

QUESTION BANK

CLASS: II - B.Sc., CHEMISTRY

SUBJECT: INORGANIC CHEMISTRY-II

SUBJECT CODE: CH305T

UNIT-I

SECTION-A

CHOOSE THE CORRECT ANSWER:

- 1) The golden spangle is
a) PbCrO_4 b) PbI_2 c) PbCl_2 d) PbSO_4
- 2) In qualitative analysis, Al can be detected by using
a) Alizarin b) Aluminon c) Both alizarin and aluminon
d) Magneson
- 3) The relative strength of intermolecular forces are
a) hydrogen bonds < dipole – dipole interactions < dispersion forces
b) dispersion forces < dipole – dipole interactions < hydrogen bonds
c) dipole – dipole interactions < hydrogen bonds < dispersion forces
d) hydrogen bonds < dispersion forces < dipole – dipole interactions
- 4) Which of the following metal ion is not coloured
a) V^{3+} b) Ti^{4+} c) Cr^{3+} d) Cu^{2+}
- 5) Among the following, which can be used to estimate Ni^{2+}
a) DMG b) OH^- c) Cl^- d) S^{2-}
- 6) An example for Amphi – protic solvent is
a) HF b) HCN c) NH_3 d) CH_3COOH
- 7) A member of the IV A group does not form complex is
a) Si b) Ge c) Sn d) C

SECTION-B

ANSWER THE FOLLOWING:

- 1) Write the preparation of Nessler's reagent?
- 2) What are protic and aprotic solvents? Give examples.
- 3) Ti(III) compounds are strong reducing agent- explain.
- 4) Calculate the oxidation number of Mn in KMnO_4 .
- 5) Give the advantages of liquid ammonia.

SECTION-C

ANSWER THE FOLLOWING:

- 1) Write any one test with equation to detect borate and oxalate.
- 2) How are the metal atoms in a metal crystal bonded Together? Explain.
- 3) Give spot for Ni^{2+} and Al^{3+} .

- 4) What is common ion effect.
- 5) What are inter and intra molecular hydrogen Bonding ? Give an example.
- 6) Write a note on HF as a solvent.

UNIT-II

SECTION-A

CHOOSE THE CORRECT ANSWER:

- 1) The hybridization of Si atom in silicates is
a) sp b) sp² c) sp³ d) dsp²
- 2) Which compound is probably most polar of the following ?
a) Boron trichloride b) Oxygen difluoride
c) Silicon tetrafluoride d) Selenium difluoride
- 3) A member of the IV A group does not form complex is
a) Si b) Ge c) Sn d) C
- 4) The mineral, quartz, is an example of:
a) a single – chain silicate b) a framework silicate
c) a sheet silicate d) a double – chain silicate
- 5) Among the following, which is used as abrasive?
a) ZrC b) Be₂C c) Al₄C₃ d) SiC

FILL IN THE BLANKS:

- 1) The ----- halides of carbon is not hydrolysed by water.
- 2) Silicates that contain discrete ----- linkage are called ortho Silicates.
- 3) Clay minerals are common example of ----- silicate structures.

SECTION-B

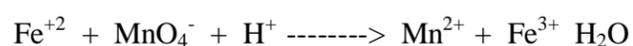
ANSWER THE FOLLOWING:

- 1) Write short note on three dimensional silicates.
- 2) What is inert pair effect?
- 3) Give the oxidation numbers of the elements in the following ions. i) S₂O₃²⁻ ii) H₂C₂O₄²⁻
- 4) Balance the equation using Oxidation number method.
$$\text{Cr}_2\text{O}_7^{2-} + \text{I}^- \longrightarrow \text{Cr}^{3+} + \text{I}_2 + \text{H}_2\text{O}.$$
- 5) Compare and contrast one significant figures of CCl₄ & SiCl₄.

SECTION-C

ANSWER THE FOLLOWING:

- 1) Discuss the structure of cyclic silicates.
- 2) What are silicates ? How are they classified?
- 3) CCl₄ is not hydrolysed by water but NCl₃ is rapidly hydrolysed. Why?
- 4) Write a note on catenation.
- 5) Classify silicates according to SiO₄⁴⁻ linkage.
- 6) What are interstitial and covalent carbides? Explain with examples
- 7) Discuss the structure of chain silicates.
- 8) Balance the following equation by ion electron Number method.



UNIT-III

SECTION-A

CHOOSE THE CORRECT ANSWER:

- 1) The more acidic hydride is
a) H_2O b) H_2S c) H_2Se d) H_2Te
- 2) The type of hybridization in NH_4^+ ion is -----.
a) sp^3 b) dsp^2 c) dsp^3 d) sp^2
- 3) Which of the following is explosive
a) NF_3 b) NCl_3 c) PCl_3 d) PCl_5
- 4) Of the following the bond which has highest bond Energy.
a) O-O b) S-S c) Se-Se d) Te-Te
- 5) Which statement is incorrect about the reaction between copper metal and concentrated H_2SO_4 ?
a) SO_2 is formed b) A blue solution is formed
c) H_2 is liberated d) Cu is oxidized.
- 6) Among the following the halogen acid has highest boiling point
a) HF b) HCl c) HBr d) HI
- 7) Which one of the following atoms has two unpaired electrons in its ground state:
a) Sodium b) Calcium c) Oxygen d) Aluminum
- 8) The shape of SO_4^{2-} is
a) linear b) trigonal c) tetrahedral d) pyramidal
- 9) The fertilizer which has highest nitrogen content is
a) Nitrolime stone b) Sindri fertilizer
c) Urea d) Nangal fertilizer
- 10) The more ionic hydride is
a) NH_3 b) PH_3 c) SbH_3 d) BiH_3

FILL IN THE BLANKS:

- 1) Caro's acid is -----.
- 2) The negative oxidation state shown by N and P is -----.
- 3) Hydrazine is used as ----- fuel.
- 4) Ozone is used to ----- air.
- 5) The chemical formula of Bleaching powder is -----.

