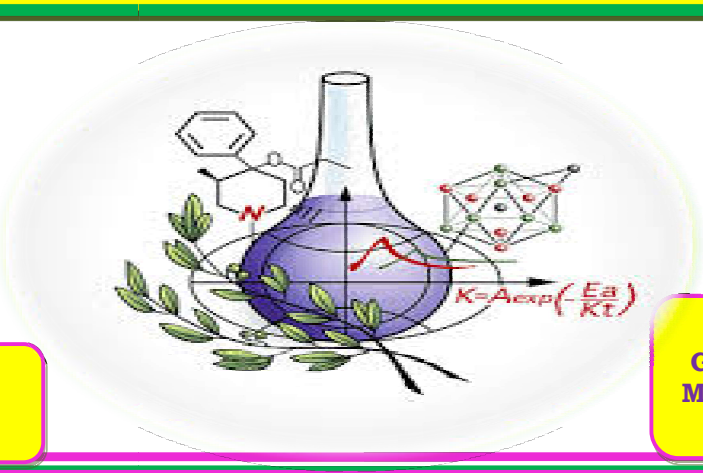
VIVEKANADA VIDYALAYA MATRIC HR SEC SCHOOL

PANNAIKADU PIRIVU

KODAIKANAL

12TH - STD

Antoine-Laurent de Lavoisier



IF YOU FAIL NEVER GIVE UP BECAUSEFAIL MEANS FIRST ATTEMPT IN LEARNING

CHEMISTRY QUESTION BANK 2024-2025

NAME : _____

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VIVEKANANDA VIDYALAYA MATRIC HR SEC SCHOOL

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WEEKLY UNIT TEST -1

SUBJECT: CHEMISTRY **[LESSON -1]** **STD: XII**

MARKS: 35 **TIME: 1.00 HRS**

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I. CHOOSE THE CORRECT ANSWER: **(5 X 1 =5)**

1. The metal oxide which cannot be reduced to metal by carbon is

a) PbO b) Al_2O_3 c) ZnO d) FeO

2. Wolframite ore is separated from tinstone by the process of

a) Smelting b) Calcination c) Roasting d) Electromagnetic separation

3. Electrochemical process is used to extract

a) Iron b) Lead c) Sodium d) silver

4. Bauxite has the composition

a) Al_2O_3 b) $Al_2O_3.nH_2O$ c) $Fe_2O_3.2H_2O$ d) None of these

5. Which of the metal is extracted by Hall-Heroult process?

a) Al b) Ni c) Cu d) Zn

II. TWO MARKS: **(5 X 2 = 10)**

6. What are the various steps involved in extraction of pure metals from their ores?

7. Which type of ores can be concentrated by froth flotation method? Give two examples for such ores.

8. Define Blister Copper.

9. Explain the Gravity separation.

10. Out of coke and CO which is better reducing agent for the reduction of ZnO? Why?

III. THREE MARKS: **(5 X 3 = 15)**

11. Describe a method for refining nickel.

12. What is the difference between minerals and ores?

13. Expalin Ammonia leaching.

14. Define Calcination and Roasting.

15. What is the role of limestone in the extraction of iron from its oxide Fe_2O_3?

IV. FIVE MARK: **(1 X 5 = 5)**

16. Explain the Froth Floatation process.

WEEKLY UNIT TEST - 2

SUBJECT: CHEMISTRY **[LESSON -1]** **STD: XII**

MARKS: 35 **TIME: 1.00 HRS**

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I. CHOOSE THE CORRECT ANSWER: **(5 X 1 =5)**

1. Zinc is obtained from ZnO by

a) Carbon reduction b) Reduction using silver

c) Electrochemical process d) Acid leaching

2. Which of the following is used for concentrating ore in metallurgy?

a) Leaching b) Roasting c) Froth floatation d) Both (a) and (c)

3. Flux is a substance which is used to convert

a) Mineral into silicate b) Infusible impurities to soluble impurities

c) Soluble impurities to infusible impurities d) All of these

4. Extraction of gold and silver involves leaching with cyanide ion. silver is later recovered by

a) Distillation b) Zone refining c) Displacement with zinc d) liquation

5. Which of the following plot gives Ellingham diagram

a) ΔS Vs T b) ΔG^0 Vs T c) ΔG^0 Vs 1/T d) ΔG^0 Vs T^2

II. TWO MARKS: **(5 X 2 = 10)**

6. Give the basic requirements for vapour phase refining.

7. How Titanium is refined by the Van-Arkel method.

8. Explain the Auto reduction reaction

9. Define Smelting.

10. Describe the role of the Silica in the extraction of copper.

III. THREE MARKS: **(5 X 3 = 15)**

11. Explain the following terms with suitable examples. a)Gangue b) slag

12. What are the limitations of Ellingham's diagram

13. Explain Cyanide leaching.

14. Expalin Acid leaching.

15. Describe the role of the following in the process mentioned.

(i) Iodine in the refining of zirconium (ii) Sodium cyanide in froth flotation.

IV. FIVE MARK: **(1 X 5 = 5)**

16. Explain zone refining process with an example

WEEKLY UNIT TEST -3

SUBJECT: CHEMISTRY **[LESSON - 6]** **STD: XII**

MARKS: 35 **TIME: 1.00 HRS**

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I. CHOOSE THE CORRECT ANSWER: **(5 X 1 =5)**

1. The ratio of close packed atoms to tetrahedral hole in cubic packing is

a) 1:1 b) 1:2 c) 2:1 d) 1:4

2. The number of carbon atoms per unit cell of diamond is

a) 8 b) 6 c) 1 d) 4

3. Solid CO_2 is an example of

a) Covalent solid b) metallic solid c) molecular solid d) ionic solid

4. The number of carbon atoms per unit cell of diamond is

a) 8 b) 6 c) 1 d) 4

5. In a solid atom M occupies ccp lattice and (1/3) of tetrahedral voids are occupied by atom N. find the formula of solid formed by M and N.

a) MN b) M_3N c) MN_3 d) M_3N_2

II. TWO MARKS: **(5 X 2 = 10)**

6. Classify the following solids a) P_4 b) Brass c) Diamond d) NaCl e) Iodine

7. What are point defects?

8. What are the characteristics of Covalent crystals?

9. Define crystal lattice and unit cell

10. What is Bragg's equation?

III. THREE MARKS: **(5 X 3 = 15)**

11. What are primitive and non-primitive unit cell?

12. What are the characteristics of ionic crystal

13. Why ionic crystals are hard and brittle?

14. What is meant by Isotropy and Anisotropy?

15. Write a note on Frenkel defect with example

IV. FIVE MARK: **(1 X 5 = 5)**

16. What are difference between crystalline and amorphous solids.

WEEKLY UNIT TEST - 4

SUBJECT: CHEMISTRY **[LESSON -6]** **STD: XII**

MARKS: 35 **TIME: 1.00 HRS**

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I. CHOOSE THE CORRECT ANSWER: **(5 X 1 =5)**

1. The crystal with a metal deficiency defect is

a) NaCl b) FeO c) ZnO d) KCl

2. Potassium has a bcc structure with nearest neighbor distance 4.52 Aº. Its atomic weight is 39. its density will be

a) 915 kg m^{-3} b) 2142 kg m^{-3} c) 452 kg m^{-3} d) 390 kg m^{-3}

3. The yellow colour in NaCl crystal is due to

a) excitation of electrons in F centers

b) reflection of light from Cl^- ion on the surface

c) refraction of light from Na^+ ion

d) all of the above

4. In calcium fluoride, having the flurite structure the coordination number of Ca^{2+} ion and F- Ion are a) 4 and 2 b) 6 and 6 c) 8 and 4 d) 4 and 8

5. The vacant space in bcc lattice unit cell is

a) 48% b) 23% c) 32% d) 26%

II. TWO MARKS: **(5 X 2 = 10)**

6. What is the two dimensional coordination number of a molecule in square close packed layer?

7. What are the general characteristics of solids?

8. Define Packing Efficiency.

9. What is Stoichiometric defect ?

10. Calculate the number of atoms in a fcc unit cell.

III. THREE MARKS: **(5 X 3 = 15)**

11. Write a short note on impurity defect?

12. Calculate the percentage efficiency of packing in case of a simple cubic crystal

13. Explain Schottky defect.

14. Distinguish between Tetrahedral and Octahedral voids.

15. Explain classification of Point defects.

IV. FIVE MARK: **(1 X 5 = 5)**

16. Calculate the percentage efficiency of packing in case of a body centred cubic crystal.

WEEKLY UNIT TEST -5

SUBJECT: CHEMISTRY **[LESSON- 2]** **STD: XII**

MARKS: 35 **TIME: 1.00 HRS**

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I. CHOOSE THE CORRECT ANSWER: **(5 X 1 =5)**

1. Which of the following metals has the largest abundance in the earth's crust?

a) Aluminium b) calcium c) Magnesium d) sodium

2. An aqueous solution of borax is

a) neutral b) acidic c) basic d) amphoteric

3. Carbon atoms in fullerene with formula C60 have

a) sp^3 hybridised b) sp hybridized

c) sp^2 hybridised d) partially sp^2 and partially sp^3 hybridised

4. The basic structural unit of silicates is

a) $(SiO_3)^{2-}$ b) $(SiO_4)^{2-}$ c) $(SiO)^{-}$ d) $(SiO_4)^{4-}$

5. . The element that does not show catenation among the following p-block elements is a) Carbon b) silicon c) Lead d) germanium

II. TWO MARKS: **(5 X 2 = 10)**

6. Give the uses of Boric acid

7. Give one example for each of the following

(i) icosagens (ii) tetragens (iii) pnictogens (iv) chalcogens

8. How will you identify borate radical ?

9. CO is a reducing agent, justify with an example.

10. Write a short note on anamolous properties of the first element of p-block

III. THREE MARKS: **(5 X 3 = 15)**

11. Describe briefly allotropism in p-block elements with specific reference to carbon

12. Give the uses of Borax.

13. What is catenation ? Describe briefly the catenation property of carbon.

14. Give the uses of silicones.

15. Write a note on Fischer Tropsch synthesis

IV. FIVE MARK: **(1 X 5 = 5)**

16. i) Write a note on Zeolites? Ii) How will you convert Boric acid to Boron nitride?

WEEKLY UNIT TEST - 6

SUBJECT: CHEMISTRY **[LESSON -2]** **STD: XII**

MARKS: 35 **TIME: 1.00 HRS**

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I. CHOOSE THE CORRECT ANSWER: **(5 X 1 =5)**

1. Duralumin is an alloy of

a) Cu,Mn b) Cu,Al,Mg c) Al,Mn d) Al,Cu,Mn,Mg

2. Which of the following is not sp^2 hybridised?

a) Graphite b) grapheme c) Fullerene d) dry ice

3. The stability of +1 oxidation state increases in the sequence

a) Al < Ga < In < Tl b) Tl < In < Ga < Al c) In < Tl < Ga < Al d) Ga< In < Al < Tl

4. Oxidation state of carbon in its hydrides

a) +4 b) -4 c) +3 d) +2

5. Which among the following is not a borane?

a) B_2H_6 b) B_3H_6 c) B_4H_{10} d) none of these

II. TWO MARKS: **(5 X 2 = 10)**

6. Give the structure of CO and CO_2.

7. Write a short note on hydroboration.

8. What is inorganic benzene? How to prepare it?

9. What are the uses of Boron

10. From Aluminium to Thalium only a marginal difference in ionization enthalpy why?

III. THREE MARKS: **(5 X 3 = 15)**

11. Define: McAfee Process

12. What is the action of heat on Boric acid

13. a) H_3BO_3 is a mono basic acid why?

b) Why $AlCl_3$ acts as Lewis acid?

14. Write a note on metallic nature of p-block elements.

15. Differentiate Diamond and Graphite

IV. FIVE MARK: **(1 X 5 = 5)**

16. Describe the structure of Diborane.

WEEKLY UNIT TEST - 7

SUBJECT: CHEMISTRY **[LESSON - 3]** **STD: XII**

MARKS: 35 **TIME: 1.00 HRS**

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I. CHOOSE THE CORRECT ANSWER: **(5 X 1 =5)**

1. Which is true regarding nitrogen?

a) least electronegative element b) has low ionisation enthalpy than oxygen

c) d – orbitals available d) ability to form pπ -pπ bonds with itself

2. On hydrolysis, PCl_3 gives

a) H_3PO_3 b) PH_3 c) H_3PO_4 d) $POCl_3$

3. The molarity of given orthophosphoric acid solution is 2M. Its normality is

a) 6N b) 4N c) 2N d) none of these

4. An element belongs to group 15 and 3rd period of the periodic table, its electronic configuration would be

a) $Is^2\ 2s^2\ 2p^4$ b) $Is^2\ 2s^2\ 2p^3$ c) $Is^2\ 2s^2\ 2p^6\ 3s2^2\ 3p^2$ d) $Is^2\ 2s^2\ 2p^6\ 3s^2\ 3p^3$

5. Among the following, which is the strongest oxidizing agent?

a) Cl_2 b) F_2 c) Br_2 d) I_2

II. TWO MARKS: **(5 X 2 = 10)**

6. What are inter halogen compounds? Give examples

7. Explain why fluorine always exhibit an oxidation state of –1?

8. What is the hybridisation of iodine in IF_7?Give its structure

9. What is inert pair effect?

10. Chalcogens belongs to p-block. Give reason

III. THREE MARKS: **(5 X 3 = 15)**

11. Write the reason for the anamolous behavior of Nitrogen.

12. Give the uses of helium

13. Give a reason that sulphuric acid is a dehydrating agent.

14. Give the balanced equation for the reaction between chlorine with cold NaOH and hot NaOH.

15. Write the molecular formula and structural formula for the following molecules.

a) Nitric acid b) dinitrogen pentoxide c) phosphoric acid d) phosphine

IV. FIVE MARK: **(1 X 5 = 5)**

16. i) How is bleaching powder prepared? ii) Write about Holmes signal.

WEEKLY UNIT TEST - 8

SUBJECT: CHEMISTRY **[LESSON 3]** **STD: XII**

MARKS: 35 **TIME: 1.00 HRS**

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I. CHOOSE THE CORRECT ANSWER: **(5 X 1 =5)**

1. Which one of the following orders is correct for the bond dissociation enthalpy of halogen molecules?

a) $Br_2 > I_2 > F_2 > Cl_2$ b) $F_2 > Cl_2 > Br_2 > I_2$

c) $I_2 > Br_2 > Cl_2 > F_2$ d) $Cl_2 > Br_2 > F_2 > I_2$

2. The basicity of pyrophosphorous acid ($H_4P_2O_3$) is

a) 4 b) 2 c) 3 d) 5

3. Which of the following is strongest acid among all?

a) HI b) HF c) HBr d) HCl

4. Most easily liquefiable gas is

a) Ar b) Ne c) He d) Kr

5. When copper is heated with cone HNOs it produces

a) Cu $(NO_3)_2$, NO and NO_2 b) Cu $(NO_3)_2$ and N_2O

c) Cu $(NO_3)_2$ and NO_2 d) Cu $(NO_3)_2$ and NO

II. TWO MARKS: **(5 X 2 = 10)**

6. What type of hybridisation occur in a) BrF_5 b) BrF_3

7. What are the uses of Sulphur dioxide.

8. Suggest a reason why HF is a weak acid, whereas binary acids of the all other halogens are strong acids.

9. Complete the following equation: i) $NaNO_2 + HCl \rightarrow$ ii) $P_4 + NaOH + H_2O \rightarrow$

10. What happens when PCl_5 is heated?

III. THREE MARKS: **(5 X 3 = 15)**

11. Write the valence shell electronic configuration of group -15 elements.

12. Give the uses of sulphuric acid.

13. How is chlorine is manufactured by Deacon's process?

14. Mention the characteristic of interhalogen compounds

15. Give the test for sulphate / sulphuric acid.

IV. FIVE MARK: **(1 X 5 = 5)**

16. Write the uses of i) Neon ii) Argon iii) Krypton iv) Radon v) Xenon

WEEKLY UNIT TEST -9

SUBJECT: CHEMISTRY **[LESSON 7]** **STD: XII**

MARKS: 35 **TIME: 1.00 HRS**

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I. CHOOSE THE CORRECT ANSWER: **(5 X 1 =5)**

1. The decomposition of phosphine (PH3) on tungsten at low pressure is a first order reaction. It is because the
   a) rate is proportional to the surface coverage
   b) rate is inversely proportional to the surface coverage
   c) rate is independent of the surface coverage
   d) rate of decomposition is slow
2. The addition of a catalyst during a chemical reaction alters which of the following quantities?
   a) Enthalpy b)Activation energy c) Entropy d) Internal energy
3. For a first order reaction, the rate constant is 6.909 min-1.the time taken for 75% conversion in minutes is

a) $\left(\frac{3}{2}\right)\log 2$ b) $\left(\frac{2}{3}\right)\log 2$ c) $\left(\frac{3}{2}\right)\log\left(\frac{3}{4}\right)$ d) $\left(\frac{2}{3}\right)\log\left(\frac{4}{3}\right)$

4. For a first order reaction A → B the rate constant is $x\ min^{-1}$. If the initial concentration of A is 0.01M , the concentration of A after one hour is given by the expression.
   a) $0.01\ e^{-x}$ b) $1 \times 10^{-2}\ (1-e^{-60x})$ (c) $(1\times10^{-2})\ e^{-60x}$ d) none of these

5. What is the activation energy for a reaction if its rate doubles when the temperature is raised from 200K to 400K? (R = 8.314 JK-1mol-1)
   a) 234.65 kJ $mol^{-1}K^{-1}$ b) 434.65 kJ $mol^{-1}K^{-1}$
   c) 434.65 J $mol^{-1}K^{-1}$ d) 334.65 J $mol^{-1}K^{-1}$

II. TWO MARKS: **(5 X 2 = 10)**

6. What is average rate of a chemical reaction?
7. Define Rate Law.
8. Define Rate of a chemical reaction.
9. What is Instantaneous rate of a chemical reaction?
10. Write Arrhenius equation and explains the terms involved.

III. THREE MARKS: **(5 X 3 = 15)**

11. What are pseudo first order reactions? Give an example.
12. Give any three examples for the first order reaction
13. Give the differences between order and molecularity of a reacti
14. Derive an equation for the half-life period of a zero order reaction.
15. List the factors affecting reaction rate

IV. FIVE MARK: **(1 X 5 = 5)**

16. Derive integrated rate law for a first order reaction.

WEEKLY UNIT TEST -10

SUBJECT: CHEMISTRY **[LESSON 11]** **STD: XII**

MARKS: 35 **TIME: 1.00 HRS**

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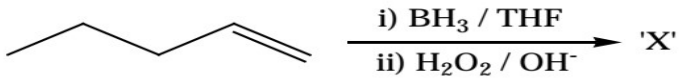
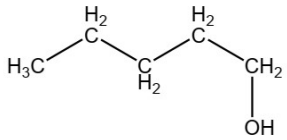
I. CHOOSE THE CORRECT ANSWER: **(5 X 1 =5)**

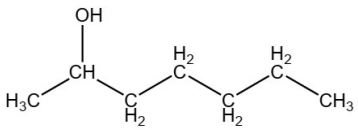
1. Which of the following compounds on reaction with methyl magnesium bromide will give tertiary alcohol.
(a) benzaldehyde (b) propanoic acid (c) methyl propanoate (d) acetaldehyde

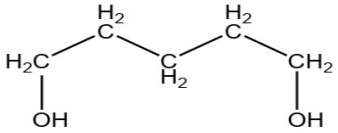
2. Which one of the following is the strongest acid
a) 2 – nitrophenol (b) 4 – chlorophenol (c) 4 – nitrophenol (d) 3 – nitrophenol

3. Carbolic acid is …
(a) Phenol (b) Picric acid (c) benzoic acid (d) phenylacetic acid

4. 

a) 

b) 

c) 

5. In the reaction Ethanol $\xrightarrow{PCl_5}$ X $\xrightarrow{\text{alc.KOH}}$ Y $\xrightarrow[298K]{H_2SO_4/H_2O}$ Z. The 'Z' is

(a) ethane (b) ethoxyethane (c) ethylbisuiphite (d) ethanol

II. TWO MARKS: **(5 X 2 = 10)**

6. What happens when 1 – phenyl ethanol is treated with acidified $KMnO_4$.
7. How is phenol prepared form chloro benzene.
8. Write the preaparation of glycerol.
9. Draw the major product formed when 1 – ethoxyprop – 1 – ene is heated with one equivalent of HI.
10. Write the uses of ethylene glycol.

