

2022

Time : 3 Hours

Maximum Marks : 100

D-012

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

All questions carry equal marks.

Answer five Question in which Question

No. 1 is Compulsory.

1. Answer the following: 5×4=20

- (a) Binding Energy
- (b) Person theory of Hard and Soft acid base
- (c) $[\text{Ni}(\text{CN})_4]^{-2}$ is diamagnetic whole
 $[\text{Ni}(\text{Cl}_4)]^{2-}$ is paramagnetic
- (d) $[\text{Fe}(\text{CN})_6]^{4-}$ Obeys EAN rule

2. Discuss the chemistry of Vanadium with respect to: 5×4=20

- (a) Ores and Extraction
- (b) Kristian in P.T
- (c) Oxidation State
- (d) Colour and analytical test of its ions

3. (a) Discuss Artificial radioactivity with example. 8

(b) Explain:

- (i) Packing fraction 4×3=12
- (ii) Half-life and Average life period of a nuclear reaction
- (iii) Carbon dating

4. (a) Explain Crystal Field Splitting in Complexes with Co-ordination Number Six and Four with the help of labelled diagram. 10

- (b) Discuss Selection rule for electrons Transition and explain d. d transition and charge transfer Phenomena for Colour of Co-ordination Complexes. 10

5. Write notes on any two of the following: 10+10=20

- (a) Valence bond theory
- (b) Extraction and properties of Mo.
- (c) Separation of Biotopes

6. Explain the formation of following species by

UBT: 5×4=20

- (a) $[\text{Co}(\text{NH}_3)_6]^{3+}$
- (b) $[\text{Ni}(\text{CO})_4]$
- (c) $[\text{Fe}(\text{CN})_6]^{3-}$
- (d) $[\text{Cr}(\text{NH}_3)_6]^{3+}$

7. Explain the following: 5×4=20

- (a) Tetrahedral Complexes are always high spin.
- (b) Analytical test of Ti^{+4} ion
- (c) Classification of surface acting agents
- (d) Spectra chemical series

8. (a) What are different types of non-aqueous Solvent-
out line important reaction that are Carried out
in Liquid SO_2 15

(b) Explain different types of Glass 5

9. Discuss the following: 10+10=20

(a) Goy's method to determine Magnetic
susceptibility.

(b) Magnetic properties of Co-ordination complex in
brief.

10. (a) How one can decide the Ground State term
symbols among the given symbol. 5

(b) Find out the Ground State term symbol for. 15

(i) V^{+3} ion

(ii) Co^{+2} ion

(iii) Tl^{3+} ion

(iv) Carbon Ground State

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