

## B.Sc. Semester - 5 (CBCS) Examination

Oct/Nov. - 2018

## INORGANIC AND INDUSTRIAL CHEMISTRY (CORE)

Time: 2:30 Hours

Marks: 70

## Instructions:

1. All questions are compulsory.
  2. Figures to the right indicate marks.
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- Que-1 (A) Answer the following question. (04)  
(1) Differentiate: High spin and Low spin complex with example.
- (B) Answer the following questions. (Any two) (10)  
(1) Explain splitting of d-orbital in octahedral field with CFSE.  
(2) Discuss the factors affecting crystal field stabilization energy.  
(3) Splitting energy ( $\Delta_0$ ) of d-orbital in  $[\text{Fe}(\text{CN})_6]^{-4}$  is  $32500 \text{ cm}^{-1}$  and pairing energy is  $17500 \text{ cm}^{-1}$ . Find out CFSE and Magnetic moment. [ $1 \text{ kJ/mole} = 83.7 \text{ cm}^{-1}$ ]
- Que-2 (A) Answer the following question. (04)  
(1) Explain types of CO groups in metal carbonyls.
- (B) Answer the following questions. (Any two) (10)  
(1) Explain how IR spectroscopy is useful in the study of metal carbonyls.  
(2) Explain structure of  $\text{Fe}(\text{CO})_5$ .  
(3) Discuss the nature of M-NO bond in linear metal nitrosyls.
- Que-3 (A) Answer the following question. (04)  
(1) Write a note on raw materials used for manufacturing of glass.
- (B) Answer the following questions. (Any two) (10)  
(1) Derive the Normalized wave function for a particle moving in one dimensional box  
(2) Briefly discuss degeneracy.  
(3) Discuss different types of glass.
- Que-4 (A) Answer the following question. (04)  
(1) Write a note on RCC.
- (B) Answer the following questions. (Any two) (10)  
(1) Discuss manufacturing of Portland cement with reactions.  
(2) Explain setting and hardening of Portland cement with chemical reactions.  
(3) Discuss properties of cement.
- Que-5 (A) Answer the following question. (04)  
(1) Discuss classification of fertilizer.
- (B) Answer the following questions. (Any two) (10)  
(1) Explain Sindri method for the production of Urea.  
(2) Describe manufacture of normal super phosphate by Den process with flow diagram.  
(3) Discuss the role of micro nutrients in plant growth.

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