III. THREE MARKS: **(5 X 3 = 15)**

11. What is metamerism?
12. How will you prepate the following compounds from Glycerol ?

a) trinitro glycerol b) Acrolein

13. Mention the uses of Glycerol
14. Write a note on Swern oxidation reaction.
15. What happens when ethylene glycol is heated with conc. HNO_3 and conc. H_2SO_4?

IV. FIVE MARK: **(1 X 5 = 5)**

16. How will you differentiate primary, secondary and tertiary alcohols by Lucas test?

WEEKLY UNIT TEST -11

SUBJECT: CHEMISTRY **[LESSON 11]** **STD: XII**

MARKS: 35 **TIME: 1.00 HRS**

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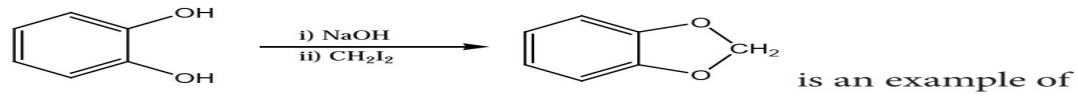
I. CHOOSE THE CORRECT ANSWER: **(5 X 1 =5)**

1. On reacting with neutral ferric chloride, phenol gives

(a) red colour (b) violet colour (c) dark green colour (d) no colouration

2. The reactions



is an example of

(a) Wurtz reaction (b) cyclic reaction (c) Williamson reaction (d) Kolbe reactions

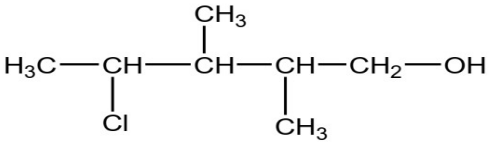
3. . $HO\text{-}CH_2\ CH_2 - OH$ on heating with periodic acid gives ……

(a) methanoic acid (b) Glyoxal (c) methanol (d) CO_2

4. Williamson synthesis of preparing dimethyl ether is a / an

(a) SN^1 reactions (b) SN^2 reaction (c) electrophilic addition (d) electrophilic substitution

5. The correct IUPAC name of the compound,



(a) 4 – chloro – 2, 3 – dimethyl pentan – 1 – ol

(b) 2, 3 – dimethyl – 4 – chloropentan – 1 – ol

(c) 2, 3, 4 – trimethyl – 4 – chiorobutan – 1 – ol

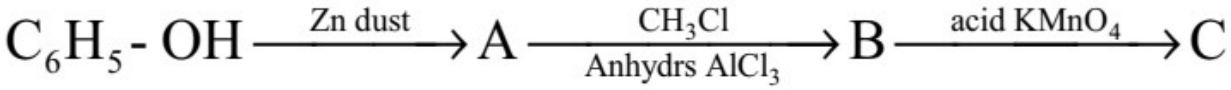
(d) 4 – chioro – 2, 3, 4 – trimethyl pentan – 1 – ol

II. TWO MARKS: **(5 X 2 = 10)**

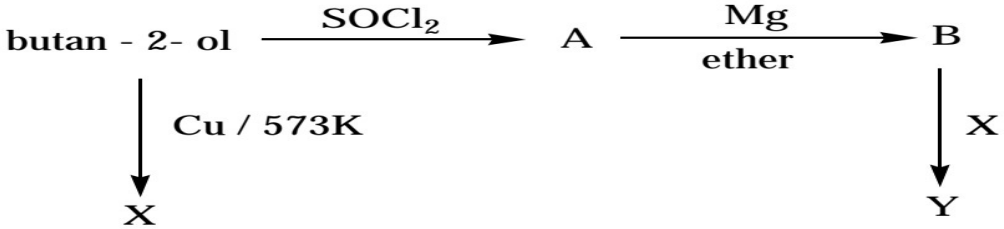
6. Mention the uses of Phenol
7. What happens when phenol reacts with Zn?
8. Write a note on williamson ether synthesis?
9. Write the uses of ethanol.
10. What happen when Anisole (Methoxy benzene) react with HI ?

III. THREE MARKS: **(5 X 3 = 15)**

11. Write the preparation of picric acid?
12. Write the test to differentiate alcohol and phenols
13. Write a note on Riemer Tiemann reaction
14. Complete the following reactions



15. Predict the product A,B,X and Y in the following sequence of reaction.



IV. FIVE MARK: (1 X 5 = 5)

16. Write a note on (i) Phthalein reaction (ii) coupling reaction

WEEKLY UNIT TEST -12

SUBJECT: CHEMISTRY **[LESSON - 4]** **STD: XII**

MARKS: 35 **TIME: 1.00 HRS**

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I. CHOOSE THE CORRECT ANSWER: **(5 X 1 =5)**

1. Which of the following d block element has half-filled penultimate d sub shell as well as half-filled valence sub shell? a) Cr b) Pd c) Pt d) none of these

2. The magnetic moment of Mn^{2+} ion is

a) 5.92BM b) 2.80BM c) 8.95BM d) 3.90BM

3. In acid medium, potassium permanganate oxidizes oxalic acid to

a) oxalate b) Carbon dioxide c) acetate d) acetic acid

4. Permanganate ion changes to _____ in acidic medium

a) MnO_4^{2-} b) Mn^{2+} c) Mn^{3+} d) MnO_2

5. Which one of the following ions has the same number of unpaired electrons as present in V^{3+}? a) Ti^{3+} b) Fe^{3+} c) Ni^{2+} d) Cr^{3+}

II. TWO MARKS: **(5 X 2 = 10)**

6. What are actinides? Give three examples.

7. Write the electronic configuration of Cr and Cu.

8. Among Fe^{2+} and Fe^{3+} which one is more stable why?

9. Write the electronic configuration of Ce^{4+} and Co^{2+}

10. Why do transition elements form more number of complexes?

III. THREE MARKS: **(5 X 3 = 15)**

11. What are interstitial compounds?

12. What are transition metals? Give four examples.

13. What is the reason for d-block elements to form alloys?

14. List the properties of interstitial compounds?

15. Most of the transition metals and their compounds have catalytic activity why?

IV. FIVE MARK: **(1 X 5 = 5)**

16. What is Lanthanide contration? List the consequences of Lanthanide contraction.

WEEKLY UNIT TEST -13

SUBJECT: CHEMISTRY **[LESSON - 4]** **STD: XII**

MARKS: 35 **TIME: 1.00 HRS**

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I. CHOOSE THE CORRECT ANSWER: **(5 X 1 =5)**

1. The most common oxidation state of actinoids is

a) +2 b) +3 c) +4 d) +6

2. Which of the following oxidation states is most common among the lanthanoids?

a) 4 b) 2 c) 5 d) 3

3. How many moles of I_2 are liberated when 1 mole of potassium dichromate react with potassium iodide? a) 1 b) 2 c) 3 d) 4

4. Which of the following lanthanoid ions is diamagnetic?

a) Eu^{2+} b) Yb^{2+} c) Ce^{2+} d) Sm^{2+}

5. The actinoid elements which show the highest oxidation state of +7 are

a) Np, Pu, Am b) Li, Fm, Th c) U, Th, Md d) Es, No, Lr

II. TWO MARKS: **(5 X 2 = 10)**

6. Write the electronic configuration of lanthanoids and Actinoids

7. Which metal in the 3d series exhibits +1 oxidation state most frequently and why?

8. Explain Ziegler-Natta catalyst.

9. Write the oxidizing property of $K_2Cr_2O_7$.

10. Classify the following elements into d-block and f-block elements.

i) Tungsten ii) Ruthenium iii) Promethium iv) Einstenium

III. THREE MARKS: **(5 X 3 = 15)**

11. Write any three uses of $KMnO_4$.

12. Write chromyl chloride test.

13. Out of $Lu(OH)_3$ and $La(OH)_3$ which is more basic and why?

14. Which is stronger reducing agent Cr^{2+} or Fe^{2+}?

15. What are inner transition elements?

IV. FIVE MARK: **(1 X 5 = 5)**

16. Compare Lanthanoids and Actinoids.

WEEKLY UNIT TEST -14

SUBJECT: CHEMISTRY **[LESSON 12]** **STD: XII**

MARKS: 35 **TIME: 1.00 HRS**

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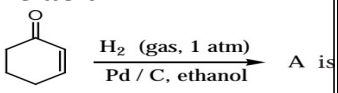
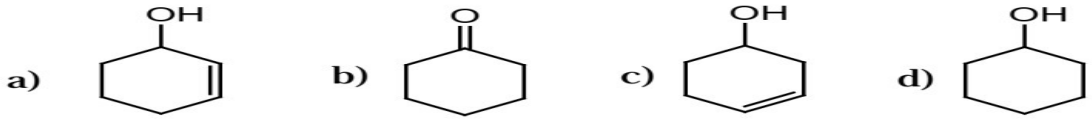
I. CHOOSE THE CORRECT ANSWER: **(5 X 1 =5)**

1. The formation of cyanohydrin from acetone is an example of
   a) nucleophilic substitution b) electrophilic substitution
   c) electrophilic addition d) Nucleophilic addition

2. $CH_2{=}CH_2 \xrightarrow[ii)\ Zn\ /\ H_2O]{i)\ O_3} X \xrightarrow{NH_3} Y$ 'Y' is
   a) formaldehyde b) di acetone ammonia
   c) hexamethylene tetraamine d) oxime

3. Benzoic acid $\xrightarrow[ii)\ \Delta]{i)\ NH_3} A \xrightarrow{NaOBr} B \xrightarrow{NaNO_2/HCl} C$ 'C' is
   a) anilinium chloride b) o - nitro aniline
   c) benzene diazonium chloride d) m – nitro benzoic acid

4. The correct structure of the product 'A' formed in the reaction  A is



5. Reaction of acetone with one of the following reagents involves nucleophilic addition followed by elimination of water. The reagent is
   a) Grignard reagent b) Sn / HCl
   c) hydrazine in presence of slightly acidic solution d) hydrocyanic acid

II. TWO MARKS: **(5 X 2 = 10)**

6. Write the IUPAC name for the following compound
   a) $(CH_3)_2C = CHCOCH_3$ b) $(CH_3)_2C(OH)CH_2CHO$
7. Write a note on Rosenmund Reduction Reaction.
8. Write a note on Stephen's Reaction.
9. What is the action of HCN on propanone
10. What happens when the following alkenes are subjected to reductive ozonolysis Propene

III. THREE MARKS: **(5 X 3 = 15)**

11. Wrtie all possible structural isomers and position isomers for the ketone represented by the molecular formula $C_5H_{10}O$
12. Write preparation of Urotropine and Mention its uses.
13. Write a note on Clemmensen Reduction and Wolf Kishner Reduction
14. Convert Acetone to Pinacols
15. What is Formalin and mention its uses ?

IV. FIVE MARK: **(1 X 5 = 5)**

16. Explain Mechanism of Aldol condensation Reaction.

WEEKLY UNIT TEST -15

SUBJECT: CHEMISTRY **[LESSON 12]** **STD: XII**

MARKS: 35 **TIME: 1.00 HRS**

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I. CHOOSE THE CORRECT ANSWER: **(5 X 1 =5)**

1. Which one of the following undergoes reaction with 50% sodium hydroxide solution to give the corresponding alcohol and acid

a) Phenylmethanal b) ethanol c) ethanol d) methanol

2. Carboxylic acids have higher boiling points than aldehydes, ketones and even alcohols of comparable molecular mass. It is due to their

a) more extensive association of carboxylic acid via van der Waals force of attraction

b) formation of carboxylate ion

c) formation of intramolecular H-bonding

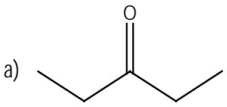
d) formation of intermolecular H – bonding

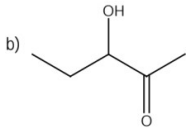
3. In which of the following reactions new carbon – carbon bond is not formed?

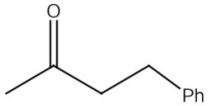
a) Aldol condensation b) Friedel craft reaction

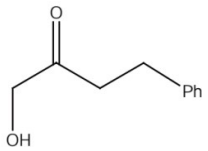
c) Kolbe's reaction d) Wolf kishner reduction

4. In which case chiral carbon is not generated by reaction with HCN

a) 

b) 

C) 

d) 

5. Which one of the following reaction is an example of disproportionation reaction?

a) Aldol condensation b) cannizaro reaction

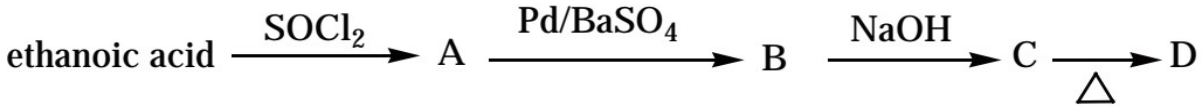
c) Benzoin condensation d) none of these

II. TWO MARKS: **(5 X 2 = 10)**

6. Give tests to Carboxylic acids.
7. Illustrate Popoff's rule.
8. Write about Gattermann – Koch reaction.
9. Write a note on Benzoin Condensation Reaction
10. Write a note on Knovenagal Reaction

III. THREE MARKS: **(5 X 3 = 15)**

11. Give tests to identify Aldehydes
12. Identify A, B, C and D



13. Explain the reducing nature of formic acid.
14. Write the formation of Malachite Green dye Reaction
15. Write a note on Cannizaro's Reaction

IV. FIVE MARK: **(1 X 5 = 5)**

16. Explain the uses of i) Acetic acid ii) Benzoic acid iii) Ethyl acetate.

WEEKLY UNIT TEST -16

SUBJECT: CHEMISTRY **[LESSON -]** **STD: XII**

MARKS: 35 **TIME: 1.00 HRS**

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I. CHOOSE THE CORRECT ANSWER: **(5 X 1 =5)**

1. Conjugate base for bronsted acids H_2O and HF are .....
   (a) OH^- and H_2FH^+, respectively (b) H_3O^+ and F^-, respectively
   (c) OH^- and F^-, respectively (d) H_3O^+ and H_2F^+, respectively
2. Which of these is not likely to act as lewis base?
   (a) BF_3 (b) PF_3 (c) CO (d) F^-
3. pH of a saturated solution of $Ca(OH)_2$ is 9. The Solubility product (K_{sp}) of $Ca(OH)_2$ (a) 0.5×10^{-15} (b) 0.25×10^{-10} (c) 0.125×10^{-15} (d) 0.5×10^{-10}
4. The aqueous solutions of sodium formate, anilinium chloride and potassium cyanide are respectively
   (a) acidic, acidic, basic (b) basic, acidic, basic
   (c) basic, neutral, basic (d) none of these
5. Which will make basic buffer?
   (a) 50 mL of 0.1M NaOH + 25mL of 01M CH_3COOH
   (b) 100 mL of 0.1M CH_3COOH + 100 mL of 0.1M NH_4OH
   (c) 100 mL of 0.1M HCl + 200 mL of 0.1M NH_4OH
   (d) 100 mL of 0.1M HCl + 100 mL of O.1 M NaOH

II. TWO MARKS: **(5 X 2 = 10)**

6. What are lewis acids and bases? Give two example for each.
7. Write the pH value of the following substances.
   (a) Vinegar (b) Black coffee (c) Baking soda (d) Soapy water
8. Define pH.
9. Calculate the pH of 0.04 M HNO_3 solution
10. Identify the conjugate acid base pair for the following reaction in aqueous solution. i) $HS^-(aq) + HF \rightleftharpoons F^-(aq) + H_2S(aq)$ ii) $HPO_4^{2-} + SO_3^{2-} \rightleftharpoons PO_4^{3-} + HSO_3^-$

III. THREE MARKS: **(5 X 3 = 15)**

11. Define Ionic product of water. Give its value at room temperature.
12. Give the difference between acids and bases.
13. Distinguish between Lewis Acid and Lewis Base.
14. Explain the Arrhenius concept of acid and bases and its limitations.
15. Discuss the Lowry – Bronsted concept of acids and bases.

IV. FIVE MARK: **(1 X 5 = 5)**

16. Derive an expression for Ostwald's Dilution law.

WEEKLY UNIT TEST -17

SUBJECT: CHEMISTRY **[LESSON - 8]** **STD: XII**

MARKS: 35 **TIME: 1.00 HRS**

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I. CHOOSE THE CORRECT ANSWER: **(5 X 1 =5)**

1. Dissociation constant of NH_4OH is 1.8×10^{-5} the hydrolysis constant of NH_4Cl would be .....

(a) 1.8×10^{-19} (b) 5.55×10^{-10} (c) 5.55×10^{-5} (d) 1.80×10^{-5}

2. The pH of an aqueous solution is Zero. The solution is .....

(a) slightly acidic (b) strongly acidic (c) neutral (d) basic

3. Which of the following can act as lowery – Bronsted acid well as base?

(a) HCl (b) SO_4^{2-} (c) HPO_4^{2-} (d) Br^-

4. The dissociation constant of a weak acid is 1×10^{-3} . In order to prepare a buffer solution with a pH =4, the [Acid] / [Salt] ratio should be .....

(a) 4:3 (b) 3:4 (c) 10:1 (d) 1:10

5. The solubility of AgCl (s) with solubility product 1.6×10^{-10} in 0. 1 M NaCl solution would be .....

(a) 1.26×10^{-5} M (b) 1.6×10^{-9} M (c) 1.6×10^{-11} M (d) Zero

II. TWO MARKS: **(5 X 2 = 10)**

6. Write the expression for the solubility product of $Ca_3(PO_4)_2$

7. A saturated solution, prepared by dissolving CaF_2(s) in water, has $[Ca^{2+}] = 3.3 \times 10^{-4}$ M. What is the K_{sp} of CaF_2?

8. Write the expression for the solubility product of Hg_2Cl_2.

9. What is Buffer index (β) ?

10. Define Solubility Product.

III. THREE MARKS: **(5 X 3 = 15)**

11. Explain common ion effect with an example.

12. Write a notes on Buffer solution. And mention its types.

13. A lab assistant prepared a solution by adding a calculated quantity of HCl gas 25°C to get a solution with $[H_3O^+] = 4 \times 10^5$ M. Is the solution neutral (or) acidic (or) basic.

14. Derive the relation between pH and pOH

15. Account for the acidic nature of HClO4 in terms of Bronsted – Lowry theory, identify its conjugate base.

IV. FIVE MARK: **(1 X 5 = 5)**

16. Derive Henderson-Hasselbalch equation.

WEEKLY UNIT TEST -18

SUBJECT: CHEMISTRY **[LESSON -5]** **STD: XII**

MARKS: 35 **TIME: 1.00 HRS**

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I. CHOOSE THE CORRECT ANSWER: **(5 X 1 =5)**

1. Oxidation state of Iron and the charge on the ligand NO in $[Fe(H_2O)_5 NO]SO_4$ are
   a) +2 and 0 respectively b) +3 and 0 respectively
   c) +3 and -1 respectively d) +1 and +1 respectively
2. A magnetic moment of 1.73BM will be shown by one among the following
   a) $TiCl_4$ b) $[CoCl_6]^{4-}$ c) $[Cu(NH_3)_4]^{2+}$ d) $[Ni(CN)_4]^{2-}$
3. Which type of isomerism is exhibited by $[Pt(NH_3)_2Cl_2]$?
   a) Coordination isomerism b) Linkage isomerism
   c) Optical isomerism d) Geometrical isomerism
4. The sum of primary valence and secondary valance of the metal M in the complex $[M(en))_2 (Ox)]Cl$ is a) 3 b) 6 c) -3 d) 9
5. Which one of the following will give a pair of enantiomorphs?
   a) $[Cr(NH_3)_6][Co(CN))_6]$ b) $[Co(en)_2Cl_2]Cl$
   c) $[Pt(NH_3)_4][FtCl_4]$ d) $[CO(NH_3)_4Cl_2]NO_2$

II. TWO MARKS: **(5 X 2 = 10)**

6. Define Ambidentate ligand.
7. Draw all possible geometrical isomers of the complex $[Co(en)_2Cl_2]^+$ and identify the optically active isomer.
8. Give one test to differentiate $[Co(NH_3)_5Cl]SO_4$ and $[Co(NH_3)_5 SO_4]Cl$
9. Classify the following ligand based on the number of donor atoms,
   a) NH_3 b) en c) ox^{2-} d) triaminotriethylamine e) pyridine
10. What is linkage isomerism? Explain with an example.

