

Time-3 Hours

Total Marks-75

Part-A (10x1=10)

I. Answer all the following objective question (Choose the correct answer)

- EDTA ligand is an example of ----- ligand
a) monodentate b) bidentate c) neutral d) flexidentate
- The isomerism exhibited by thiocyanatoligand is
a) ionisation b) coordination c) linkage d) optical
- The bonding in $[\text{Co}(\text{H}_2\text{O})_6]^{3+}$ according to VB theory involves
a) sp^3 b) sp^2d c) sp^3d^2 d) $2sp^2$
- Tetrahedral complexes are mostly-----complexes
a) Highfield b) low spin c) high spin d) paramagnetic
- The metal cation present in haemoglobin is
a) Fe^{2+} b) Fe^{3+} c) Mn^{2+} d) Mg^{2+}
- In the reaction of H_2SO_4 with HNO_3 , H_2SO_4 behaves as a
a) Lowry Bronsted acid b) Lowry Bronsted base c) conjugate acid d) acid
- The rate of all radioactive decay are
a) first order b) second order c) pseudo order d) zero order
- What will be quantity of 10 gram of radio isotope remaining after 10 hours if the $t_{1/2} = 5$ hours
a) 5 grams b) 2.5 grams c) 1.25 grams d) 0.625 grams
- The nuclear reaction taking place in sun is
a) Nuclear fusion b) Nuclear fission c) Thermal reaction d) Photochemical reaction.
- ${}_{28}^{63}\text{Ni} \rightarrow {}_{29}^{63}\text{Cu} + ?$
a) electron b) Proton c) α -particle d) neutron

Part-B (5x4=20)

II. Answer all the questions for the following. Write not more than 200 words each.

- Discuss in detail the geometrical isomerism in six coordination complexes.

OR

- With suitable example explain outer orbital and inner orbital complexes involving sp^3d^2

12 a) Draw the CFT energy diagram of tetragonally distorted and square planar complexes

OR

b) What is trans effect? Explain the application of it in the synthesis of specific geometrical isomers

13 a) Draw the structures of haemoglobin an, and vitamin B12 myoglobin.

OR

b) Explain in detail the Lowry Bronsted and Lewis concepts of acid and bases

14 a) How will you account for the enormous amount of energy released in nuclear reactions?

OR

b) With shell model explain the nucleus

15 a) What is meant by a chain reaction give example

OR

b) Explain the principle and functioning betatron.

PART-C (3x15=45)

III Answer any three questions:

16. Explain all structural isomerism in complexes with example

17. Write the salient features of CFT with the energy diagram and calculate the CFSE for d^3 and d^7 systems both in strong and weak fields.

18. Give a detailed account with examples the role of metals in biological systems

19. List all the applications of radio isotopes in the field of medicine, industry and reaction mechanisms.

20. Describe in detail the principle and the working of nuclear reactors.
