

(6 pages)

Reg. No. :

Code No. : 6157

Sub. Code : C 21 C

M.Sc.(CBCS) DEGREE EXAMINATION, APRIL 2011.

Second Semester

Chemistry

INORGANIC CHEMISTRY – II

(For those who joined in July 2008 and afterwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

1. What are the advantages of using graphite as a moderator in nuclear reactors?
2. What is breeder reactor?
3. What is anation reaction? Give an example.
4. What are stepwise and overall formation constants? How are the two related each other?

5. Explain ENA rule with an example.
6. What are isolobal fragments?
7. Suggest how immobilized homogeneous catalyst can be made.
8. What is reductive elimination? Give an example.
9. What are the metabolic disorders connected with Wilkinson's disease? Name the chelating agent used in the treatment.
10. Write the chemotherapeutic use of cis-diamminedichloroplatinum(II).

PART B — (5 × 5 = 25 marks)

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

11. (a) Write briefly on the following:
 - (i) Threshold energy and
 - (ii) Q value in nuclear chemistry.

Or

 - (b) Discuss briefly on the disposal of radioactive wastes.

12. (a) Discuss the polarization theory of trans effect.

Or

- (b) List out the various factors affect the stability of a metal complex.

13. (a) Discuss the use of IR spectra in metal carbonyls.

Or

- (b) Discuss the structure and bonding in metal-olefin complexes.

14. (a) How is synthesis gas prepared? Discuss the important aspects of ZSM-5 catalysts in the production of synthetic gasoline.

Or

- (b) What is hydroformylation reaction? Explain the mechanism of this reaction using Rh-complex as catalyst.

15. (a) Discuss the mode of action of carboxypeptidase in the hydrolysis of an amide linkage in a polypeptide.

Or

- (b) Discuss the structure and functions of peroxidases and catalases.

PART C — (5 × 8 = 40 marks)

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

16. (a) (i) Explain with illustrations various types of nuclear reactions involving natural and accelerated particles.

- (ii) Give the theory of nuclear fission. Explain how fission and spallation reactions differ.

Or

- (b) (i) Calculate the 'Q' value of the reaction



- (ii) Describe how product distribution in nuclear fission reactions can be accounted.

17. (a) Discuss briefly the ligand substitution reactions of square-planar complexes.

Or

- (b) Explain briefly the substitution reactions in octahedral complexes.

18. (a) Discuss the general methods for the synthesis of metallocenes. Write briefly on the bonding in ferrocene.

Or

- (b) What are metal-metal bonds? With illustrative examples discuss the structures of carbonyls containing metal-metal bonds.
19. (a) (i) How is acetaldehyde formed from ethylene using palladium chloride?
- (ii) Write briefly on Zeigler Natta catalysis.

Or

- (b) (i) Citing suitable example and explain the oxidative addition and reductive elimination reactions.
- (ii) Explain the catalytic cycle involved in the production of acetic acid based on rhodium complexes.

20. (a) (i) Metal complexes serve as a useful probe of nucleic acids. Explain.
- (ii) Discuss the mechanism of action of carbonic anhydrase.

Or

- (b) Explain briefly on therapeutic chelating agents.
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