III. THREE MARKS: **(5 X 3 = 15)**

11. What are hydrate isomers? Explain with an example.
12. What are the limitations of VB theory?
13. In the complex, $[Pt(NO_2)(H_2O)(NH_3)_2]Br$, identify the following
    i. Central metal atom/ion ii. Ligand(s) and their types iii. Coordination entity
    iv. Oxidation number of the central metal ion v. Coordination number
14. Indicate the possible type of isomerism for the following complexes and draw their isomers, i) $[Co(en)_3][Cr(CN)_6]$ ii) $[Co(NH_3)_5(NO_2)]^{2+}$ iii) $[Pt(NH_3)_3(NO_2)]Cl$
15. A solution of $[Ni(H_2O)_6]^{2+}$ is green, whereas a solution of $[Ni(CN)_4]^{2-}$ is colorless – Explain.

IV. FIVE MARK: **(1 X 5 = 5)**

16. Write the postulates of Werner's theory?

WEEKLY UNIT TEST -19

SUBJECT: CHEMISTRY **[LESSON -5]** **STD: XII**

MARKS: 35 **TIME: 1.00 HRS**

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I. CHOOSE THE CORRECT ANSWER: **(5 X 1 =5)**

1. Which one of the following pairs represents linkage isomers?
   a) $[Cu(NH_3)_4]$ $[PtCl_4]$ and $[Pt(NH_3)_4]$ $[CuCl_4]$
   b) $[Co(NH_3)_5(NO_3)]SO_4$ and $[CO(NH_3)_5(ONO)]$
   c) $[Co(NH_3)_4(NCS)_2]Cl$ and $[Co(NH_3)_4(SCN)_2]Cl$
   d) both (b) and (c)
2. Which one of the following complexes is not expected to exhibit isomerism?
   a) $[Ni(NH_3)_4(H_2O)_2]^{2+}$ b) $[Pt(NH_3)_2Cl_2]$ c) $[Co(NH_3)_5SO_4]Cl$ d)$[FeCl_6]^{3-}$
3. Which of the following is paramagneticin nature?
   a) $[Zn(NH_3)_4]^{2+}$ b) $[CO(NH_3)_6]^{3+}$ c) $[Ni(H_2O)_6]^{2+}$ d) $[Ni(CN)_4]^{2-}$
4. How many geometrical isomers are possible for $[Pt(Py)(NH_3)(Br)(Cl)]$?
   a) 3 b) 4 c) 0 d) 15
5. A complex in which the oxidation number of the metal is zero is
   a) $K_4[Fe(CN)_6]$ b) $[Fe(CN)_3(NH_3)_3]$ c) $[Fe(Co)_5]$ d) both (b) and (c)

II. TWO MARKS: **(5 X 2 = 10)**

6. Why tetrahedral complexes do not exhibit geometrical isomerism.
7. What is the coordination entity formed when excess of liquid ammonia is added to an aqueous solution of copper sulphate?
8. Write the IUPAC names for the following complexes.
   a) $[Co(ONO)(NH_3)_5]^{2+}$ b) $[Pt(NH_3)_2Cl(NO_2)]$
9. Define crystal field stabilizing energy.
10. Define coordination number.

III. THREE MARKS: **(5 X 3 = 15)**

11. Write the formula for the following coordination compounds.
    a) Potassiumhexacyanidoferrate(II) b) pentacarbonyl iron(O)
    c) pentaamminenitrito -k -Ncobalt(III)ion
12. Give an example for complex of the type $[Ma_2b_2C_2]$ where a, b, c are monodentate ligands and give the possible isomers.
13. Write the central metal ion, oxidation state , coordination number, nature of the ligand and magnetic property for $K_4[Mn(CN)_6]$
14. In an octahedral crystal field, draw the figure to show the splitting of d orbitals.
15. Give the difference between double salts and coordination compounds

IV. FIVE MARK: **(1 X 5 = 5)**

16. Discuss briefly the nature of bonding in metal carbonyls.

WEEKLY UNIT TEST - 20

SUBJECT: CHEMISTRY **[LESSON - 9]** **STD: XII**

MARKS: 35 **TIME: 1.00 HRS**

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I. CHOOSE THE CORRECT ANSWER: **(5 X 1 =5)**

1. The molar conductivity of a 0.5 mol dm^{-3} solution of $AgNO_3$ with electrolytic conductivity of 5.76×10^{-3} S cm^{-1} at 298 K is ……..

(a) 2.88 S cm^2 $mo1^{-1}$ (b) 11.52 S cm^2 mol^{-1} (c) 0.086 S cm^2 mol^{-1} (d) 28.8 S cm^2 mol^{-1}

2. Faradays constant is defined as

(a) charge carried by I electron (b) charge carried by one mole of electrons

(c) charge required to deposit one mole of substance

(d) charge carried by 6.22×10^{10} electrons

3. During electrolysis of molten sodium chloride, the time required to produce 0.1 mol of chlorine gas using a current of 3A is ……

(a) 55 minutes (b) 107.2 minutes (c) 220 minutes (d) 330 minutes

4. Which of the following electrolytic solution has the least specific conductance?

(a) 2N (b) 0.002N (c) 0.02N (d) 0.2N

5. The number of electrons that have a total charge of 9650 coulombs is ……

(a) 6.22×10^{23} (b) 6.022×10^{24} (c) 6.022×10^{22} (d) 6.022×10^{-34}

II. TWO MARKS: **(5 X 2 = 10)**

6. Define Specific conductance.

7. Define anode and cathode.

8. Define Kohlraush law

9. Why is AC current used instead of DC in measuring the electrolytic conductance?

10. Why does conductivity of a solution decrease on dilution of the solution?

III. THREE MARKS: **(5 X 3 = 15)**

11. What are the factors affecting electrolytic conductance

12. State Faraday's Laws of electrolysis.

13. Write the Galvanic cell notation

14. Write a note on sacrificial protection.

15. Explain the function of H_2 – O_2 fuel cell.

IV. FIVE MARK: **(1 X 5 = 5)**

16. Derive an expression for Nernst equation.

WEEKLY UNIT TEST -21

SUBJECT: CHEMISTRY **[LESSON - 13]** **STD: XII**

MARKS: 35 **TIME: 1.00 HRS**

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I. CHOOSE THE CORRECT ANSWER: **(5 X 1 =5)**

1. Which one of the following will not undergo Hofmann bromamide reaction

a) $CH_3CONHCH_3$ b) $CH_3CH_2CONH_2$ c) CH_3CONH_2 d) $C_6H_5CONH_2$

2. Aniline + benzoylchloride $\xrightarrow{NaOH}$ C_6H_5- NH - COC_6H_5 this reaction is known as

a) Friedel – Crafts reaction b) HVZ reaction

c) Schotten – Baumann reaction d) None of these

3. When aniline reacts with acetic anhydride the product formed is

a) o – amirìoacetophenone b) m – aminoacetophenone

c) p – aminoacetophenone d) acetanilide

4. $CH_3CH_2Br \xrightarrow[\Delta]{aq\ NaOH} A \xrightarrow[\Delta]{KMnO_4/H^+} B \xrightarrow[\Delta]{NH_3} C \xrightarrow{Br_2/NaOH} D$ 'D' is

a) bromomethane b) α -Bromo sodium acetate c) methanamine d) acetamide

5. The product formed by the reaction of an aldehyde with a primary amine

a) carboxylic acid b) aromatic acid c) Schiff's base d)ketone

II. TWO MARKS: **(5 X 2 = 10)**

6. How will you convert nitrobenzene into 1, 3, 5 – trinitrobenzene.

7. What will be the product of the following reactions?

$CH_3 - NO_2$ (Nitromethane) $\xrightarrow[6[H]]{Sn/HCl}$?

$\xrightarrow[4[H]]{Zn / NH_4Cl}$?

8. Give the correct IUPAC names for the following amines

a) $CH_3 - CH_2 - CH_2 - CH(NH_2) - CH_3$ b) $CH_3 - CH_2 - CH(NHCH_3) - CH_3$

9. Aniline does not undergo Fridel – Craft's Reaction. Why?

10. How will you convert nitrobenzene into aniline?

III. THREE MARKS: **(5 X 3 = 15)**

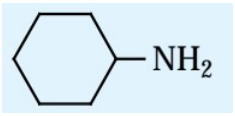
11. There are two isomers with the formula CH_3NO_2. How will you distinguish between them?

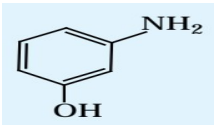
12. Write a note on Gabriel phthalimide synthesis.

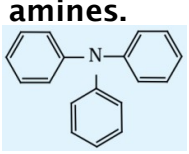
13. Draw the structure of the following compounds

i. Neopentylaniine ii. Tert – butylamine iii. α- amino propionaldehyde

14. Give the correct IUPAC names for the following amines.

a) 

b) 

c) 

15. Write down the possible isomers of the $C_4H_9NO_2$ and give their IUPAC names

IV. FIVE MARK: **(1 X 5 = 5)**

16. How will you distinguish between Primary, Secondary, and tertiary aliphatic amines

WEEKLY UNIT TEST -22

SUBJECT: CHEMISTRY **[LESSON -13]** **STD: XII**

MARKS: 35 **TIME: 1.00 HRS**

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I. CHOOSE THE CORRECT ANSWER: **(5 X 1 =5)**

1. Which of the following amines does not undergo acetylation?

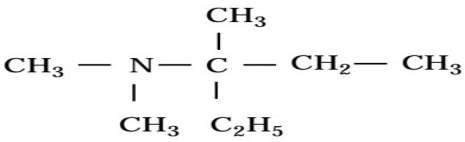
a) t-butylamine b) ethylamine c) diethylamine d) triethylamine

2. Ammonium salt of benzoic acid is heated strongly with P_2O_5 and the product so formed is reduced and then treated with $NaNO_2$/ HCl at low temperature. The final compound formed is

a) Benzene diazonium chloride b) Benzyl alcohol

c) Phenol d) Nitrosobenzene

3. IUPAC name for the amine



a) 3 – Bimethy lamino – 3 – methyl pentane

b) 3(N,N – Triethyl) – 3 – amino pentane

c) 3-N,N – trimethyl pentanamine

d) 3 – (N,N – Dimethyl amino) – 3- methyl pentane

4. Which one of the following is most basic?

a) 2, 4 – dichloroaniline b) 2, 4 – dimethylaniline

c) 2, 4 – dinitroaniline d) 2, 4 – dibromoaniline

5. Secondary nitro alkanes react with nitrous acid to form

a) red solution b) blue solution c) green solution d) yellow solution

II. TWO MARKS: **(5 X 2 = 10)**

6. Write a note on Mustard Oil Reaction

7. How is Chloropicrin prepared and mention its use?

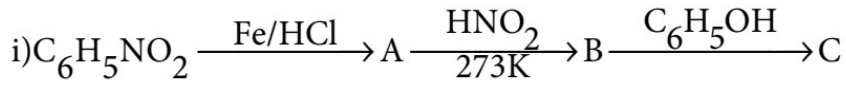
8. Write a note on Gomberg Reaction

9. Write the uses of Nitroalkanes

10. Write a note on Schotten-Baumenn reaction.

III. THREE MARKS: **(5 X 3 = 15)**

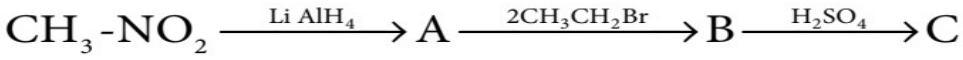
11. Identify compounds A, B, and C in the following sequence of reactions.



12. How will you convert nitrobenzene into a) o and p – nitrophenol b) m – nitro aniline

13. Write short notes on Coupling reaction.

14. Identify A,B,and C.



15. Ethyl amine is soluble in water whereas aniline is not Why ?

IV. FIVE MARK: **(1 X 5 = 5)**

16. How will you prepare the following compounds from Benzene diazonium chloride

a) p-Hydroxy azobenzene b) Phenol c) Nitrobenzene

WEEKLY UNIT TEST - 23

SUBJECT: CHEMISTRY **[LESSON - 10]** **STD: XII**

MARKS: 35 **TIME: 1.00 HRS**

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I. CHOOSE THE CORRECT ANSWER: **(5 X 1 =5)**

1. Fog is colloidal solution of
   a) solid in gas b) gas in gas c) liquid in gas d) gas in liquid
2. The most effective electrolyte for the coagulation of As_2S_3 Soils
   (a) NaCl (b) $Ba(NO_3)_2$ (c) $K_3[Fe(CN)_6]$ (d) $Al_2(SO_4)_3$
3. Which one of the following characteristics are associated with adsorption?
   a) ΔG and ΔH are negative but ΔS is positive
   b) ΔG and ΔS are negative but ΔH is positive
   c) ΔG is negative but ΔH and ΔS are positive
   d) ΔG, ΔH and ΔS all are negative.
4. Which of the following is incorrect for physisorption?
   a) reversible b) increases with increase in temperature
   c) low heat of adsorption d) increases with increase in surface area
5. The phenomenon observed when a beam of light is passed through a colloidal solution is
   a) Cataphoresis b) Electrophoresis c) Coagulation d) Tyndall effect

II. TWO MARKS: **(5 X 2 = 10)**

6. Give two important characteristics of physisorption.
7. In case of chemisorption, why adsorption first increases and then decreases with temperature?
8. Write the characteristics of catalysts
9. Addition of Alum purifies water. Why?
10. Which will be adsorbed more readily on the surface of charcoal and why? NH3 or CO_2?

III. THREE MARKS: **(5 X 3 = 15)**

11. Differentiate physisorption and chemisorption
12. What is the difference between a sol and a gel?
13. What are promoters? Give one example
14. Why are lyophillic colloidal sols are more stable than lyophobic colloidal sols?
15. Define the following.a) Positive catalysis b) Negative catalysis

IV. FIVE MARK: **(1 X 5 = 5)**

16. Explain intermediate compound formation theory of catalysis with an example. What are the Limitations of intermediate compound theory?

WEEKLY UNIT TEST - 24

SUBJECT: CHEMISTRY **[LESSON -10]** **STD: XII**

MARKS: 35 **TIME: 1.00 HRS**

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I. CHOOSE THE CORRECT ANSWER: **(5 X 1 =5)**

1. Adsorption of a gas on solid metal surface is spontaneous and exothermic, then
a) ΔH increases b) ΔS increases c) ΔG increases d) ΔS decreases
2. Hair cream is
a) gel b) emulsion c) solid sol d) sol.
3. Which one of the following is an example for homogeneous catalysis?
a) manufacture of ammonia by Haber's process
b) manufacture of sulphuric acid by contact process
c) hydrogenation of oil
d) Hydrolysis of sucrose in presence of dil HCl

4. If x is the amount of adsorbate and m is the amount of adsorbent, which of the following relations is not related to adsorption process?
a) $x/m = f(P)$ at constant T b) $x/m = f(T)$ at constant P
c) P = f(T) at constant x/m d) x/m = PT
5. On which of the following properties does the coagulating power of an ion depend ?
a) Both magnitude and sign of the charge on the ion.
b) Size of the ion alone
c) the magnitude of the charge on the ion alone
d) the sign of charge on the ion alone.

II. TWO MARKS: **(5 X 2 = 10)**

6. Define Gold number.
7. Give three uses of emulsions.
8. Write a short note on Brownian movement
9. Why does bleeding stop by rubbing moist alum?
10. What is Tyndall effect?

III. THREE MARKS: **(5 X 3 = 15)**

11. Define the following.a) Positive catalysis b) Negative catalysis
12. What is Ultrafiltration?
13. Differentiate Homogeneous and Heterogeneous catalysis
14. What is coagulation? Mention the various methods of coagulation.
15. Write a note on catalytic poison. Give one example

IV. FIVE MARK: **(1 X 5 = 5)**

16. Describe adsorption theory of catalysis.

WEEKLY UNIT TEST - 25

SUBJECT: CHEMISTRY **[LESSON -14]** **STD: XII**

MARKS: 35 **TIME: 1.00 HRS**

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I. CHOOSE THE CORRECT ANSWER: **(5 X 1 =5)**

1. In a protein, various amino acids linked together by

a) Peptide bond b) Dative bond c) α - Glycosidic bond d) β- Glycosidic bond

2. Which one of the following is not produced by the body?

a) DNA b) Enzymes c) Hormones d) Vitamins

3. Which one given below is a non-reducing sugar?

a) Glucose b) Sucrose c) maltose d) Lactose

4. Which one of the following rotates the plane polarized light towards left?

a) D(+) Glucose (b) L(+) Glucose (c) D(-) Fructose d) D(+) Galactose

5. $\text{Glucose} \xrightarrow{(HCN)} \text{Product} \xrightarrow{(hydrolysis)} \text{Product} \xrightarrow{(HI + Heat)} \text{A, the compound A is}$

a) Heptanoic acid b) 2-Iodohexane c) Heptane d) Heptanol

II. TWO MARKS: **(5 X 2 = 10)**

6. Name the Vitamins whose deficiency cause i) rickets ii) scurvy
7. How are vitamins classified.
8. Classify the following into monosaccharides, oligosaccharides and polysaccharides.

i)starch ii)fructose iii)sucrose iv)lactose v) maltose

9. Write the structure of α–D(+) glucopyranose
10. Write a short note on peptide bond.

III. THREE MARKS: **(5 X 3 = 15)**

11. Give two difference between Hormones and Vitamins.
12. What are the functions of lipids in living organisms?
13. Write a note on denaturation of Proteins.
14. What are reducing and non- reducing sugars.
15. What are hormones? Give examples.

IV. FIVE MARK: **(1 X 5 = 5)**

16. Give any three difference between DNA and RNA.

What are different types of RNA which are found in cell?

XIITH STD CHEMISTRY ONE WORDS
VOLUME - I

UNIT 1 : METALLURGY

1. Bauxite has the composition

a) Al_2O_3 b) $Al_2O_3 .nH_2O$ c) $Fe_2O_3 .2H_2O$ d) None of these

2. Roasting of sulphide ore gives the gas (A).(A) is a colourless gas. Aqueous solution of (A) is acidic. The gas (A) is

a) CO_2 b) SO_3 c) SO_2 d) H_2S

3. Which one of the following reaction represents calcinations?

a) $2Zn + O_2 \rightarrow 2ZnO$ b) $2ZnS + 3O_2 \rightarrow 2ZnO + 2SO_2$

c) $MgCO_3 \rightarrow MgO + CO_2$ d) Both (a) and (c)

4. The metal oxide which cannot be reduced to metal by carbon is

a) PbO b) Al_2O_3 c) ZnO d) FeO

5. Which of the metal is extracted by Hall-Heroult process?

a) Al b) Ni c) Cu d) Zn

6. Which of the following statements, about the advantage of roasting of sulphide ore before reduction is not true?

a) ΔG_f^0 of sulphide is greater than those for CS_2 and H_2S .

b) ΔG_f^0 is negative for roasting of sulphide ore to oxide

c) Roasting of the sulphide to its oxide is thermodynamically feasible.

d) Carbon and hydrogen are suitable reducing agents for metal sulphides.

