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SMCH61

B.Sc. (CBCS) DEGREE EXAMINATION,  
APRIL 2020.

Sixth Semester

Chemistry – Main

INORGANIC CHEMISTRY – III

(For those who joined in July 2016 onwards)

Time : Three hours

Maximum : 75 marks

PART A — ( $10 \times 1 = 10$  marks)

Answer ALL questions.

Choose the correct answer :

1. The IUPAC name of  $K_3[CrF_6]$  is
  - (a) Potassium hexafluoro chromate (II)
  - (b) Potassium chromo hexafluoride (II)
  - (c) Potassium hexafluoro chromate (III)
  - (d) Chromium hexafluoro potassium (I)

2. VB theory was introduced by
- (a) Pauling
  - (b) Warner
  - (c) Sidgwick
  - (d) Bethe and Vanvleck
3. If the crystal field splitting energy for any complex is lower the complex requires the excitation energy.
- (a) high
  - (b) low
  - (c) zero
  - (d) no relationship between crystal field splitting energy and excitation energy
4. The number of unpaired electrons present in  $\text{Mn}^{2+}$  is
- (a) 5
  - (b) 4
  - (c) 3
  - (d) 2
5. Which one of the following has more transeffect?
- (a)  $\text{H}_2\text{O}$
  - (b)  $\text{NH}_3$
  - (c) Pyridine
  - (d)  $\text{I}^-$

6. Commonly, the rate of base hydrolysis is \_\_\_\_\_ than that of acid hydrolysis.

- (a) more (b) lesser  
(c) 0 (d) equal

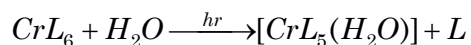
7. The catalyst used in O x O process is

- (a)  $(\text{Ph}_3\text{P})_2\text{RhCl}$   
(b)  $\text{HCo}(\text{CO})_4$   
(c) Wacker catalyst  
(d) Ziegler-Natta catalyst

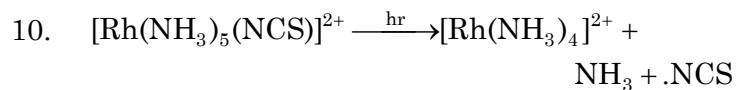
8. The metal carbonyl obtained by the action of carbon-monoxide on finely divided cobalt at  $150 - 200^\circ \text{C}$  and 250 atm pressure is

- (a)  $\text{Co}(\text{CO})_3$  (b)  $\text{Co}_2(\text{CO})_8$   
(c)  $\text{Co}(\text{CO})_2$  (d)  $[\text{Co}_4(\text{CO})_{12}]$

9. How is the following reaction called?



- (a) Photoredox (b) Base hydrolysis  
(c) Acid hydrolysis (d) Photoequation



is an example for

- (a) Photosubstitution reaction
- (b) Photoredox
- (c) Ammoniacal reaction
- (d) Photoaquation reaction

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 250 words.

11. (a) Explain with suitable examples the structural isomerism in octahedral complexes.

Or

- (b) What are ligands? How are they classified? Give one example for each type.

12. (a) What is meant by crystal field stabilization energy? Write down its uses.

Or

- (b) Explain any five factors which affect the crystal field splitting.

13. (a) Explain the inner-sphere electron transfer reaction with mechanism.

Or

- (b) Write a note on anation reactions in co-ordination compounds.

14. (a) State and explain 18 electron rule.

Or

- (b) Mention any two organometallic compounds of zinc. How are they prepared?

15. (a) Explain the metal-centred and charge-transfer transitions with suitable examples.

Or

- (b) State and explain the Adamson's rules.

PART C — ( $5 \times 8 = 40$  marks)

Answer ALL questions, choosing either (a) or (b).

Each answer should not exceed 600 words.

16. (a) Discuss briefly the stereoisomerism in octahedral and tetrahedral co-ordination compounds.

Or

- (b) Explain briefly the applications of VB theory in octahedral and tetrahedral complexes.

17. (a) Explain briefly the magnetic and spectral properties of transition metal complexes.

Or

- (b) What is meant by stability of complexes? What are the factors which affect it? Write anyone method to determine the stability constant.

18. (a) Explain the inert and labile complexes with suitable examples. Discuss the base hydrolysis with mechanism.

Or

- (b) What is meant by trans-effect? Explain any two theories of trans-effect.

19. (a) What are metal nitrosyls? Write down their structure and bonding.

Or

- (b) What are Wilkinson's and Ziegler-Natta catalysts? Write down their importance.

20. (a) Discuss briefly the photosubstitution and photoredox reactions with suitable examples.

Or

- (b) Explain briefly the photogalvanic cells and semiconductor based photovoltaic cells.