{2g} orbitals?
 - (2) Which are the essential raw materials for the manufacturing of cement ?
 - (3) For diamagnetic substances, value of magnetic moment is
 - (4) Which oxide is responsible for the greenish-grey colour of ordinay portland cement ?
 - (5) By which equation CFSE for octahedral complexes is calculated?
 - (6) At which IR range terminal CO group absorbs the radiation?
 - (7) What is meant by 'g' in e_g and t_{2g} ?
 - (8) Laplacian operator is denoted as _____
 - (9) According to boundary conditions for the system, ψ must be



derive R, θ, Φ equations by variable separation method.

- (3) Discuss the structure of $Fe(CO)_5$.
- (4) Discuss splitting of d-orbitals in octahedral complexes.
- (5) Calculate the energy 1s orbital where

$$Q_{1s} = \frac{1}{\sqrt{\pi a_0^3}} e^{-r/a_0}.$$

3 (a) Answer any three:

6

- (1) Explain the soundness of cement.
- (2) Name any two phosphatic fertilizers.
- (3) Write the reactions for manufacturing glycerol via acrolein.
- (4) Write advantages of artificial fertilizers.
- (5) Write the uses of trichloro methane.
- (6) What is Sorel's cement? Write formula of Sorel's cement.
- (b) Answer any three:

9

- (1) Write the difference between dry and wet process of cement.
- (2) Explain the action of urea as fertilizer.
- (3) Write short note: Concrete and RCC.
- (4) Write the equations for the manufacturing of ethanol by catalytic hydration process.
- (5) Write the properties and uses of trichloromethane.
- (6) Explain: Cement rock benefication.
- (c) Answer any two:

10

- (1) Describe prilling method for the production of ammonium nitrate with process flow diagram.
- (2) What are C₂ petrochemicals ? Explain production of ethylene glycol from ethylene.
- (3) Explain in detail the manufacturing process of portland cement with reaction.
- (4) Discuss manufacturing of calcium cynamide and explain action of calcium cynamide as fertilizer.
- (5) Explain the manufacture of glycerol via allyl chloride with necessary reactions and diagram.