7. Match items in column - I with the items of column – II and assign the correct code.

	Column-I		Column-II
A	Cyanide process	i)	Ultrapure Ge
B	Froth floatation process	ii)	Dressing of ZnS
C	Electrolytic reduction	iii)	Extraction of Al
D	Zone refining	iv)	Extraction of Au
		v)	Purification of Ni

a) A-i , B-ii , C-iii , D-iv b) A-iii , B-iv , C-v , D-i

c) A-iv , B-ii , C-iii , D-i d) A-ii , B-iii , C-i , D-v

8. Wolframite ore is separated from tinstone by the process of

a) Smelting b) Calcination c) Roasting d) Electromagnetic separation

9. Which one of the following is not feasible

a) $Zn(s) + Cu^{2+}(aq) \rightarrow Cu(s) + Zn^{2+}(aq)$ b) $Cu(s) + Zn^{2+}(aq) \rightarrow Zn(s) + Cu^{2+}(aq)$

c) $Cu(s) + 2Ag^{+}(aq) \rightarrow 2Ag(s) + Cu^{2+}(aq)$ d) $Fe(s) + Cu^{2+}(aq) \rightarrow Cu(s) + Fe^{2+}(aq)$

10. Electrochemical process is used to extract

a) Iron b) Lead c) Sodium d) silver

11. Flux is a substance which is used to convert

a) Mineral into silicate b) Infusible impurities to soluble impurities

c) Soluble impurities to infusible impurities d) All of these

12. Which one of the following ores is best concentrated by froth – floatation method?

a) Magnetite b) Haematite c) Galena d) Cassiterite

13. In the extraction of aluminium from alumina by electrolysis, cryolite is added to

a) Lower the melting point of alumina b) Remove impurities from alumina

c) Decrease the electrical conductivity d) Increase the rate of reduction

14. Zinc is obtained from ZnO by
a) Carbon reduction b) Reduction using silver
c) Electrochemical process d) Acid leaching

15. Cupellation is a process used for the refining of
a) Silver b) Lead c) Copper d) iron

16. Extraction of gold and silver involves leaching with cyanide ion. silver is later recovered by
a) Distillation b) Zone refining c) Displacement with zinc d) liquation

17. Considering Ellingham diagram, which of the following metals can be used to reduce alumina? a) Fe b) Cu c) Mg d) Zn

18. The following set of reactions are used in refining Zirconium. This method is known as

$$Zr\ (impure) + 2I_2 \xrightarrow{523\ K} ZrI_4$$
$$ZrI_4 \xrightarrow{1800K} Zr\ (pure) + 2I_2$$

a) Liquation b) van Arkel process c) Zone refining d) Mond's process

19. Which of the following is used for concentrating ore in metallurgy?
a) Leaching b) Roasting c) Froth floatation d) Both (a) and (c)

20. The incorrect statement among the following is
a) Nickel is refined by Mond's process
b) Titanium is refined by Van Arkel's process
c) Zinc blende is concentrated by froth floatation
d) In the metallurgy of gold, the metal is leached with dilute sodium chloride solution

21. In the electrolytic refining of copper, which one of the following is used as anode?
a) Pure copper b) Impure copper c) Carbon rod d) Platinum electrode

22. Which of the following plot gives Ellingham diagram
a) ΔS Vs T b) ΔG^0 Vs T c) ΔG^0 Vs 1/T d) ΔG^0 Vs T^2

23. In the Ellingham diagram, for the formation of carbon monoxide

a) $\left(\frac{\Delta S^0}{\Delta T}\right)$ is negative

b) $\left(\frac{\Delta G^0}{\Delta T}\right)$ is positive

c) $\left(\frac{\Delta G^0}{\Delta T}\right)$ is negative

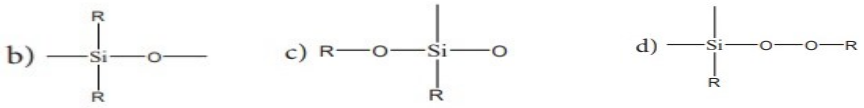
d) initially $\left(\frac{\Delta T}{\Delta G^0}\right)$ is positive, after 700^0C, $\left(\frac{\Delta G^0}{\Delta T}\right)$ is negative

24. Which of the following reduction is not thermodynamically feasible?
a) $Cr_2O_3 + 2Al \rightarrow Al_2O_3 + 2Cr$ b) $Al_2O_3 + 2Cr \rightarrow Cr_2O_3 + 2Al$
c) $3TiO_2 + 4Al \rightarrow 2\ Al_2O_3 + 3Ti$ d) none of these

25. Which of the following is not true with respect to Ellingham diagram?
a) Free energy changes follow a straight line. Deviation occurs when there is a phase change.
b) The graph for the formation of CO_2 is a straight line almost parallel to free energy axis.
c) Negative slope of CO shows that it becomes more stable with increase in temperature.
d) Positive slope of metal oxides shows that their stabilities decrease with increase in temperature.

UNIT 2 : P-BLOCK ELEMENTS-I

1. An aqueous solution of borax is
   a) neutral b) acidic c) basic d) amphoteric
2. Boric acid is an acid because its molecule
   a) contains replaceable H+ ion b) gives up a proton
   c) combines with proton to form water molecule
   d) accepts OH- from water ,releasing proton.
3. Which among the following is not a borane?
   a) B_2H_6 b) B_3H_6 c) B_4H_{10} d) none of these
4. Which of the following metals has the largest abundance in the earth's crust?
   a) Aluminium b) calcium c) Magnesium d) sodium
5. In diborane, the number of electrons that accounts for banana bonds is
   a) six b) two c) four d) three
6. The element that does not show catenation among the following p-block elements is
   a) Carbon b) silicon c) Lead d) germanium
7. Carbon atoms in fullerene with formula C60 have
   a) sp^3 hybridised b) sp hybridized
   c) sp^2 hybridised d) partially sp^2 and partially sp^3 hybridised
8. Oxidation state of carbon in its hydrides
   a) +4 b) -4 c) +3 d) +2
9. The basic structural unit of silicates is
   a) $(SiO_3)^{2-}$ b) $(SiO_4)^{2-}$ c) $(SiO)^{-}$ d) $(SiO_4)^{4-}$
10. The repeating unit in silicone is
    a) SiO_2



11. Which of these is not a monomer for a high molecular mass silicone polymer?
    a) Me_3SiCl b) $PhSiCl_3$ c) $MeSiCl_3$ d) Me_2SiCl_2
12. Which of the following is not sp2 hybridised?
    a) Graphite b) grapheme c) Fullerene d) dry ice
13. The geometry at which carbon atom in diamond are bonded to each other is
    a) Tetrahedral b) hexagonal c) Octahedral d) none of these
14. Which of the following statements is not correct?
    a) Beryl is a cyclic silicate b) Mg_2SiO_4 is an orthosilicate
    c) $(SiO_4)^{4-}$ is the basic structural unit of silicates d) Feldspar is not aluminosilicate
16. Match items in column - I with the items of column – II and assign the correct code.

Column-I		Column-II	
A	Borazole	1	$B(OH)_3$
B	Boric acid	2	$B_3N_3H_6$
C	Quartz	3	$Na_2[B_4O_5(OH)_4]\ 8H_2O$
D	Borax	4	SiO_2

	A	B	C	D						
(a)	2	1	4	3		(c)	1	2	4	3
(b)	1	2	4	3		(d) None of these				

17. Duralumin is an alloy of
a) Cu,Mn b) Cu,Al,Mg c) Al,Mn d) Al,Cu,Mn,Mg
18. Thermodynamically the most stable form of carbon is
a) Diamond b) graphite c) Fullerened) none of these
19. The compound that is used in nuclear reactors as protective shields and control rods is a) Metal borides b) metal oxides c) Metal carbonates d) metal carbide
20. The stability of +1 oxidation state increases in the sequence
a) Al < Ga < In < Tl b) Tl < In < Ga < Al c) In < Tl < Ga < Al d) Ga< In < Al < Tl

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UNIT 3 : P-BLOCK ELEMENTS-II

1. In which of the following, NH_3 is not used?
a) Nessler's reagent b) Reagent for the analysis of IV group basic radical
c) Reagent for the analysis of III group basic radical d) Tollen's reagent
2. Which is true regarding nitrogen?
a) least electronegative element b) has low ionisation enthalpy than oxygen
c) d – orbitals available d) ability to form pπ -pπ bonds with itself
3. An element belongs to group 15 and 3rd period of the periodic table, its electronic configuration would be
a) $Is^2\ 2s^2\ 2p^4$ b) $Is^2\ 2s^2\ 2p^3$ c) $Is^2\ 2s^2\ 2p^6\ 3s2^2\ 3p^2$ d) $Is^2\ 2s^2\ 2p^6\ 3s^2\ 3p^3$
4. Solid (A) reacts with strong aqueous NaOH liberating a foul smelling gas(B) which spontaneously burn in air giving smoky rings. A and B are respectively
a) P_4(red) and PH_3 b) P_4 (white) and PH_3 c) S_8 and H_2S d) P_4(white) and H_2S
5. On hydrolysis, PCl_3 gives
a) H_3PO_3 b) PH_3 c) H_3PO_4 d) $POCl_3$
6. P_4O_6 reacts with cold water to give
a) H_3PO_3 b) $H_4P_2O_7$ c) HPO_3 d) H_3PO_4
7. The basicity of pyrophosphorous acid ($H_4P_2O_3$) is
a) 4 b) 2 c) 3 d) 5
8. The molarity of given orthophosphoric acid solution is 2M. Its normality is
a) 6N b) 4N c) 2N d) none of these
9. Assertion : bond dissociation energy of fluorine is greater than chlorine gas
Reason : chlorine has more electronic repulsion than flourine
a) Both assertion and reason are true and reason is the correct explanation of assertion.
b) Both assertion and reason are true bu t reason is not the correct explanation of assertion
c) Assertion is true bu t reason is false d) Both assertion and reason are false
10. Among the following, which is the strongest oxidizing agent?
a) Cl_2 b) F_2 c) Br_2 d) I_2
11. The correct order of the thermal stability of hydrogen halide is
a) Hl > HBr > HCl > HF b) HF > HCl > HBr > HI
c) HCl > HF > HBr > HI d) HI > HCl > HF > HBr
12. Which one of the following compounds is not formed?
a) $XeOF_4$ b) XeO_3 c) XeF_2 d) NeF_2
13. Most easily liquefiable gas is a) Ar b) Ne c) He d) Kr

14. XeF_6 on complete hydrolysis produces
a) $XeOF_4$ b) XeO_2F_2 c) XeO_3 d) XeO_2
15. Which of the following is strongest acid among all?
a) HI b) HF c) HBr d) HCl
16. Which one of the following orders is correct for the bond dissociation enthalpy of halogen molecules?
a) $Br_2 > I_2 > F_2 > Cl_2$ b) $F_2 > Cl_2 > Br_2 > I_2$
c) $I_2 > Br_2 > Cl_2 > F_2$ d) $Cl_2 > Br_2 > F_2 > I_2$
17. Among the following the correct order of acidity is
a) $HClO_2 < HClO < HClO_3 < HClO_4$ b) $HClO_4 < HClO_2 < HClO < HClO_3$
c) $HClO_3 < HClO_4 < HClO_2 < HClO$ d) $HClO < HClO_2 < HClO_3 < HClO_4$
18. When copper is heated with cone HNOs it produces
a) Cu $(NO_3)_2$, NO and NO_2 b) Cu $(NO_3)_2$ and N_2O
c) Cu $(NO_3)_2$ and NO_2 d) Cu $(NO_3)_2$ and NO

UNIT 4 : TRANSITION AND INNER TRANSITION ELEMENTS

1. Sc (Z = 21) is a transition element but Zinc (Z = 30) is not because
a) both Sc^{3+} and Zn^{2+} ions are colourless and form white compounds
b) in case of Sc, 3d orbital are partially filled but in Zn these are completely filled
c) last electron as assumed to be added to 4s level in case of zinc
d) both Sc and Zn do not exhibit variable oxidation states
2. Which of the following d block element has half-filled penultimate d sub shell as well as half-filled valence sub shell? a) Cr b) Pd c) Pt d) none of these
3. Among the transition metals of 3d series, the one that has highest negative (M^{2+}/M) standard electrode potential is
a) Ti b) Cu c) Mn d) Zn
4. Which one of the following ions has the same number of unpaired electrons as present in V^{3+}? a) Ti^{3+} b) Fe^{3+} c) Ni^{2+} d) Cr^{3+}
5. The magnetic moment of Mn^{2+} ion is
a) 5.92BM b) 2.80BM c) 8.95BM d) 3.90BM
6. The catalytic behaviour of transition metals and their compounds is ascribed mainly due to a) their magnetic behavior b) their unfilled d orbitals
c) their ability to adopt variable oxidation states d) their chemical reactivity
7. The correct order of increasing oxidizing power in the series
a) $VO^{2+} < Cr_2O_7^{2-} < MnO4^-$ b) $Cr_2O_7^{2-} < VO_2^+ < MnO_4^-$
c) $Cr_2O_7^{2-} < MnO_4^- < VO_2^+$ d) $MnO_4^- < Cr_2O_7^{2-} < VO_2^+$
8. In acid medium, potassium permanganate oxidizes oxalic acid to
a) oxalate b) Carbon dioxide c) acetate d) acetic acid
9. Which of the following statements is not true?
a) on passing H_2S, through acidified $K_2Cr_2O_7$ solution, a milky colour is observed
b) $Na_2Cr_2O_7$ is preferred over $K_2Cr_2O_7$ in volumetric analysis
c) $K_2Cr_2O_7$ solution in acidic medium is orange in colour
d) $K_2Cr_2O_7$ solution becomes yellow on increasing the pH beyond 7
10. Permanganate ion changes to _____ in acidic medium
a) MnO_4^{2-} b) Mn^{2+} c) Mn^{3+} d) MnO_2
11. How many moles of I_2 are liberated when 1 mole of potassium dichromate react with potassium iodide? a) 1 b) 2 c) 3 d) 4

12. The number of moles of acidified $KMnO_4$ required to oxidize 1 mole of ferrous oxalate (FeC_2O_4) is a) 5 b) 3 c) 0.6 d) 1.5

13. Which one of the following statements related to lanthanons is incorrect?
a) Europium shows +2 oxidation state
b) The basicity decreases as the ionic radius decreases from Pr to Lu.
c) All the lanthanons are much more reactive than aluminium.
d) Ce^{4+} solutions are widely used as oxidising agents in volumetric analysis

14. Which of the following lanthanoid ions is diamagnetic?
a) Eu^{2+} b) Yb^{2+} c) Ce^{2+} d) Sm^{2+}

15. Which of the following oxidation states is most common among the lanthanoids?
a) 4 b) 2 c) 5 d) 3

16. Assertion : Ce^{4+} is used as an oxidizing agent in volumetric analysis
Reason : Ce^{4+} has the tendency of attaining +3 oxidation state.
a) Both assertion and reason are true and reason is the correct explanation of assertion.
b) Both assertion and reason are true but reason is not the correct explanation of assertion.
c) Assertion is true but reason is false
d) Both assertion and reason are false.

17. The most common oxidation state of actinoids is
a) +2 b) +3 c) +4 d) +6

18. The actinoid elements which show the highest oxidation state of +7 are
a) Np, Pu, Am b) Li, Fm, Th c) U, Th, Md d) Es, No, Lr

19. Which one of the following is not correct?
a) La $(OH)_3$, is less basic than Lu $(OH)_3$
b) In lanthanoid series ionic radius of Ln^{3+} ions decreases
c) La is actually an element of transition metal series rather than lanthanide series
d) Atomic radii of Zr and Hf are same because of lanthanide contraction,

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UNIT 5 : COORDINATION CHEMISTRY

1. The sum of primary valence and secondary valance of the metal M in the complex $[M(en))_2$ (Ox)] Cl is a) 3 b) 6 c) -3 d) 9

2. An excess of silver nitrate is added to 100ml of a O.O1 M solution of pentaaquachloridochromium (III) chloride. The number of moles of AgCl precipitated would be a) 0.02 b) 0.002 c) 0.01 d) 0.2

3. A complex has a molecular formula $MSO_4Cl.6H_2O$. The aqueous solution of it gives white precipitate with Barium chloride solution and no precipitate is obtained when it is treated with silver nitrate solution. If the secondary valence of the metal is six, which one of the following correctly represents the complex?
a) $[M(H_2O)_4Cl]\ SO_4.2H_2O$ b) $[M(H_2O)_6]\ SO_4$
c) $[M(H_2O)_5Cl]SO_4.H_2O$ d) $[M\ (H_2O)_3Cl]\ SO_4.3H_2O$

4. Oxidation state of Iron and the charge on the ligand NO in $[Fe\ (H_2O)_5\ NO]\ SO_4$ are
a) +2 and 0 respectively b) +3 and 0 respectively
c) +3 and -1 respectively d) +1 and +1 respectively

5. As per IUPAC guidelines, the name of the complex [Co(en)2 (ONO)Cl] Cl is
a) chlorobisethylenediaminenitritocobalt(III) chloride

b) chi or id obis (e thane-1, 2-diamine) nitrito K-Ocobaltate(III) chloride
c) chloridobis (ethane-1, 2-diammine) nitrito K -Ocobalt(II) chloride
d) chloridobis (ethane-1, 2-diamine) nitrito K -Ocobalt(III) chloride

6. IUPAC name of the complex $K_3[Al(C_2O_4)_3]$ is
a) potassiumtrioxalatoaluminium(III)
b) potassiumtrioxalatoaluminate(II)
c) potassiumtrisoxalatoaluminate(III)
d) potassiumtrioxalatoaluminate(III)

7. A magnetic moment of 1.73BM will be shown by one among the following
a) $TiCl_4$ b) $[CoCl_6]^{4-}$ c) $[Cu(NH_3)_4]^{2+}$ d) $[Ni(CN)_4]^{2-}$

8. Crystal field stabilization energy for high spin d^5 octahedral complex is
a) $-0.6\Delta_0$ b) 0 c) $2(P - \Delta_0)$ d) $2(P + \Delta_0)$

9. In which of the following coordination entities the magnitude of Δ_0 will be maximum? a) $[Co(CN)_6]^{3-}$ b) $[Co(C_2O_4)_3]^{3-}$ c) $[Co(H_2O)_6]^{3+}$ d) $[Co(NH_3)_6]^{3+}$

10. Which one of the following will give a pair of enantiomorphs?
a) $[Cr(NH_3)_6][Co(CN))_6]$ b) $[Co(en)_2Cl_2]Cl$
c) $[Pt(NH_3)_4][FtCl_4]$ d) $[CO(NH_3)_4Cl_2]NO_2$

11. Which type of isomerism is exhibited by $[Pt(NH_3)_2Cl_2]$?
a) Coordination isomerism b) Linkage isomerism
c) Optical isomerism d) Geometrical isomerism

12. How many geometrical isomers are possible for $[Pt(Py)(NH_3)(Br)(Cl)]$?
a) 3 b) 4 c) 0 d) 15

13. Which one of the following pairs represents linkage isomers?
a) $[Cu(NH_3)_4]$ $[PtCl_4]$ and $[Pt(NH_3)_4]$ $[CuCl_4]$
b) $[Co(NH_3)_5(NO_3)]$ SO_4 and $[CO(NH_3)_5(ONO)]$
c) $[Co(NH_3)_4(NCS)_2]$ Cl and $[Co(NH_3)_4(SCN)_2]Cl$
d) both (b) and (c)

14. Which kind of isomerism is possible for a complex $[Co(NH_3)_4Br_2]Cl$?
a) geometrical and ionization b) geometrical and optical
c) optical and ionization d) geometrical only

15. Which one of the following complexes is not expected to exhibit isomerism?
a) $[Ni(NH_3)_4(H_2O)_2]^{2+}$ b) $[Pt(NH_3)_2Cl_2]$ c) $[Co(NH_3)_5SO_4]Cl$ d) $[FeCl_6]^{3-}$

16. A complex in which the oxidation number of the metal is zero is
a) $K_4[Fe(CN)_6]$ b) $[Fe(CN)_3(NH_3)_3]$ c) $[Fe(Co)_5]$ d) both (b) and (c)

17. Formula of tris(ethane-l,2-diamine) iron (II) phosphate
a) $[Fe(CH_3 - CH(NH_2)_2)_3](PO_4)_3$ b) $[Fe(H_2N - CH_2 - CH_2 - NH_2)_3](PO_4)$
c) $[Fe(H_2N\text{-}CH_2\text{-}CH_2\text{-}NH_2)_3](PO_4)_2$ d) $[Fe(H_2N\text{-}CH_2\text{-}CH_2\text{-}NH_2)_3]_3(PO_4)_2$

18. Which of the following is paramagneticin nature?
a) $[Zn(NH_3)_4]^{2+}$ b) $[CO(NH_3)_6]^{3+}$ c) $[Ni(H_2O)_6]^{2+}$ d) $[Ni(CN)_4]^{2-}$

19. Fac-mer isomerism is shown by
a) $[Co(en)_3]^{3+}$ b) $[Co(NH_3)_4(Cl)_2]^{+}$ c) $[Co(NH_3)_3(Cl)_3]$ d) $[Co(NH_3)_5Cl]SO_4$

