

[A-10]

SARDAR PATEL UNIVERSITY

B. Sc. (Semester-IV) EXAMINATION

Monday, 9th April 2018

Subject: INORGANIC CHEMISTRY (US04CCHE01)

(UNDER CBCS) JUNE 2010 BATCH

Time: 10.00 am To 1.00 pm

Total Marks: 70

Q-1 Multiple choice questions:

[10]

- The standard reduction potential values for the elements of the 1st transition series are negative excepting for elements,
(a) Cu (b) Cu (c) Cr (d) Mn
- is not π - acid ligand.
(a) NH_3 (b) Co (c) CNR (d) PCl_3
- $[\text{Ni}(\text{H}_2\text{O})_6]^{2+}$ is blue green whereas $[\text{Ni}(\text{NH}_3)_6]^{2+}$ is
(a) yellow (b) red (c) blue (d) blue green
- Which of the following are fulminating metals ?
(a) TiN, ZrN, HfN (b) VN, NbN, WN
(c) Ag_3N , AuN, Hg_3N_2 (d) TiC, VC, TaC
- complex ion whose central metal ion obey EAN rule.
(a) $[\text{Co}(\text{NH}_3)_6]^{3+}$ (b) $[\text{Fe}(\text{CN})_6]^{3-}$ (c) $[\text{Co}(\text{NH}_3)_6]^{2+}$ (d) $[\text{Cu}(\text{NH}_3)_4]^{2+}$
- Which of the following square planar complexes exist as cis and trans isomeric form ?
(a) Ma_2b_2 (b) Ma_4 (c) Ma_3b (d) Mabcd
- The most characteristics oxidation state of lanthanide is
(a) +1 (b) +4 (c) +3 (d) +2
- Which of the following is not soft acid ?
(a) Li^{3+} (b) Cu^+ (c) Al^{3+} (d) CO_2
- SnS_2 is more acidic than SnS according to
(a) Arrhenius concept (b) Usanovich concept
(c) Lewis concept (d) Bronsted-Lowry concept
- is not liquid at ordinary temperature.
(a) $\text{Ni}(\text{CO})_4$ (b) $\text{Fe}(\text{CO})_5$ (c) $\text{Ru}(\text{CO})_5$ (d) $\text{Cr}(\text{CO})_6$

Q-2 Attempt any six:

[12]

- Why d-block elements show variable oxidation states ?
- Which transition metal complex ions are colourless? why?
- Give the application of magnetic moment values.
- Define EAN of central metal ion in coordination compound and calculate EAN of Ni-atom in $[\text{Ni}(\text{CO})_4]$.
- What is Lanthanide contraction ?
- List the modern methods used for the separation of lanthanides.
- Water is an amphoteric solvent, explain.
- Give the structure of $\text{Fe}_3(\text{CO})_{12}$.

C.P.T.O.

- Q-3
- (a) Write the name, symbol, complete and valence shell electronic configuration of 2nd transition series elements. [04]
- (b) Discuss the variation in ionization energies of d-block elements as we moving across a period and form top to bottom in group IIIB. [04]

OR

- Q-3
- (a) Explain: "K₂[PtCl₆] is well known compound of Pt(IV) whereas K₂[NiCl₆] does not exist at all." [04]
- (b) Discuss the position of d-block elements in the periodic table. [04]

- Q-4
- (a) Deduce the formula for calculating the magnetic moment of transition metal complexes. [04]
- (b) Explain the purple colour of octahedral [Ti(H₂O)₆]³⁺ ion by d-d transition. [04]

OR

- Q-4
- (a) Discuss in brief the catalytic activities shown by the 1st transition series elements and their compounds. [04]
- (b) Give the brief account on metallic carbides of transition metal. [04]

- Q-5
- (a) Discuss the basic postulates of Werner's coordination theory. [04]
- (b) Write note on optical isomerism of octahedral complexes. [04]

OR

- Q-5
- (a) Describe a chemical method to distinguish between cis and trans isomers of the complex [Pt(NH₃)Cl₂]⁰. [04]
- (b) Draw the structure of all the possible isomers of the [Cr(NH₃)₂(H₂O)₂Br₂]⁺ complex ion. [04]

- Q-6
- (a) What are Actinides ? Write their atomic numbers, symbols, names and electronic configurations. [04]
- (b) Discuss the various oxidation states of Actinides. [04]

OR

- Q-6
- (a) Discuss the position of lanthanides in the periodic table. [04]
- (b) Discuss the ion-exchange method for Lanthanides. [04]

- Q-7
- (a) Give brief account on Usanovich concept of acid-base. [04]
- (b) Discuss the liq. Ammonia as non-aqueous solvent with respect to precipitation reactions and redox reactions.. [04]

OR

- Q-7
- (a) Discuss the SO₂ as non-aqueous solvent with respect to metathetical reactions and acid-base reactions.. [04]
- (b) Explain Arrhenius acid-base concept with its utility and limitations. [04]

- Q-8 Discuss the preparation, properties, structure and hybridization in Mn₂(CO)₁₀. [08]

OR

- Q-8 Discuss the structure and nature of M-CO bonding in metal carbonyl. [08]

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