SECTION-B

ANSWER THE FOLLOWING:

- 1) Write the preparation of hydroxylamine ?
- 2) Explain why phosphine is a much weaker base than ammonia ?
- 3) Give the structure of hydrazine and hydroxyl amine.
- 4) Oxygen molecules is O_2 and sulphur is S_8 - Explain.
- 5) The boiling points of hydrogen compounds of oxygen family.Explain.
- 6) Draw the structure of PCl_5 .
- 7) How do you prepare Caro's acid ?
- 8) Calculate the oxidation number of Sulphur in H_2SO_4 .

SECTION-C

ANSWER THE FOLLOWING:

- 1) Give the reason for the following:
 - i) PCl_5 is stable but NCl_5 cannot be prepared.
 - ii) Bismuth do not form oxy acids.
 - iii) NH_3 is the strongest electron pair donor.
- 2) How are peroxy acid of sulphur structurally different from thionic acids.
- 3) Write a note on thionic acid.
- 4) Complete the following equations
 - a) $\text{NH}_2\text{NH}_2 + \text{HNO}_2 \longrightarrow$
 - b) $\text{N}_2\text{H}_5\text{HSO}_4 + 2\text{NH}_3 \longrightarrow$
 - c) $\text{C}_2\text{H}_5\text{NO}_2 + 6[\text{H}] \longrightarrow$
- 5) Explain the chemistry of ozone.
- 6) Explain the uses of hydrazine with its appropriate structure.
- 7) Compare H_2O and HF .
- 8) Mention any two anomalous properties of oxygen.
- 9) Explain the following, given appropriate reason:
 - a) OF_6 does not exist while SF_6 exists.
 - b) Oxygen molecule is O_2 but sulphur molecule is S_8 .
 - c) Bond angle in H_2O is more than that in H_2S .

UNIT-IV

SECTION-A

CHOOSE THE CORRECT ANSWER:

- 1) Which of the following exists
 - a) PbCl_4
 - b) PbBr_4
 - c) PbI_4
 - d) none of these.
- 2) Among the following the halogen acid has highest boiling point
 - a) HF
 - b) HCl
 - c) HBr
 - d) HI .
- 3) Which of the following pairs do NOT show similar chemical properties?
 - a) Fluorine – argon
 - b) Beryllium – aluminum
 - c) Boron – silicon
 - d) Lithium – magnesium

FILL IN THE BLANKS:

- 1) Fluorine does not form polyhalides due to the absence of ----- in the valence shell of its atom.
- 2) Bond dissociation energy of the Cl_2 is greater than that of F_2 as well as Br_2 . This is due to -----.

SECTION-B

ANSWER THE FOLLOWING:

- 1) Write any two exceptional properties of Fluorine.
- 2) Explain why the electron affinity of fluorine is lower than that of chlorine ?
- 3) While fluorine always exhibits an oxidation state of -1, other halogens exhibit additional oxidation state of +3, +5, & +7.
Why is it so ?
- 4) Explain the hybridisation and structure of ClF_3 .

SECTION-C

ANSWER THE FOLLOWING:

- 1) Write a short note on pseudo halogens.
- 2) Give the reason for the following:
 - a) Noble gases have comparatively large atomic radii.
 - b) Fluorine does not form oxy-acids.
 - c) Oxygen and Chlorine have the same electronegativity, but Oxygen atom form hydrogen bond while chlorine does not.
 - d) Interhalogen compounds are diamagnetic.
- 3) Give the structure of IF_7 & IF_5 .
- 4) Arrive at the structures of BrF_3 , ClF_5 .
- 5) Explain the zone refining process.

UNIT-V

SECTION-A

CHOOSE THE CORRECT ANSWER:

- 1) The noble gas which is most abundant in atmosphere.
 - a) Kr
 - b) Ar
 - c) Ne
 - d) He
- 2) The highest oxidation state of xenon in its compound is -----
 - a) +6
 - b) +7
 - c) +8
 - d) +10

FILL IN THE BLANKS:

- 1) Elements in the Noble Gas family are considered Stable because they have ----- outer energy levels.

SECTION-B

ANSWER THE FOLLOWING:

- 1) Mention any two uses of Noble Gases.
- 2) What idea led Bartlett to study the reaction between Xenon and PtF_6 ?
- 3) What are Pseudo halogens? Give two examples.
- 4) What do you mean by host and guest in clathrates?

SECTION-C

ANSWER THE FOLLOWING:

- 1) Discuss the position of inert gases in the periodic table.
- 2) Give the reason for the following:
 - a) The chemical reactivity increases from He to Xe.
 - b) He and Ne do not form clathrates.
 - c) Xe forms compounds with fluorine but He and Ne fail to do so on.
- 3) What are clathrates of Noble Gases? Why? Do He and Ne not form clathrates.
- 4) Discuss the geometry of XeOF_4 .
- 5) Fluorine does not exist in higher oxidation state -Why?
- 6) Explain the hybridization and geometry of XeF_4 and XeF_6 .
- 7) Give any three reasons for placing Noble Gases in Zero group.

MATCH THE FOLLOWING:-

- 1) Diamond - rutile
- 2) SiO₂ - sp³d²
- 3) Titanium - Abrasive for cutting and polishing
- 4) XeF₄ - Nessler's reagent
- 5) NH₄⁺ - acidic