20. Choose the correct statement.
a) Square planar complexes are more stable than octahedral complexes
b) The spin only magnetic moment of $[Cu(Cl)_4]_4^{2-}$ is 1.732 BM and it has square planar structure.
c) Crystal field splitting energy (Δ_o) of $[FeF_6]^{4-}$ is higher than the (Ao) of [Fe (CN)6]4
d) Crystal field stabilization energy of $[V(H_2O)F_6]^{2+}$ is higher than the crystal field

stabilization of $[Ti(H_2O)_6]^{2+}$

UNIT 6: SOLID STATE

1. Graphite and diamond are
   a) Covalent and molecular crystals b) ionic and covalent crystals
   c) both covalent crystals d) both molecular crystals
2. An ionic compound AxBy crystallizes in fcc type crystal structure with B ions at the centre of each face and A ion occupying entre of the cube. the correct formula of AxBy is a) AB b) AB_3 c) A_3B d) A_8B_6
3. The ratio of close packed atoms to tetrahedral hole in cubic packing is
   a) 1:1 b) 1:2 c) 2:1 d) 1:4
4. Solid CO_2 is an example of
   a) Covalent solid b) metallic solid c) molecular solid d) ionic solid
5. Assertion : monoclinic sulphur is an example of monoclinic crystal system
   Reason: for a monoclinic system, $a \neq b \neq c$ and $\alpha = \gamma = 90\ 0$, $\beta \neq 900$
   a) Both assertion and reason are true and reason is the correct explanation of assertion.
   b) Both assertion and reason are true but reason is not the correct explanation of assertion.
   c) Assertion is true but reason is false.
   c) Both assertion and reason are false.
6. In calcium fluoride, having the flurite structure the coordination number of Ca^{2+} ion and F- Ion are a) 4 and 2 b) 6 and 6 c) 8 and 4 d) 4 and 8
7. The number of unit cells in 8 gm of an element X (atomic mass 40) which crystallizes in bcc pattern is (NA is the Avogadro number)
   a) 6.023×10^{23} b) 6.023×10^{22} c) 60.23 X 1023 d) ($[6.023 \times 10^{23}] / [8 \times 40]$)
8. The number of carbon atoms per unit cell of diamond is
   a) 8 b) 6 c) 1 d) 4
9. In a solid atom M occupies ccp lattice and (1/3) of tetrahedral voids are occupied by atom N. find the formula of solid formed by M and N.
   a) MN b) M_3N c) MN_3 d) M_3N_2
10. The composition of a sample of wurtzite is Fe0.93 O1.00 what % of Iron present in the form of Fe^{3+}? a) 16.05% b) 15.05% c) 18.05% d) 17.05%
11. The ionic radii of A+ and B− are $0.98 \times 10{-}10$ m and $1.81 \times 10{-}10$ m . the coordination number of each ion in AB is
    a) 8 b) 2 c) 6 d) 4
12. CsCl has bcc arrangement, its unit cell edge length is 400pm, its inter atomic distance is a) 400pm b) 800pm c) $\sqrt{3}$ x100pm d) ($\sqrt{3}$ / 2) x 400pm
13. A solid compound XY has NaCl structure. if the radius of the cation is 100pm , the radius of the anion will be
    a) (100/0.414) b) (0.732/100) c) 100x0.414 d) (0.414 / 100)
14. The vacant space in bcc lattice unit cell is
    a) 48% b) 23% c) 32% d) 26%
15. The radius of an atom is 300pm, if it crystallizes in a face centered cubic lattice, the length of the edge of the unit cell is
    a) 488.5pm b) 848.5pm c) 884.5pm d) 484.5pm
16. The fraction of total volume occupied by the atoms in a simple cubic is
    a) $\pi / 4\sqrt{2}$ b) $\pi / 6$ c) $\pi / 4$ d) $\pi / 3\sqrt{2}$

17. The yellow colour in NaCl crystal is due to

a) excitation of electrons in F centers

b) reflection of light from Cl^- ion on the surface

c) refraction of light from Na^+ ion

d) all of the above

18. if 'a' stands for the edge length of the cubic system ; sc , bcc, and fcc. Then the ratio of radii of spheres in these systems will be respectively.

a) $\left(\frac{1}{2}a:\frac{\sqrt{3}}{2}a:\frac{\sqrt{2}}{2}a\right)$ b) $\left(\sqrt{1}a:\sqrt{3}a:\sqrt{2}a\right)$ c) $\left(\frac{1}{2}a:\frac{\sqrt{3}}{4}a:\frac{1}{2\sqrt{2}}a\right)$ d) $\left(\frac{1}{2}a:\sqrt{3}a:\frac{1}{\sqrt{2}}a\right)$

19. If 'a' is the length of the side of the cube, the distance between the body centered atom and one corner atom in the cube will be

a) $\left(\frac{2}{\sqrt{3}}\right)a$ b) $\left(\frac{4}{\sqrt{3}}\right)a$ c) $\left(\frac{\sqrt{3}}{4}\right)a$ d) $\left(\frac{\sqrt{3}}{2}\right)a$

20. Potassium has a bcc structure with nearest neighbor distance 4.52 A°.
Its atomic weight is 39. its density will be

a) 915 kg m^{-3} b) 2142 kg m^{-3} c) 452 kg m^{-3} d) 390 kg m^{-3}

21. Schottky defect in a crystal is observed when

a) unequal number of anions and anions are missing from the lattice

b) equal number of anions and anions are missing from the lattice

c) an ion leaves its normal site and occupies an interstitial site

d) no ion is missing from its lattice.

22. The cation leaves its normal position in the crystal and moves to some interstitial position, the defect in the crystal is known as

a) Schottky defect b) F center c) Frenkel defect d) non-stoichiometric defect

23. Assertion: due to Frenkel defect, density of the crystalline solid decreases.
Reason: in Frenkel defect cation and anion leaves the crystal.

a) Both assertion and reason are true and reason is the correct explanation of assertion.

b) Both assertion and reason are true but reason is not the correct explanation of assertion.

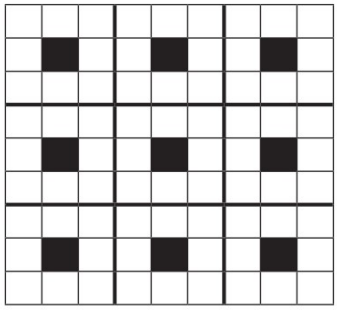
c) Assertion is true but reason is false.

d) Both assertion and reason are false

24. The crystal with a metal deficiency defect is

a) NaCl b) FeO c) ZnO d) KCl

25. A two dimensional solid pattern formed by two different atoms X and Y is shown below. The black and white squares represent atoms X and Y respectively. the simplest formula for the compound based on the unit cell from the pattern is



a) XY_8 b) X_4Y_9 c) XY_2 d) XY_4

UNIT 7: CHEMICAL KINETICS

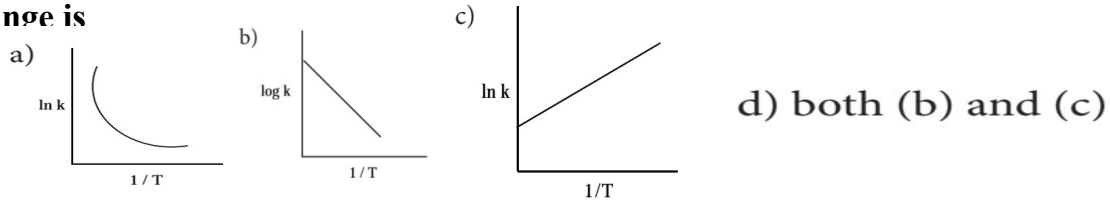
1. For a first order reaction A → B the rate constant is $x\ min^{-1}$. If the initial concentration of A is 0.01M , the concentration of A after one hour is given by the expression.

a) $0.01\ e^{-x}$ b) $1 \times 10^{-2}\ (1-e^{-60x})$ (c) $(1 \times 10^{-2})\ e^{-60x}$ d) none of these

2. A zero order reaction X →Product , with an initial concentration 0.02M has a half life of 10 min. if one starts with concentration 0.04M, then the half life is

a) 10 s b) 5 min c) 20 min d) cannot be predicted using the given information

3. Among the following graphs showing variation of rate constant with temperature (T) for a reaction, the one that exhibits Arrhenius behavior over the entire temperature range is



d) both (b) and (c)

4. For a first order reaction A → product with initial concentration *x* mol L−1 , has a half life period of 2.5 hours . For the same reaction with initial concentration (x/2) mol L^{-1} the half life is

a) (2.5 × 2) hours b) (2.5 / 2) hours c) 2.5 hours

d) Without knowing the rate constant, t1/2 cannot be determined from the given data

5. For the reaction, $2NH_3 \rightarrow N_2 + 3H_2$

, if $\frac{-d[NH_3]}{dt} = k_1[NH_3]$,

$\frac{d[N_2]}{dt} = k_2[NH_3]$, $\frac{d[H_2]}{dt} = k_3[NH_3]$

then the relation between k1, k2 and k3 is

a) $k_1 = k_2 = k_3$ b) $k_1 = 3k_2 = 2k_3$ c) $1.5\ k_1 = 3\ k_2 = k_3$ d) $2\ k_1 = k_2 = 3\ k_3$

6. The decomposition of Phosphine (PH_3) on tungsten at low pressure is a first order reaction. It is because the

a) rate is proportional to the surface coverage

b) rate is inversely proportional to the surface coverage

c) rate is independent of the surface coverage

d) rate of decomposition is slow

7. For a reaction Rate = k[acetone]3/2 acetone then unit of rate constant and rate of reaction respectively is

a) $(mol\ L^{-1}s^{-1})$, $(mol^{-1/2}\ L^{1/2}\ s^{-1})$ b) $(mol^{-1/2}\ L^{1/2}\ s^{-1})$, $(mol\ L^{-1}\ s^{-1})$

c) $(mol^{1/2}\ L^{1/2}\ s^{-1})$, $(mol\ L^{-1}\ s^{-1})$ d) $(mol\ L\ s^{-1})$, $(mol^{1/2}\ L^{1/2}\ s^{-1})$

8. The addition of a catalyst during a chemical reaction alters which of the following quantities? a) Enthalpy b)Activation energy c) Entropy d) Internal energy

9. Consider the following statements :

(i) increase in concentration of the reactant increases the rate of a zero order reaction.

(ii) rate constant k is equal to collision frequency A if Ea = 0

(iii) rate constant k is equal to collision frequency A if Ea = ∞

(iv) a plot of ln(k) vs T is a straight line

(v) a plot of ln (k) vs 1/T is a straight line with a positive slope.

Correct statements are a) (ii) only b) (ii) and (iv) c) (ii) and (v) d) (i), (ii) and (v)

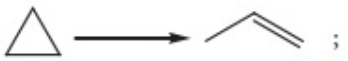
10. In a reversible reaction, the enthalpy change and the activation energy in the forward direction are respectively $-x$ kJ mol−1 and y kJ mol−1 . Therefore , the energy of activation in the backward direction is

a) ($y-x$) kJ mol^{-1} b) ($x+y$)J mol^{-1} c) ($x-y$) kJ mol^{-1} d) ($x+y$) × 103 J mol^{-1}

11. What is the activation energy for a reaction if its rate doubles when the temperature is raised from 200K to 400K? (R = 8.314 JK-1mol-1)

a) 234.65 kJ $mol^{-1}K^{-1}$ b) 434.65 kJ $mol^{-1}K^{-1}$

c) 434.65 J $mol^{-1}K^{-1}$ d) 334.65 J $mol^{-1}K^{-1}$

12.  **This reaction follows first order kinetics. The rate constant at particular temperature is 2.303 × 10−2 hour−1 . The initial concentration of cyclopropane is 0.25M. What will be the concentration of cyclopropane after 1806 minutes? (log 2 = 0.3010)**

a) 0.125M b) 0.215M c) 0.25 × 2.303M d) 0.05M

13. For a first order reaction, the rate constant is 6.909 min-1.the time taken for 75% conversion in minutes is

a) $\left(\frac{3}{2}\right)\log 2$ b) $\left(\frac{2}{3}\right)\log 2$ c) $\left(\frac{3}{2}\right)\log\left(\frac{3}{4}\right)$ d) $\left(\frac{2}{3}\right)\log\left(\frac{4}{3}\right)$

14. In a first order reaction $x \rightarrow y$; if k is the rate constant and the initial concentration of the reactant x is 0.1M, then, the half life is

a) $\left(\frac{\log 2}{k}\right)$ b) $\left(\frac{0.693}{(0.1)\,k}\right)$ c) $\left(\frac{\ln 2}{k}\right)$ d) none of these

15. Predict the rate law of the following reaction based on the data given below

$2A + B \rightarrow C + 3D$

Reaction number	[A] (min)	[B] (min)	Initial rate ($M\ s^{-1}$)
1	0.1	0.1	x
2	0.2	0.1	$2x$
3	0.1	0.2	$4x$
4	0.2	0.2	$8x$

a) rate = k $[A]^2$ [B] b) rate = k [A]$[B]^2$ c) rate = k [A][B] d) rate = k $[A]^{1/2}$ $[B]^{3/2}$

16. Assertion: rate of reaction doubles when the concentration of the reactant is doubles if it is a first order reaction.

Reason: rate constant also doubles

a) Both assertion and reason are true and reason is the correct explanation of assertion.

b) Both assertion and reason are true but reason is not the correct explanation of assertion.

c) Assertion is true but reason is false. d) Both assertion and reason are false.

17. The rate constant of a reaction is $5.8 \times 10^{-2}\ s^{-1}$.The order of the reaction is

a) First order b) zero order c) Second order d) Third order

18. For the reaction $N2O5(g) \rightarrow 2NO_2(g) + \frac{1}{2} O_2(g)$, the value of rate of disappearance of N_2O_5 is given as 6.5×10^{-2} mol $L^{-1}\ s^{-1}$. The rate of formation of NO_2 and O_2 is given respectively as

a) (3.25×10^{-2} mol $L^{-1}s^{-1}$) and (1.3×10^{-2} mol $L^{-1}s^{-1}$)

b) (1.3×10^{-2} mol $L^{-1}s^{-1}$) and (3.25×10^{-2} mol $L^{-1}s^{-1}$)
c) (1.3×10^{-1} mol $L^{-1}s^{-1}$) and (3.25×10^{-2} mol $L^{-1}s^{-1}$)
d) None of these

19. During the decomposition of H_2O_2 to give dioxygen, 48 g O_2 is formed per minute at certain point of time. The rate of formation of water at this point is

a) 0.75 mol min^{-1} b) 1.5 mol min^{-1} c) 2.25 mol min^{-1} d) 3.0 mol min^{-1}

20. If the initial concentration of the reactant is doubled, the time for half reaction is also doubled. Then the order of the reaction is

a) Zero b) one c) Fraction d) none

21. In a homogeneous reaction A →B + C + D , the initial pressure was P0 and after time t it was P. expression for rate constant in terms of P0, P and t will be

a) $k = \left(\frac{2.303}{t}\right)\log\left(\frac{2P_0}{2P_0 - P}\right)$ b) $k = \left(\frac{2.303}{t}\right)\log\left(\frac{2P_0}{P_0 - P}\right)$

c) $k = \left(\frac{2.303}{t}\right)\log\left(\frac{3P_0 - P}{2P_0}\right)$ d) $k = \left(\frac{2.303}{t}\right)\log\left(\frac{2P_0}{3P_0 - 2P}\right)$

22. If 75% of a first order reaction was completed in 60 minutes , 50% of the same reaction under the same conditions would be completed in

a) 20 minutes b) 30 minutes c) 35 minutes d) 75 minutes

23. The half life period of a radioactive element is 140 days. After 560 days, 1 g of element will be reduced to

a) (1/2)g b) (1/4)g c) (1/8)g d) (1/16)g

24. The correct difference between first and second order reactions is that

a) A first order reaction can be catalysed; a second order reaction cannot be catalysed.
b) The half life of a first order reaction does not depend on [A0]; the half life of a second order reaction does depend on [A_0].
c) The rate of a first order reaction does not depend on reactant concentrations; the rate of a second order reaction does depend on reactant concentrations.
d) The rate of a first order reaction does depend on reactant concentrations; the rate of a second order reaction does not depend on reactant concentrations.

25. After 2 hours, a radioactive substance becomes (1/16)th of original amount. Then the half life (in min) is

a) 60 minutes b) 120 minutes c) 30 minutes d) 15 minutes

VOLUME - II

UNIT 8 : IONIC EQUILIBRIUM

1. Concentration of the Ag^+ ions in a saturated solution of $Ag_2C_2O_4$ is 2.24×10^4 mol L^{-1} solubility product of $Ag_2C_2O_4$ is ……

(a) 2.42×10^{-8} mol^3 L^{-3} (b) 2.66×10^{-12} 12 mol^3 L^{-3}
(c) 45×10^{-11} mol^3 L^{-3} (d) 5.619×10^{-12} mol^3 L^{-3}

2. Following solutions were prepared by mixing different volumes of NaOH of HCl different concentrations.

i. 60 mL $\frac{M}{10}$ HCl + 40mL $\frac{M}{10}$ NaOH ii. 55 mL $\frac{M}{10}$ HCl + 45 mL $\frac{M}{10}$ NaOH

iii. 75 mL $\frac{M}{5}$ HCl + 25mL $\frac{M}{5}$ NaOH iv. 100 mL $\frac{M}{10}$ HCl + 100 mL $\frac{M}{10}$ NaOH

pH of which one of them will be equal to 1? (a) (iv) (b) (i) (c) (ii) (d) (iii)

3. The solubility of $BaSO_4$ in water is 2.42×10^{-3} gL^{-1} at 298K. The value of its solubility product (K_{sp}) will be ____ (Given molar mass of $BaSO_4$ = 233g mol^{-1})

(a) 1.08×10^{-14} mol^2L^2 (b) 1.08×10^{-12} mol^2L^2

(c) 1.08×10^{-10} mol^2 L^2 (d) 1.08×10^{-8} mol^2L^{-2}

4. pH of a saturated solution of $Ca(OH)_2$ is 9. The Solubility product (K_{sp}) of $Ca(OH)_2$

(a) 0.5×10^{-15} (b) 0.25×10^{-10} (c) 0.125×10^{-15} (d) 0.5×10^{-10}

5. Conjugate base for bronsted acids H_2O and HF are ……

(a) OH^- and H_2FH^+, respectively (b) H_3O^+ and F^-, respectively

(c) OH^- and F^-, respectively (d) H_3O^+ and H_2F^+, respectively

6. Which will make basic buffer?

(a) 50 mL of 0.1M NaOH + 25mL of 01M CH_3COOH

(b) 100 mL of 0.1M CH_3COOH + 100 mL of 0.1M NH_4OH

(c) 100 mL of 0.1M HCI + 200 mL of 0.1M NH_4OH

(d) 100 mL of 0.1M HCI + 100 mL of O.1 M NaOH

7. Which of the following fluro – compounds is most likely to behave as a Lewis base?

(a) BF_3 (b) PF_3 (c) CF_4 (d) SiF_4

8. Which of these is not likely to act as lewis base?

(a) BF_3 (b) PF_3 (c) CO (d) F^-

9. The aqueous solutions of sodium formate, anilinium chloride and potassium cyanide are respectively (a) acidic, acidic, basic (b) basic, acidic, basic

(c) basic, neutral, basic (d) none of these

10. The percentage of pyridine (C_5H_5N) that forms pyridinium ion (C_5H_5NH) in a 0.10 M aqueous pyridine solution (Kb for $C_5H_5N = 1.7 \times 10^{-9}$) iS ……

(a) 0.006% (b) 0.013% (c) 0.77% (d) 1.6%

11. Equal volumes of three acid solutions of pH 1, 2 and 3 are mixed in a vessel. What will be the H^+ ion concentration in the mixture?

(a) 37×10^{-2} (b) 10^{-6} (c) 0.111 (d) none of these

12. The solubility of AgCl (s) with solubility product 1.6×10^{-10} in 0. 1 M NaCl solution would be …(a) 1.26×10^{-5} M (b) 1.6×10^{-9} M (c) 1.6×10^{-11} M (d) Zero

13. If the solubility product of lead iodide is 3.2×10^{-8}, its solubility will be ……

(a) 2×10^{-3}M (b) 4×10^{-4} M (c) 1.6×10^{-5} M (d) 1.8×10^{-5} M

14. Using Gibb's free energy change, $\Delta G^0 = 57.34$ KJ mol^{-1}, for the reaction, $X_2Y_{(s)} \rightleftharpoons 2X^+ + Y^2{}_{-(aq)}$, calculate the solubility product of X_2Y in water at 300K (R = 8.3 J K^{-1} Mol^{-1})

(a) 10^{-10} (b) 10^{-12} (c) 10^{-14} (d) can not be calculated from the given data

15. MY and NY_3, are insoluble salts and have the same K_{sp} values of 6.2×10^{-13} at room temperature. Which statement would be true with regard to MY and NY_3?

