

(6 pages)

Reg. No. :

Code No. : 6791

Sub. Code : KCHM 22

M.Sc. (CBCS) DEGREE EXAMINATION, APRIL 2017.

Second Semester

Chemistry

INORGANIC CHEMISTRY — II

(For those who joined in July 2016 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

Choose the correct answer :

1. The oxide which adopts normal spinel structure is
(a) Co_3O_4 (b) Fe_3O_4
(c) NiAl_2O_4 (d) None of the above
2. The complex ion developing the highest CFSE is
(a) $[\text{Co}(\text{NH}_3)_6]^{2+}$ (b) $[\text{Rh}(\text{NH}_3)_6]^{3+}$
(c) $[\text{Ir}(\text{NH}_3)_6]^{3+}$ (d) $[\text{Co}(\text{NH}_3)_6]^{3+}$

3. $[\text{PtCl}_4]^{2-}$ on treatment with NH_3 give a product of composition $[\text{PtCl}_2(\text{NH}_3)_2]$. It is a
(a) Trans-isomer
(b) Cis-isomer
(c) Both (a) and (b)
(d) None of the above
4. Which of the following complexes is expected to be labile to ligand substitution reaction?
(a) $[\text{Ir}(\text{NH}_3)_6]^{3+}$ (b) $[\text{Mo}(\text{NH}_3)_6]^{3+}$
(c) $[\text{Ni}(\text{en})_3]^{2+}$ (d) $[\text{Co}(\text{NO}_2)_6]^{3-}$
5. Calculate the magnetic moment for $\text{K}_4[\text{Mn}(\text{CN})_6]$
(a) 1.7 (b) 1.2
(c) 1.5 (d) 1.9
6. The M-L charge transfer energies decrease as
(a) The ligand becomes more reducible in nature
(b) The ligand becomes less reducible in nature
(c) The ligand becomes normally reducible in nature
(d) None of the above



7. Laser ablation is also used to treat

- (a) HIV
- (b) Chronic disorder
- (c) Cancer
- (d) None of the above

8. When the size particle decreases the band gap is

- (a) Increases
- (b) Decreases
- (c) Remains the same
- (d) None of the above

9. $B_4H_4^{2-}$ is ————— cluster.

- (a) Closo
- (b) Hypho
- (c) Nido
- (d) Arachno

10. Among the following which one is the hexanuclear cluster type.

- (a) Tantalum
- (b) Rhenium
- (c) Iridium
- (d) Ruthenium

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PART B — (5 × 5 = 25 marks)

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

Each answer should not exceed 250 words.

11. (a) Write a short notes on lattice energy.

Or

(b) Write a short note on spectrochemical series with examples.

12. (a) Describe ion exchange method.

Or

(b) Explain anation reactions.

13. (a) Write a short note on quenching of orbital contribution to magnetic moment.

Or

(b) Describe charge transfer spectra.

14. (a) Write a short notes on sputtering.

Or

(b) Explain polymer based nanocomposites.

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[P.T.O.]



15. (a) Explain structure and isomerizations of carboranes.

Or

- (b) Explain the synthesis and structure of borazines.

PART C — (5 × 8 = 40 marks)

Answer ALL questions.

Each answer should not exceed 600 words.

16. (a) Explain the effect of pi-bonding in octahedral complexes.

Or

- (b) Describe Jahn-Teller theorem and explain its consequences.

17. (a) Derive and explain stepwise and overall stability constant and formation constant.

Or

- (b) Discuss the account of Bjerrum method.

18. (a) What are Orgel diagrams? Draw and discuss a combined Orgel energy level diagram for d^1 (oh) and d^9 (oh).

Or

- (b) Explain brief account on magnetic susceptibility.

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19. (a) Write a brief account on optical and electronic properties of nanomaterials.

Or

- (b) Write down the principles and application of green synthesis.

20. (a) Brief account on structure of isopoly and heteropoly anions.

Or

- (b) Discuss the structure and bonding of dinuclear clusters with example of $Mo_2Cl_8^{2-}$.

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