(a) The salts MY and NY_3 are more soluble in O.5 M KY than in pure water

(b) The addition of the salt of KY to the suspension of MY and NY_3 will have no effect on

(c) The molar solubities of MY and NY_3 in water are identical

(d) The molar solubility of MY in water is less than that of NY_3

16. What is the pH of the resulting solution when equal volumes of 0.1M NaOH and 0.01M HCl are mixed? (a) 2.0 (b) 3 (c) 7.0 (d) 12.65

17. The dissociation constant of a weak acid is 1×10^{-3} . In order to prepare a buffer solution with a pH =4, the [Acid] / [Salt] ratio should be ……

(a) 4:3 (b) 3:4 (c) 10:1 (d) 1:10

18. The pH of 10^{-5} M KOH solution will be ……

(a) 9 (b) 5 (c) 19 (d) none of these

19. $H_2PO_4^-$ the conjugate base of ……

(a) PO_4^{3-} (b) P_2O_5 (c) H_3PO_4 (d) HPO_4^{2-}

20. Which of the following can act as lowery – Bronsted acid well as base?

(a) HCl (b) SO_4^{2-} (c) HPO_4^{2-} (d) Br^-

21. The pH of an aqueous solution is Zero. The solution is ……

(a) slightly acidic (b) strongly acidic (c) neutral (d) basic

22. The hydrogen ion concentration of a buffer solution consisting of a weak acid and its salts is given by …

a) $[H^+]=\frac{K_a[acid]}{[salt]}$ b) $[H^+]= K_a[salt]$ c) $[H^+]=K_a[acid]$ d) $[H^+]=\frac{K_a[salt]}{[acid]}$

23. Which of the following relation is correct for degree of hydrolysis of ammonium acetate?

a) $h = \sqrt{\frac{K_h}{C}}$ b) $h = \sqrt{\frac{K_a}{K_b}}$ c) $h = \sqrt{\frac{K_w}{K_a.K_b}}$ d) $h = \sqrt{\frac{K_a.K_b}{K_w}}$

24. Dissociation constant of NH_4OH is 1.8×10^{-5} the hydrolysis constant of NH_4Cl would be ……

(a) 1.8×10^{-19} (b) 5.55×10^{-10} (c) 5.55×10^{-5} (d) 1.80×10^{-5}

UNIT 9: ELECTRIC CHEMISTRY

1. The number of electrons that have a total charge of 9650 coulombs is ……..

(a) 6.22×10^{23} (b) 6.022×10^{24} (c) 6.022×10^{22} (d) 6.022×10^{-34}

2. Consider the following half cell reactions:

$Mn^{2+} + 2e^- \rightarrow Mn$ $E° = -1.18V$ $Mn^{2+} \rightarrow Mn^{3+} + e^-$ $E = -1.51V$

The E for the reaction $3Mn^{2+} \rightarrow Mn+2Mn^{3+}$, and the possibility of the forward reaction are respectively.

(a) 2.69V and spontaneous (b) – 2.69 and non spontaneous

(c) 0.33V and Spontaneous (d) 4.18V and non spontaneous

3. The button cell used in watches function as follows

$Zn_{(s)} + Ag_2O_{(s)} + H_2O_{(1)} \rightleftharpoons 2Ag_{(s)} + Zn^{2+}{}_{(aq)} + 2OH^-{}_{(aq)}$ the half cell potentials are

$Ag_2O_{(s)} + H_2O_{(1)} + 2e^- \rightarrow 2Ag_{(S)} + 2OH^-{}_{(aq)}$ $E° = 034V$. The cell potential will be

(a) 0.84V (b) 1.34V (c) 1.10V (d) 0.42V

4. The molar conductivity of a 0.5 mol dm^{-3} solution of $AgNO_3$ with electrolytic conductivity of 5.76×10^{-3} S cm^{-1} at 298 K is ……

(a) 2.88 S cm^2 $mo1^{-1}$ (b) 11.52 S cm^2 mol^{-1} (c) 0.086 S cm^2 mol^{-1} (d) 28.8 S cm^2 mol^{-1}

5.

Electrolyte	KCl	KNO_3	HCl	NaOAC	NaCl
Λ_- (S cm^2 mol^{-1})	149.9	145.0	426.2	91.0	126.5

Calculate $A"_{HOAC}$ using appropriate molar conductances of the electrolytes listed above at infinite dilution in water at 25°C.

(a) 517.2 (b) 552.7 (c) 390.7 (d) 217.5

6. Faradays constant is defined as
   (a) charge carried by I electron
   (b) charge carried by one mole of electrons
   (c) charge required to deposit one mole of substance
   (d) charge carried by 6.22×10^{10} electrons

7. How many faradays of electricity are required for the following reaction to occur $MnO^-_4 \rightarrow Mn^{2+}$ (a) 5F (b) 3F (C) IF (d) 7F

8. A current strength of 3.86 A was passed through molten Calcium oxide for 41 minutes and 40 seconds. The mass of Calcium in grams deposited at the cathode is (atomic mass of Ca is 40g / mol and IF = 96500C).
   (a) 4 (b) 2 (c) 8 (d) 6

9. During electrolysis of molten sodium chloride, the time required to produce 0.1 mol of chlorine gas using a current of 3A is ……..
   (a) 55 minutes (b) 107.2 minutes (c) 220 minutes (d) 330 minutes

10. The number of electrons delivered at the cathode during electrolysis by a current of 1 A in 60 seconds is (charge of electron = 1.6×10^{-19}C)
   (a) 6.22×10^{23} (b) 6.022×10^{20} (c) 3.75×10^{20} (d) 7.48×10^{23}

11. Which of the following electrolytic solution has the least specific conductance?
   (a) 2N (b) 0.002N (c) 0.02N (d) 0.2N

12. While charging lead storage battery
   (a) $PbSO_4$ on cathode is reduced to Pb (b) $PbSO_4$ on anode is oxidised to PbO_4
   (c) $PbSO_4$ on anode is reduced to Pb(d) $PbSO_4$ on cathode is oxidised to Pb

13. Among the following cells
   I. Leclanche cell
   II. Nickel – Cadmium cell
   III. Lead storage battery
   IV. Mercury cell

Primary cells are ……
   (a) I and IV (b) I and III (c) III and IV (d) II and III

14. Zinc can be coated on iron to produce galvanized iron but the reverse is not possible. It is because
   (a) Zinc is lighter than iron (b) Zinc has lower melting point than iron
(c) Zinc has lower negative electrode potential than iron
(d) Zinc has higher negative electrode potential than iron

15. Assertion: pure iron when heated in dry air is converted with a layer Of rust.
Reason: Rust has the composition Fe_3O_4
   (a) If both assertion and reason are true and reason is the correct explanation of assertion.
   (b) If both assertion and reason are true but reason is not the correct explanation of assertion.
   (c) assertion is true but reason is false
   (d) both assertion and reason are false.

16. In $H_2 – O_2$ fuel cell the reaction occur at cathode is …….
   (a) $O_2(g) + 2H_2O\ (l) + 4e^- \rightarrow 4OH^-(aq)$ (b) $H^+(aq) + OH^-(aq) \rightarrow H_2O\ (l)$
   (c) $2H_2(g) + O_2(g) \rightarrow 2H_2O\ (g)$ (d) $H^+ + e^- \rightarrow 1/2\ H_2$

17. The equivalent conductance of M/36 solution of a weak monobasic acid is 6mho cm^2 and at infinite dilution is 400 mho cm^2. The dissociation constant of this acid is

(a) 1.25×10^{-16} (b) 6.25×10^{-6} (c) 1.25×10^{-4} (d) 6.25×10^{-5}

18. A conductivity cell has been calibrated with a 0.01M, 1:1 electrolytic solution (specific conductance ($K = 1.25 \times 10^{-3}$ S cm^{-1}) in the cell and the measured resistance was 800Ω at 25^0 C . The cell constant is,

(a) 10^{-1} cm^{-1} (b) 10^{-1} cm^{-1} (c) 1 cm^{-1} (d) 5.7×10^{-12}

19. Conductivity of a saturated solution of a sparingly soluble salt AB (1:1 electrolyte) at 298K is 1.85×10^{-5} S m^{-1}. Solubility product of the saltAB at 298K $(\Lambda^0_m)_{AB} = 14 \times 10^{-3}$ S m^2 mol^{-1}.

(a) 5.7×10^{-2} (b) 1.32×10^{12} (c) 7.5×10^{-12} (d) 1.74×10^{-12}

20. In the electrochemical cell: $Zn|ZnSO_4$ (0.01M)$||CuSO_4$ (1.0M)$|Cu$, the emf of this Daniel cell is E_1. When the concentration of $ZnSO_4$ is changed to 1.0 M and that $CuSO_4$ changed to 0.0 1M, the emf changes to E_2. From the followings, which one is the relationship between E_1 and E_2?

(a) $E_1 < E_2$ (b) $E_1 > E_2$ (c) $E_2 = 0 \uparrow E_1$ (d) $E_1 = E_2$

21. Consider the change in oxidation state of Bromine corresponding to different emf values as shown in the diagram below:

$$BrO_4^- \xrightarrow{1.82\,V} BrO_3^- \xrightarrow{1.5\,V} HBrO \xrightarrow{1.595\,V} Br_2 \xrightarrow{1.0652\,V} Br^-$$

Then the species undergoing disproportional is ……

(a) Br_2 (b) BrO_4^- (c) BrO_3^- (d) HBrO

22. For the cell reaction

$2Fe^{3+}(aq) + {}^{2I}(aq) \rightarrow 2Fe^{2+}(aq) + I_2(aq)$ $EC^0_{cell} = 0.24V$ at 298K.

The standard Gibbs energy (ΔG^0) of the cell reactions is ……

(a) – 46.32 KJ mol^{-1} (b) – 23.16 KJ mol^{-1} (c) 46.32 KJ mol^{-1} (d) 23.16 KJ mor^{-1}

23. A certain current liberated 0.504gm of hydrogen in 2 hours. How many grams of copper can be liberated by the same current flowing for the same time in a copper sulphate solution?

(a) 31.75 (b) 15.8 (c) 7.5 (d) 63.5

24. A gas X at 1 atm is bubble through a solution containing a mixture of $1MY^-$ and $1MZ^{-1}$ at 25°C . If the reduction potential of Z > Y> X, then

(a) Y will oxidize X and not Z

(b) Y will oxidize Z and not X

(c) Y will oxidize both X and Z

(d) Y will reduce both X and Z

25. Cell equation: $A^{2+} + 2B^- \rightarrow A^{2+} + 2B$ $A^{2+} + 2e^- \rightarrow A$ E° = + 0.34V and $\log_{10} K = 15.6$ at 300K for cell reactions find E° for $B^1 + e^- \rightarrow B$

(a) 0.80 (b) 1.26 (c) – 0.54 (d) – 10.94

UNIT 10: SURFACE CHEMISTRY

1. For Freundlich isotherm a graph of log (*x*/m) is plotted against log p. The slope of the line and its y – axis intercept respectively corresponds to

a) 1/n , k b) log 1/n , k c) 1/n , log k d) log 1/n , log k

2. Which of the following is incorrect for physisorption?

a) reversible b) increases with increase in temperature

c) low heat of adsorption d) increases with increase in surface area

3. Which one of the following characteristics are associated with adsorption?
a) ΔG and ΔH are negative but ΔS is positive
b) ΔG and ΔS are negative but ΔH is positive
c) ΔG is negative but ΔH and ΔS are positive
d) ΔG, ΔH and ΔS all are negative.
4. Fog is colloidal solution of
a) solid in gas b) gas in gas c) liquid in gas d) gas in liquid
5. Assertion : Coagulation power of Al3+ is more than Na+ .
Reason : greater the valency of the flocculating ion added, greater is its power to cause precipitation
a) if both assertion and reason are true and reason is the correct explanation of assertion.
b) if both assertion and reason are true but reason is not the correct explanation of assertion.
c) assertion is true but reason is false
d) both assertion and reason are false.
6. Statement : To stop bleeding from an injury, ferric chloride can be applied. Which comment about the statement is justified?
a) It is not true, ferric chloride is a poison.
b) It is true, Fe^{3+} ions coagulate blood which is a negatively charged sol
c) It is not true; ferric chloride is ionic and gets into the blood stream.
d) It is true, coagulation takes place because of formation of negatively charged sol with Cl-.
7. Hair cream is
a) gel b) emulsion c) solid sol d) sol.
8. Which one of the following is correctly matched?
a) Emulsion – Smoke b) Gel – butter c) foam – Mist d) whipped cream – sol
9. The most effective electrolyte for the coagulation of As_2S_3 Soils
(a) NaCl (b) $Ba(NO_3)_2$ (c) $K_3[Fe(CN)_6]$ (d) $AI_2(SO_4)_3$
10. Which one of the is not a surfactant?
(a) $CH_3 – (CH_2)_{15} – N – (CH_3)_2CH_2Br$ (b) $CH_3 – (CH_2)_{15} – NH_2$
(c) $CH_3 – (CH_2)_{16} – CH_2OSO_2 – Na^+$ (d) $OHC – (CH_2)_{14} – CH_2 – COO^-Na^+$
11. The phenomenon observed when a beam of light is passed through a colloidal solution is
a) Cataphoresis b) Electrophoresis c) Coagulation d) Tyndall effect
12. In an electrical field, the particles of a colloidal system move towards cathode. The coagulation of the same sol is studied using K_2SO_4 (i), Na_3PO_4 (ii),K_4 $[Fe(CN)_6]$ (iii) and NaCl (iv) Their coagulating power should be
a) II > I>IV > III b) III > II > I > IV c) I > II > III > IVd) none of these
13. Collodion is a 4% solution of which one of the following compounds in alcohol – ether mixture?
a) Nitroglycerine b) Cellulose acetate c) Glycoldinitrate d) Nitrocellulose
14. Which one of the following is an example for homogeneous catalysis?
a) manufacture of ammonia by Haber's process
b) manufacture of sulphuric acid by contact process
c) hydrogenation of oil
d) Hydrolysis of sucrose in presence of dil HCl

15. Match the following

A) V_2O5 i) High density polyethylene
B) Ziegler – Natta ii) PAN
C) Peroxide iii) NH_3
D) Finely divided Fe iv) H_2SO_4

A B C D
a) (iv) (i) (ii) (iii)
b) (i) (ii) (iv) (iii)
c) (ii) (iii) (iv) (i)
d) (iii) (iv) (ii) (i)

16. The coagulation values in millimoles per litre of the electrolytes used for the coagulation of As_2S_3 are given below (I) (NaCl)=52 (II) ($BaCl_2$)=0.69 (III) ($MgSO_4$)=0.22 The correct order of their coagulating power is

a) III > II > I b) I > II > III c) I > III > II d) II > III>I

17. Adsorption of a gas on solid metal surface is spontaneous and exothermic, then

a) ΔH increases b) ΔS increases c) ΔG increases d) ΔS decreases

18. If x is the amount of adsorbate and m is the amount of adsorbent, which of the following relations is not related to adsorption process?

a) *x*/m = f(P) at constant T b) *x*/m = f(T) at constant P
c) P = f(T) at constant x/m d) x/m = PT

19. On which of the following properties does the coagulating power of an ion depend ?

a) Both magnitude and sign of the charge on the ion.
b) Size of the ion alone
c) the magnitude of the charge on the ion alone
d) the sign of charge on the ion alone.

20. Match the following

A) Pure nitrogen i) Chlorine
B) Haber process ii) Sulphuric acid
C) Contact process iii) Ammonia
D) Deacons Process iv) sodium azide (or) Barium azide

Which of the following is the correct option?

A B C D A B C D A B C D A B C D
a) (i) (ii) (iii) (iv) b) (ii) (iv) (i) (iii) c) (iii) (iv) (ii) (i) d) (iv) (iii) (ii) (i)

UNIT 11: HYDROXY COMPOUNDS AND ETHERS

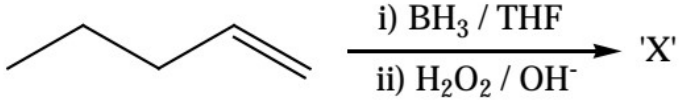
1. An alcohol (x) gives blue colour in victormayer's test and 3.7g of X when treated with metallic sodium liberates 560 mL of hydrogen at 273 K and 1 atm pressure what will be the possible structure of X?

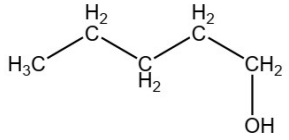
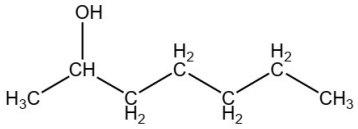
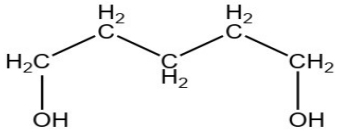
(a) $CH_3CH(OH)CH_2CH_3$ (b) $CH_3 – CH(OH) – CH_3$
(c) $CH_3 – C(OH)(CH_3)_2$ (d) $CH_3 – CH_2 – CH(OH) – CH_2 – CH_3$

2. Which of the following compounds on reaction with methyl magnesium bromide will give tertiary alcohol.

(a) benzaldehyde (b) propanoic acid (c) methyl propanoate (d) acetaldehyde

3.



a)  b)  c) 

d) none of these

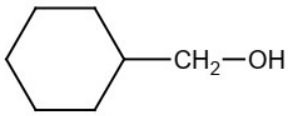
4. In the reaction sequence, Ethene $\xrightarrow{HOCl}$ A $\xrightarrow{X}$ ethan -1, 2 - diol . A and X respectively are

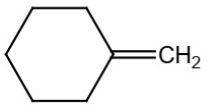
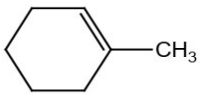
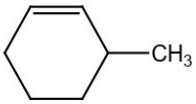
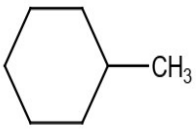
(a) Chloroethane and NaOH **(b) ethanol and H_2SO_4**

(c) 2 – chloroethan – 1 – ol and $NaHCO_3$ **(d) ethanol and H_2O**

5. Which one of the following is the strongest acid

a) 2 – nitropheno (b) 4 – chlorophenol (c) 4 – nitrophenol (d) 3 – nitrophenol

6.  **on treatment with Con. H_2SO_4, predominately gives ……**

a)  b)  c)  d) 

7. Carbolic acid is …

(a) Phenol (b) Picric acid (c) benzoic acid (d) phenylacetic acid

8. Which one of the following will react with phenol to give salicyladehyde after hydrolysis …

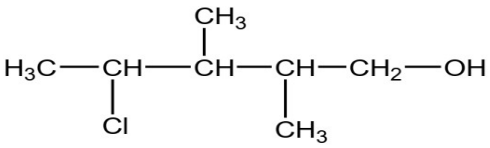
(a) Dichioro methane (b) trichioroethane (c) trichloro methane (d) CO_2

9. $(CH_3)_3 - C - CH(OH)\,CH_3 \xrightarrow{Con\ H_2SO_4} X$ (major product)

(a) $(CH_3)_3$ CCH = CH_2 **(b) $(CH_3)_2$ C = C $(CH_3)_2$**

(c) CH_2 = C$(CH_3)CH_2 – CH_2 – CH_3$ **(d) CH_2 = C $(CH_3) – CH_2 – CH_2 – CH_3$**

10. The correct IUPAC name of the compound,



(a) 4 – chloro – 2, 3 – dimethyl pentan – 1 – ol

(b) 2, 3 – dimethyl – 4 – chloropentan – 1 – ol

(c) 2, 3, 4 – trimethyl – 4 – chiorobutan – 1 – ol

(d) 4 – chioro – 2, 3, 4 – trimethyl pentan – 1 – ol

11. Assertion: Phenol is more acidic than ethanol

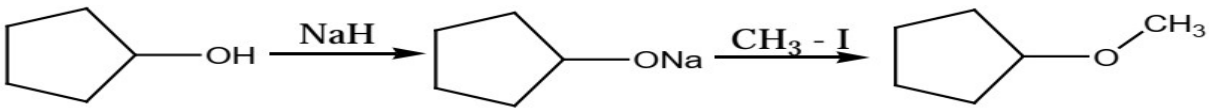
Reason: Phenoxide ion is resonance stabilized

(a) if both assertion and reason are true and reason is the correct explanation of assertion.

(b) if both assertion and reason are true but reason is not the correct explanation of assertion.

(c) assertion is true but reason is false (d) both assertion and reason are false.

12. The reaction



(a) ethane (b) ethoxyethane (c) ethylbisuiphite (d) ethanol

13. In the reaction Ethanol $\xrightarrow{PCl_5}$ X $\xrightarrow{alc.KOH}$ Y $\xrightarrow[298K]{H_2SO_4/H_2O}$ Z. The 'Z' is classified as

(a) dehydration **(b) Williams on alcohol synthesis**
(c) Williamson ether synthesis **(d) dehydrogenation of alcohol**

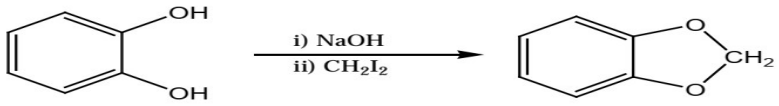
14. Isoprophylbcnzene on air oxidation in the presence of dilute acid gives ……
(a) C_6H_5COOH (b) $C_6H_5COCH_3$ (c) $C_6H_5COC_6H_5$ (d) $C_6H_5 – OH$

15. Assertion: Phenol is more reactive than benzene towards electrophilic substitution reaction
Reason: In the case of phenol. the intermediate arenium ion is more stabilized by resonance.
(a) if both assertion and reason are true and reason is the correct explanation of assertion.
(b) if both assertion and reason are true but reason is not the correct explanation of assertion.
(c) assertion is true but reason is false
(d) both assertion and reason are false,.

16. HO CH_2 CH_2 – OH on heating with periodic acid gives ……
(a) methanoic acid (b) Glyoxal (c) methanol (d) CO_2

17. Which of the following compound can be used as artireeze in automobile radiators?
(a) methanol (b) ethanol (c) Neopentyl alcohol (d) ethan -1, 2-diol

18.
The reactions



is an example of

(a) Wurtz reaction (b) cyclic reaction (c) Williamson reaction (d) Kolbe reactions

19. One mole of an organic compound (A) with the formula C_3H_8O reacts completely with two moles of HI to form X and Y. When Y is boiled with aqueous alkali it forms Z. Z answers the iodoform test. The compound (A) is ……
(a) propan – 2 – ol (b) propan- 1- ol (c) ethoxy ethane (d) methoxy ethane

20. Among the following ethers which one will produce methyl alcohol on treatment with hot HI?

a) $(H_3C)_3C—O—CH_3$

b) $(CH_3)_2—CH—CH_2—O—CH_3$

c) $CH_3(CH_2)_3—O—CH_3$

d) $CH_3—CH_2—\underset{\displaystyle CH_3}{\underset{|}{CH}}—O—CH_3$

21. Williamson synthesis of preparing dimethyl ether is a / an
(a) SN^1 reactions ` (b) SN^2 reaction
(c) electrophilic addition (d) electrophilic substitution

22. On reacting with neutral ferric chloride, phenol gives
(a) red colour (b) violet colour (c) dark green colour (d) no colouration

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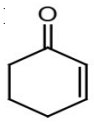
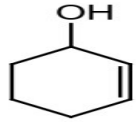
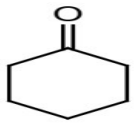
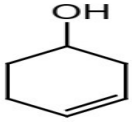
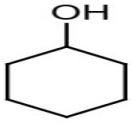
UNIT 12: CARBONYL COMPOUNDS AND CARBOXYLIC ACIDS

1. The correct structure of the product 'A' formed in the



$\xrightarrow[\text{Pd / C, ethanol}]{H_2 \text{ (gas, 1 atm)}}$ **A is**

a)  **b)**  **c)**  **d)** 

2. The formation of cyanohydrin from acetone is an example of

a) nucleophilic substitution **b) electrophilic substitution**
c) electrophilic addition **d) Nucleophilic addition**

3. Reaction of acetone with one of the following reagents involves nucleophilic addition followed by elimination of water. The reagent is

a) Grignard reagent **b) Sn / Hcl**
c) hvdrazine in presence of slightly acidic solution **d) hvdrocvanic acid**

4. In the following reaction, $HC{\equiv}CH \xrightarrow[HgSO_4]{H_2SO_4} X$ **Product 'X' will not give**

a) Tollens test **b) Victor meyer test** **c) lodoform test** **d) Fehling solution test**

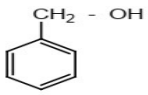
5. $CH_2{=}CH_2 \xrightarrow[ii)\ Zn / H_2O]{i)\ O_3} X \xrightarrow{NH_3} Y$ **'Y' is**

a) formaldehyde **b) di acetone ammonia**
c) hexamethvlene tetraamine **d) oxime**

6. Predict the product Z in the following series of reactions

$$\text{Ethanoic acid} \xrightarrow{PCl_5} X \xrightarrow[\text{AnhydrousAlCl}_3]{C_6H_6} Y \xrightarrow[ii)H_3O^+]{i)CH_3MgBr} Z .$$

a) $(CH_3)_2C(OH)C_6H_5$ b) $CH_3CH(OH)C_6H_5$

c) $CH_3CH(OH)CH_2 - CH_3$ d) 

7. Assertion: 2,2 – dimethyl propanoic acid does not give HVZ reaction.
Reason: 2 – 2, dimethyl propanoic acid does not have a – hydrogen atom
a) if both assertion and reason are true and reason is the correct explanation of assertion.
b) if both assertion and reason are true but reason is not the correct explanation of assertion.
c) assertion is true but reason is false **d) both assertion and reason are false.**

8. Which of the following represents the correct order of acidity in the given compounds

a) $FCH_2COOH > CH_3COOH > BrCH_2COOH > ClCH_2COOH$
b) $FCH_2COOH > ClCH_2COOH > BrCH_2COOH > CH_3COOH$
c) $CH_3COOH > C1CH_2COOH > FCH_2COOH > Br\text{-}CH_2COOH$
d) $ClCH_2COOH > CH3COOH > BrCH_2COOH > ICH_2COOH$

9.

$$\text{Benzoic acid} \xrightarrow[ii)\ \Delta]{i)\ NH_3} A \xrightarrow{NaOBr} B \xrightarrow{NaNO_2/HCl} C$$ **'C' is**

a) anilinium chloride **b) o - nitro aniline**
c) benzene diazonium chloride **d) m – nitro ben.zoic acid**

10. Ethanoic acid $\xrightarrow{P/Br_2}$ 2 – bromoethanoic acid. This reaction is called

a) Finkeistein reaction **b) Haloform reaction**

c) Hell – Volhard – Zelinsky reaction **d) none of these**

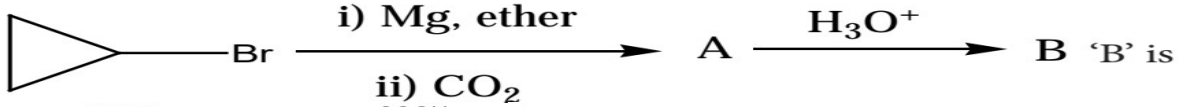
11. $CH_3Br \xrightarrow{KCN} (A) \xrightarrow{H_3O^+} (B) \xrightarrow{PCl_5} (C)$ product (C) is

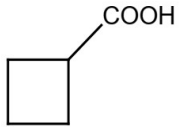
a) acetylchloride **b) chloro acetic acid**

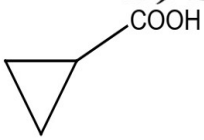
c) α- chlorocyano ethanoic acid **d) none of these**

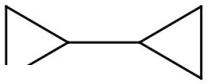
12. Which one of the following reduces Tollens reagent

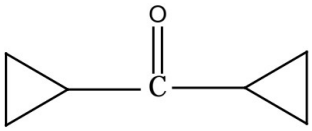
a) formic acid **b) acetic acid** **c) benzophenone** **d) none of these**

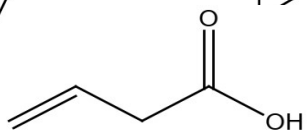
13. 

a) 

b) 

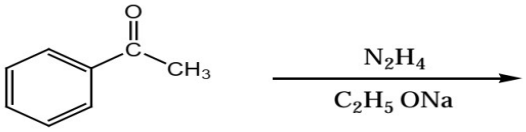
c) 

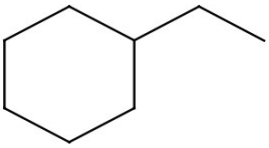
d) 

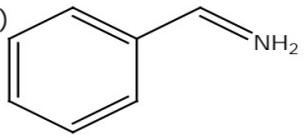
14. The IUPAC name of 

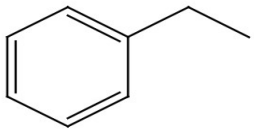
a) but- 3- enoicacid **b) but – 1- ene-4-oic acid**

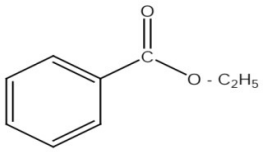
c) but – 2- ene-1-oic acid **d) but -3-ene-1-oicacid**

15. Identify the product formed in the reaction 

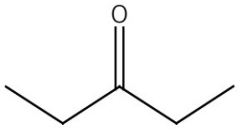
a) 

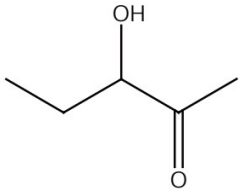
b) 

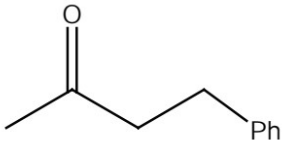
d) 

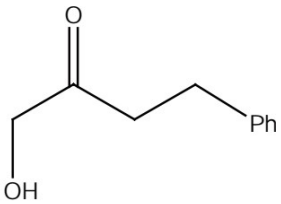
C) 

16. In which case chiral carbon is not generated by reaction with HCN

a) 

b) 

C) 

d) 

17. Assertion : p – N, N – dimethyl aminobenzaldehyde undergoes benzoin condensation

Reason : The aldehydic (-CHO) group is meta directing

a) if both assertion and reason are true and reason is the correct explanation of assertion.

b) if both assertion and reason are true but reason is not the correct explanation of assertion.

c) assertion is true but reason is false **d) both assertion and reason are false.**

18. Which one of the following reaction is an example of disproportionation reaction

a) Aldol condensation **b) cannizaro reaction** **c) Benzoin condensation** **d) none of these**

19. Which one of the following undergoes reaction with 50% sodium hydroxide solution to give the corresponding alcohol and acid

a) Phenylmethanal b) ethanol c) ethanol d) methanol

20. The reagent used to distinguish between acetaldehyde and benzaldehyde is

a) Tollens reagent b) Fehling's solution

c) 2,4 – dinitrophenyl hydrazine d) semicarbazide

21. Phenyl methanal is reacted with concentrated NaOH to give two products X and Y. X reacts with metallic sodium to liberate hydrogen X and Y are

a) sodiumbenzoate and phenol b) Sodium benzoate and phenyl methanol

c) phenyl methanol and sodium benzoate d) none of these

22. In which of the following reactions new carbon – carbon bond is not formed?

a) Aldol condensation b) Friedel craft reaction

c) Kolbe's reaction d) Wolf kishner reduction

23. Alkene "A" on reaction with O_3 and Zn – H_2O gives propanone and ethanal in equimolar ratio. Addition of HCl to alkene "A" gives "B" as the major product. The structure of product "B" is

a) $Cl-CH_2-CH_2-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_3}{\underset{|}{\overset{|}{CH}}}}$

b) $H_3C-CH_2-\underset{\displaystyle CH_3}{\overset{\displaystyle CH_2Cl}{\underset{|}{\overset{|}{CH}}}}$

c) $H_3C-CH_2-\underset{\displaystyle Cl}{\overset{\displaystyle CH_3}{\underset{|}{\overset{|}{C}}}}-CH_3$

d) $H_3C-\underset{\displaystyle Cl}{\overset{\displaystyle CH_3}{\underset{|}{\overset{|}{CH}}}}-CH$

24. Carboxylic acids have higher boiling points than aldehydes, keton alcohols of comparable molecular mass. It is due to their

a) more extensive association of carboxylic acid via van der Waals force of attraction

b) formation of carboxylate ion

c) formation of intramolecular H-bonding

d) formation of intermolecular H – bonding

UNIT 13: ORGANIC NITROGEN COMPOUNDS

1. Which of the following reagent can be used to convert nitrobenzene to aniline

a) Sn/HCl b) ZnHg/NaOH c) $LiAlH_4$ d) All of these

2. The method by which aniline cannot be prepared is

a) degradation of benzamide with Br_2/NaOH

b) potassium salt of phthalimide treated with chlorobenzene followed by hydrolysis with aqueous NaOH solution.

c) Hydrolysis of phenylcyanide with acidic solution.

d) reduction of nitrobenzene by Sn/HCl

3. Which one of the following will not undergo Hofmann bromamide reaction

a) $CH_3CONHCH_3$ b) $CH_3CH_2CONH_2$ c) CH_3CONH_2 d) $C_6H_5CONH_2$

4. Assertion: Acetamide on reaction with KOH and bromine gives acetic acid

Reason: Bromine catalyses hydrolysis of acetamide.

a) if both assertion and reason are true and reason is the correct explanation of assertion

b) if both assertion and reason are true but reason is not the correct explanation of assertion.

c) assertion is true but reason is false

d) both assertion and reason are false

5 $CH_3CH_2Br \xrightarrow[\Delta]{\text{aq NaOH}} A \xrightarrow[\Delta]{KMnO_4/H^+} B \xrightarrow[\Delta]{NH_3} C \xrightarrow{Br_2/NaOH} D$ 'D' is

a) bromomethane b) α -Bromo sodium acetate c) methanamine d) acetamide

6. Which one of the following nitro compounds does not react with nitrous acid?

a) $CH_3\text{-}CH_2\text{-}CH_2\text{-}NO_2$ b) $(CH_3)_2CH\text{-}CH_2NO_2$

c) $(CH_3)_3C\,NO_2$ d) $CH_3-\underset{\underset{O}{\|}}{C}-\underset{\underset{CH_3}{|}}{CH}-NO_2$

7. Aniline + benzoylchloride $\xrightarrow{NaOH}$ C_6H_5 - NH - COC_6H_5 this reaction is known as

a) Friedel – Crafts reaction b) HVZ reaction
c) Schotten – Baumann reaction d) None of these

8. The product formed by the reaction of an aldehyde with a primary amine
a) carboxylic acid b) aromatic acid c) Schiff's base d) ketone

9. Which of the following reaction is not correct?

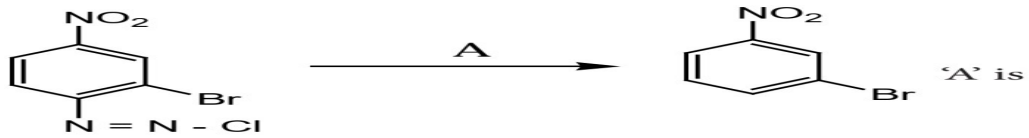
a) $CH_3CH_2NH_2 \xrightarrow{HNO_2} CH_3CH_2OH + N_2$

b) $(CH_3)_2N$-C$_6$H$_5$ $\xrightarrow{NaNO_2 / HCl}$ $(CH_3)_2N$-C$_6$H$_4$-N = NCl

c) $CH_3CONH_2 \xrightarrow{Br_2/NaOH} CH_3NH_2$ d) none of these

10. When aniline reacts with acetic anhydride the product formed is
a) o – amirìoacetophenone b) m – aminoacetophenone
c) p – aminoacetophenone d) acetanilide

11. The order of basic strength for methyl substituted amines in aqueous solution is
a) $N(CH_3)_3 > N(CH_3)_2H > N(CH_3)H_2 > NH_3$ b) $N(CH_3)H_2 > N(CH_3)_2H > N(CH_3)_3 > NH_3$
c) $NH_3 > N(CH_3)H_2 > N(CH_3)_2H > N(CH_3)_3$ d) $N(CH_3)_2H > N(CH_3)H_2 > N(CH_3)_3 > NH_3$

12. 

'A' is

a) H_3PO_2 and H_2O b) H^+/H_2O c) $HgSO_4$ / H_2SO_4 d) Cu_2Cl_2

13. $C_6H_5NO_2 \xrightarrow{Fe / Hcl} A \xrightarrow[273K]{NaNO_2 / HCl} B \xrightarrow[283K]{H_2O} C$ 'C' is

a) C_6H_5-OH b) C_6H_5-CH_2OH c) C_6H_5-CHO d) $C_6H_5NH_2$

14. Nitrobenzene on reaction with Con HNO_3 / H_2SO_4 at 80- 100^oC forms which one of the following products?
a) 1, 4 – dinitrobenzene b) 2, 4, 6 – tirnitrobenzene
c) 1, 2 – dinitrobenzene d) 1, 3 – dinitrobenzene

15. $C_5H_{13}N$ reacts with HNO_2 to give an optically active compound – The compound is
a) pentan-1 –amine b) pentan-2-amine
c) N, N – dimethyipropan -2-amine d) N-methylbutan-2-amine

16. Secondary nitro alkanes react with nitrous acid to form

a) red solution b) blue solution c) green solution d) yellow solution

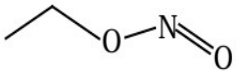
17. Which of the following amines does not undergo acetylation?

a) t-butylamine b) ethylamine c) diethylamine d) triethylamine

18. Which one of the following is most basic?

a) 2, 4 – dichloroaniline b) 2, 4 – dimethylaniline

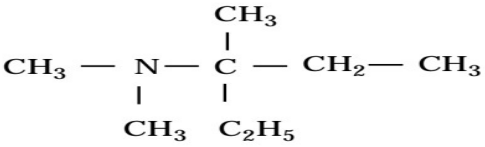
c) 2, 4 – dinitroaniline d) 2, 4 – dibromoaniline

19. When  is reduced with Sn / HCl the pair of compounds formed are

a) Ethanol, hydroxylamine hydrochloride b) Ethanol, ammonium hydroxide

c) Ethanol, NH_2OH d) $C_3H_5NH_2$, H_2O

20. IUPAC name for the amine



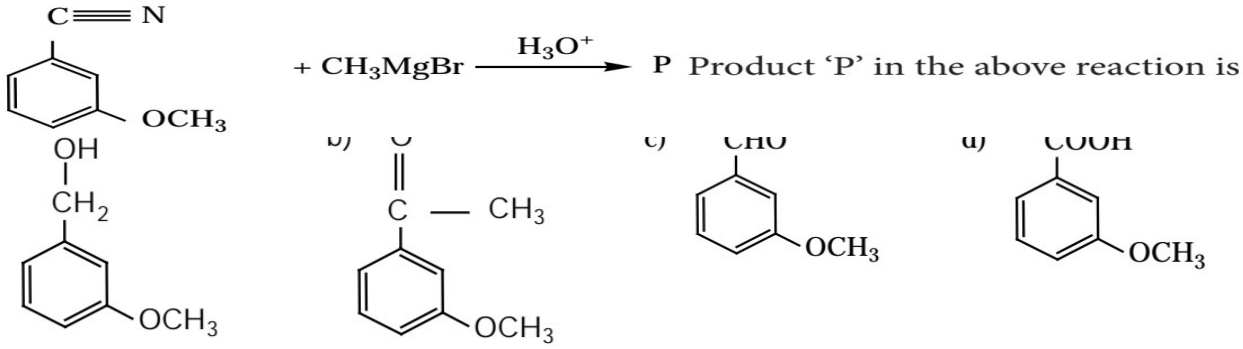
a) 3 – Bimethy lamino – 3 – methyl pentane

b) 3(N,N – Triethyl) – 3 – amino pentane

c) 3-N,N – trimethyl pentanamine

d) 3 – (N,N – Dimethyl amino) – 3- methyl pentane

21.

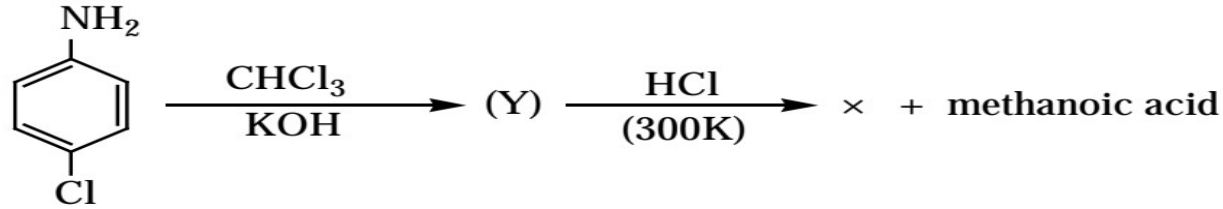


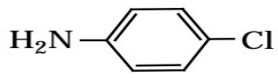
22. Ammonium salt of benzoic acid is heated strongly with P_2O_5 and the product so formed is reduced and then treated with $NaNO_2$/ HCl at low temperature. The final compound formed is

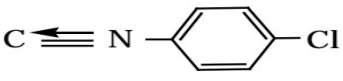
a) Benzene diazonium chloride b) Benzyl alcohol

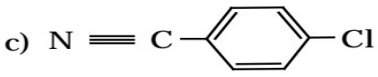
c) Phenol d) Nitrosobenzene

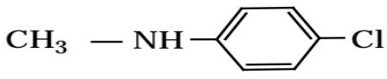
23. Identify X in the sequence given below.



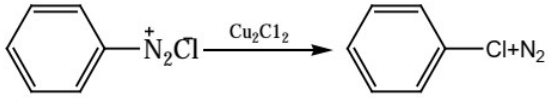
a) 

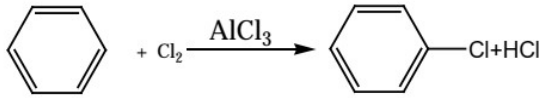
b) 

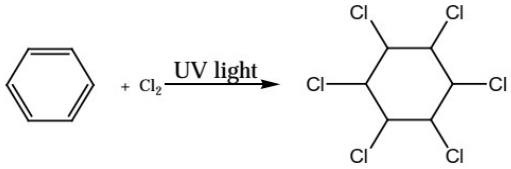
c) 

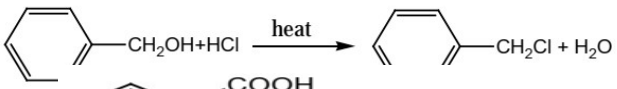
d) 

24. Among the following, the reaction that proceeds through an electrophilic substitution, is :

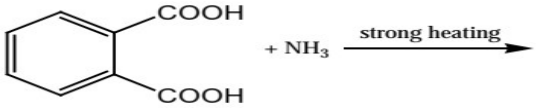
a) 

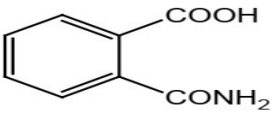
b) 

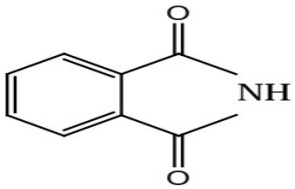
c) 

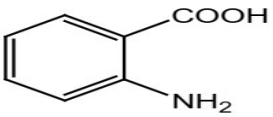
d) 

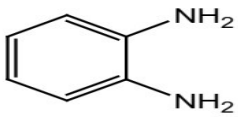
25. The major product of the following reaction



a) 

b) 

c) 

d) 

UNIT 14: BIOMOLECULES

1. Which one of the following rotates the plane polarized light towards left?

a) D(+) Glucose (b) L(+) Glucose (c) D(-) Fructose d) D(+) Galactose

2. The correct corresponding order of names of four aldoses with configuration given below Respectively is,

a) *L*-Erythrose, *L*-Threose, *L*-Erythrose, *D*-Threose

b) *D*-Threose,*D*-Erythrose, *L*-Threose, *L*-Erythrose,

c) *L*-Erythrose, *L*-Threose, *D*-Erythrose, *D*-Threose

d) *D*-Erythrose, *D*-Threose, *L*-Erythrose, *L*-Threose

3. Which one given below is a non-reducing sugar?

a) Glucose b) Sucrose c) maltose d) Lactose.

4. Glucose $\xrightarrow{(HCN)}$ Product $\xrightarrow{(hydrolysis)}$ Product $\xrightarrow{(HI + Heat)}$ A, the compound A is

a) Heptanoic acid b) 2-Iodohexane c) Heptane d) Heptanol

5. Assertion: A solution of sucrose in water is dextrorotatory. But on hydrolysis in the presence of little hydrochloric acid, it becomes levorotatory.

Reason: Sucrose hydrolysis gives equal amounts of glucose and fructose. As a result of this change in sign of rotation is observed.

a) If both accretion and reason are true and reason is the correct explanation of assertion

b) If both assertion and reason are true but reason is not the correct explanation of assertion

c) If assertion is true but reason is false.

d) if both assertion and reason are false.

6. The central dogma of molecular genetics states that the genetic information flows from

a) Amino acids → Protein → DNA b) DNA → Carbohydrates → Proteins
c) DNA → RNA → Proteins d) DNA → RNA → Carbohydrates

7. In a protein, various amino acids linked together by

a) Peptide bond b) Dative bond c) α - Glycosidic bond d) β - Glycosidic bond

8. Among the following the achiral amino acid is

a) 2-ethylalanine b) 2-methylglycine
c) 2-hydroxymethylserine d) Tryptophan

9) The correct statement regarding RNA and DNA respectively is

a) the sugar component in RNA is an arabinos and the sugar component in DNA is ribose

b) the sugar component in RNA is 2'-deoxyribose and the sugar component in DNA is arabinose

c) the sugar component in RNA is an arabinose and the sugar component in DNA is 2'-deoxyribose

d) the sugar component in RNA is ribose and the sugar component in DNA is 2'-deoxyribose

10. In aqueous solution amino acids mostly exist in,

a) NH_2-CH(R)-COOH b) NH_2-CH(R)-COO^-
c) H_3N^+-CH(R)-COOH d) H_3N^+-CH(R)-COO^-

11. Which one of the following is not produced by the body?

a) DNA b) Enzymes c) Hormones d) Vitamins

12. The number of sp^2 and sp^3 hybridised carbon in fructose are respectively

a) 1 and 4 b) 4 and 2 c) 5 and 1 d) 1 and 5

13. Vitamin B_2 is also known as

a) Riboflavin b) Thiamine c) Nicotinamide d) Pyridoxine

14. The pyrimidine bases present in DNA are

a) Cytosine and Adenine b) Cytosine and Guanine
c) Cytosine and Thiamine d) Cytosine and Uracil

15. The secondary structure of a protein refers to

a) fixed configuration of the polypeptide backbone
b) hydrophobic interaction
c) sequence of a-amino acids
d) α -the helical backbone

16. Which of the following vitamins is water-soluble?

a) Vitamin E b) Vitamin K c) Vitamin A d) Vitamin B

17. Complete hydrolysis of cellulose gives

a) L-Glucose b) D-Fructose c) D-Ribose d) D-Glucose

18. Which of the following statement is incorrect?

a) Ovalbumin is a simple food reserve in the egg- white
b) Blood proteins thrombin and fibrinogen are involved in blood clotting
c) Denaturation makes the protein more active
d) Insulin maintains the sugar level in the human body.

19. Glucose is an aldose. Which one of the following reactions is not expected with glucose?

a) It does not form an oxime **b) It does not react with the Grignard reagent**
c) It does not form osazones **d) It does not reduce tollens reagent**

20. If one strand of the DNA has the sequence 'ATGCTTGA', then the sequence of complementary strand would be

a) TACGAACT **b) TCCGAACT** **c) TACGTACT** **d) TACGRAGT**

21. Insulin, a hormone chemically is

a) Fat **b) Steroid** **c) Protein** **d) Carbohydrates**

22. α -D (+) Glucose and β -D (+) glucose are

a) Epimers **b) Anomers** **c) Enantiomers** **d) Conformational isomers**

23. Which of the following are epimers

a) D(+)-Glucose and D(+)-Galactose **b) D(+)-Glucose and D(+)-Mannose**
c) Neither (a) nor (b) **d) Both (a) and (b)**

24. Which of the following amino acids is achiral?

a) Alanine **b) Leucine** **c) Proline** **d) Glycine**

UNIT 15: CHEMISTRY IN EVERYDAY LIFE

1. Which of the following is an analgesic?

a) Streptomycin **b) Chloromycetin** **c) Asprin** **d) Penicillin**

2. Antiseptics and disinfectants either kill or prevent growth of microorganisms. Identify which of the following statement is not true.

a) dilute solutions of boric acid and hydrogen peroxide are strong antiseptics.
b) Disinfectants harm the living tissues.
c) A 0.2% solution of phenol is an antiseptic while 1% solution acts as a disinfectant.
d) Chlorine and iodine are used as strong disinfectants.

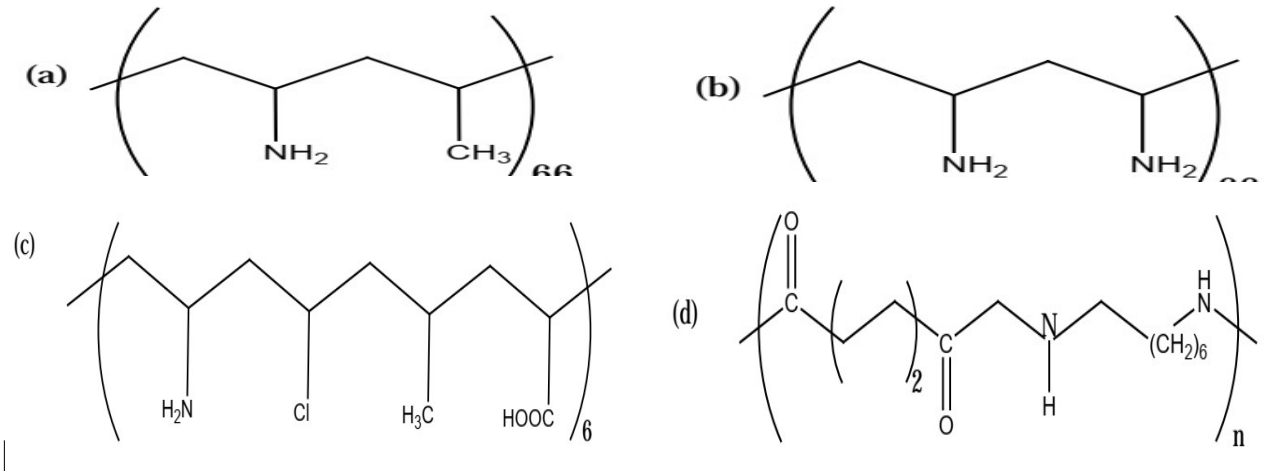
3) Drugs that bind to the receptor site and inhibit its natural function are called

a) antagonists **b) agonists** **c) enzymes** **d) molecular targets**

4. Aspirin is a/an

a) acetylsalicylic acid **b) benzoyl salicylic acid**
c) chlorobenzoic acid **d) anthranilic acid**

5. Which one of the following structures represents nylon 6,6 polymer?



6. Natural rubber has

a) alternate cis- and trans-configuration b) random cis- and trans-configuration
c) all cis-configuration d) all trans-configuration

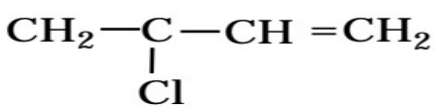
7. Nylon is an example of

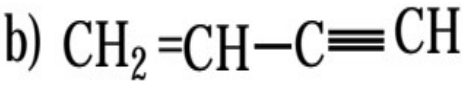
a) polyamide b) polythene c) polyester d) poly saccharide

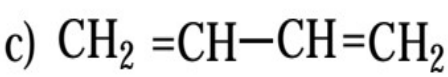
8. Terylene is an example of

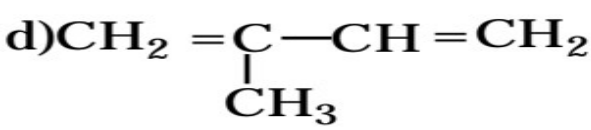
a) polyamide b) polythene c) polyester d) polysaccharide

9. Which is the monomer of neoprene in the following?

a) 

b) 

c) 

d) 

10. Which one of the following is a bio-degradable polymer?

a) HDPE b) PVC c) Nylon 6 d) PHBV

11. Non stick cook wares generally have a coating of a polymer, whose monomer is

a) ethane b) prop-2-enenitrile c) chloroethene d)1,1,2,2-tetrafluoroethane

12. Assertion: 2-methyl-1,3-butadiene is the monomer of natural rubber
Reason: Natural rubber is formed through anionic addition polymerisation.

a) If both assertion and reason are true and reason is the correct explanation of assertion.

b) if both assertion and reason are true but reason is not the correct explanation of assertion.

c) assertion is true but reason is false.

d) both assertion and reason are false.

13. Which of the following is a co-polymer?

a) Orlon b) PVC c) Teflon d) PHBV

14. The polymer used in making blankets (artificial wool) is

a) polystyrene b) PAN c) polyester d) polythene

15. Regarding cross-linked or network polymers, which of the following statement is incorrect?

a) Examples are Bakelite and melamine
b) They are formed from bi and tri-functional monomers
c) They contain covalent bonds between various linear polymer chains
d) They contain strong covalent bonds in their polymer chain

XIITH STD CHEMISTRY ONE WORDS
Volume - I

UNIT 1 : METALLURGY

1. Bauxite has the composition

a) Al_2O_3 **b) $Al_2O_3.nH_2O$** c) $Fe_2O_3.2H_2O$ d) None of these

2. Roasting of sulphide ore gives the gas (A).(A) is a colourless gas. Aqueous solution of (A) is acidic. The gas (A) is

a) CO_2 b) SO_3 **c) SO_2** d) H_2S

3. Which one of the following reaction represents calcinations?

a) $2Zn + O_2 \rightarrow 2ZnO$ b) $2ZnS + 3O_2 \rightarrow 2ZnO + 2SO_2$

c) $MgCO_3 \rightarrow MgO + CO_2$ d) Both (a) and (c)

4. The metal oxide which cannot be reduced to metal by carbon is

a) PbO **b) Al_2O_3** c) ZnO d) FeO

5. Which of the metal is extracted by Hall-Heroult process?

a) Al b) Ni c) Cu d) Zn

6. Which of the following statements, about the advantage of roasting of sulphide ore before reduction is not true?

a) ΔG_f^0 of sulphide is greater than those for CS_2 and H_2S .

b) ΔG_f^0 is negative for roasting of sulphide ore to oxide

c) Roasting of the sulphide to its oxide is thermodynamically feasible.

d) Carbon and hydrogen are suitable reducing agents for metal sulphides.

7. Match items in column - I with the items of column – II and assign the correct code.

	Column-I		**Column-II**
A	Cyanide process	i)	Ultrapure Ge
B	Froth floatation process	ii)	Dressing of ZnS
C	Electrolytic reduction	iii)	Extraction of Al
D	Zone refining	iv)	Extraction of Au
		v)	Purification of Ni

a) A-i , B-ii , C-iii , D-iv b) A-iii , B-iv , C-v , D-i

c) A-iv , B-ii , C-iii , D-i d) A-ii , B-iii , C-i , D-v

8. Wolframite ore is separated from tinstone by the process of

a) Smelting b) Calcination c) Roasting **d) Electromagnetic separation**

9. Which one of the following is not feasible

a) $Zn(s) + Cu^{2+}(aq) \rightarrow Cu(s) + Zn^{2+}(aq)$ **b) $Cu(s) + Zn^{2+}(aq) \rightarrow Zn(s) + Cu^{2+}(aq)$**

c) $Cu(s) + 2Ag^{+}(aq) \rightarrow 2Ag(s) + Cu^{2+}(aq)$ d) $Fe(s) + Cu^{2+}(aq) \rightarrow Cu(s) + Fe^{2+}(aq)$

10. Electrochemical process is used to extract

a) Iron b) Lead **c) Sodium** d) silver

11. Flux is a substance which is used to convert

a) Mineral into silicate **b) Infusible impurities to soluble impurities**

c) Soluble impurities to infusible impurities d) All of these

12. Which one of the following ores is best concentrated by froth – floatation method?

a) Magnetite b) Haematite **c) Galena** d) Cassiterite

13. In the extraction of aluminium from alumina by electrolysis, cryolite is added to

a) Lower the melting point of alumina b) Remove impurities from alumina

c) Decrease the electrical conductivity d) Increase the rate of reduction

14. Zinc is obtained from ZnO by

a) Carbon reduction b) Reduction using silver

c) Electrochemical process d) Acid leaching

15. Cupellation is a process used for the refining of

a) Silver b) Lead c) Copper d) iron

16. Extraction of gold and silver involves leaching with cyanide ion. silver is later recovered by

a) Distillation b) Zone refining **c) Displacement with zinc** d) liquation

17. Considering Ellingham diagram, which of the following metals can be used to reduce alumina? a) Fe b) Cu **c) Mg** d) Zn

18. The following set of reactions are used in refining Zirconium. This method is known as

$$Zr\ (impure) + 2I_2 \xrightarrow{523\ K} ZrI_4$$

$$ZrI_4 \xrightarrow{1800K} Zr\ (pure) + 2I_2$$

a) Liquation **b) van Arkel process** c) Zone refining d) Mond's process

19. Which of the following is used for concentrating ore in metallurgy?

a) Leaching b) Roasting c) Froth floatation **d) Both (a) and (c)**

20. The incorrect statement among the following is

a) Nickel is refined by Mond's process

b) Titanium is refined by Van Arkel's process

c) Zinc blende is concentrated by froth floatation

d) In the metallurgy of gold, the metal is leached with dilute sodium chloride solution

21. In the electrolytic refining of copper, which one of the following is used as anode?

a) Pure copper **b) Impure copper** c) Carbon rod d) Platinum electrode

22. Which of the following plot gives Ellingham diagram

a) ΔS Vs T **b) ΔG^0 Vs T** c) ΔG^0 Vs 1/T d) ΔG^0 Vs T^2

23. In the Ellingham diagram, for the formation of carbon monoxide

a) $\left(\frac{\Delta S^0}{\Delta T}\right)$ is negative

b) $\left(\frac{\Delta G^0}{\Delta T}\right)$ is positive

c) $\left(\frac{\Delta G^0}{\Delta T}\right)$ is negative

d) initially $\left(\frac{\Delta T}{\Delta G^0}\right)$ is positive, after 700^0C, $\left(\frac{\Delta G^0}{\Delta T}\right)$ is negative

Ans: c) ($\Delta G^0/\Delta T$) is negative

24. Which of the following reduction is not thermodynamically feasible?

a) $Cr_2O_3 + 2Al \rightarrow Al_2O_3 + 2Cr$ **b) $Al_2O_3 + 2Cr \rightarrow Cr_2O_3 + 2Al$**

c) $3TiO_2 + 4Al \rightarrow 2\ Al_2O_3 + 3Ti$ d) none of these

25. Which of the following is not true with respect to Ellingham diagram?

a) Free energy changes follow a straight line. Deviation occurs when there is a phase change.

b) The graph for the formation of CO_2 is a straight line almost parallel to free energy axis.

c) Negative slope of CO shows that it becomes more stable with increase in temperature.

d) Positive slope of metal oxides shows that their stabilities decrease with increase in temperature.

UNIT 2 : P-BLOCK ELEMENTS-I

1. An aqueous solution of borax is

a) neutral b) acidic **c) basic** d) amphoteric

2. Boric acid is an acid because its molecule

a) contains replaceable H+ ion b) gives up a proton

c) combines with proton to form water molecule

d) accepts OH- from water ,releasing proton.

3. Which among the following is not a borane?

a) B_2H_6 **b) B_3H_6** c) B_4H_{10} d) none of these

4. Which of the following metals has the largest abundance in the earth's crust?

a) Aluminium b) calcium c) Magnesium d) sodium

5. In diborane, the number of electrons that accounts for banana bonds is

a) six b) two **c) four** d) three

6. The element that does not show catenation among the following p-block elements is a) Carbon b) silicon **c) Lead** d) germanium

7. Carbon atoms in fullerene with formula C60 have

a) sp^3 hybridised b) sp hybridized

c) sp^2 hybridised d) partially sp^2 and partially sp^3 hybridised

8. Oxidation state of carbon in its hydrides

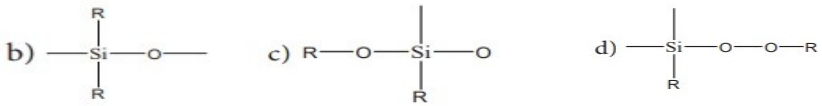
a) +4 b) -4 c) +3 d) +2

9. The basic structural unit of silicates is

a) $(SiO_3)^{2-}$ b) $(SiO_4)^{2-}$ c) $(SiO)^{-}$ **d) $(SiO_4)^{4-}$**

10. The repeating unit in silicone is

a) SiO_2



Ans: b

11. Which of these is not a monomer for a high molecular mass silicone polymer?

a) Me_3SiCl b) $PhSiCl_3$ c) $MeSiCl_3$ d) Me_2SiCl_2

12. Which of the following is not sp2 hybridised?

a) Graphite b) grapheme c) Fullerene **d) dry ice**

13. The geometry at which carbon atom in diamond are bonded to each other is

a) Tetrahedral b) hexagonal c) Octahedral d) none of these

14. Which of the following statements is not correct?

a) Beryl is a cyclic silicate b) Mg_2SiO_4 is an orthosilicate

c) $(SiO_4)^{4-}$ is the basic structural unit of silicates **d) Feldspar is not aluminosilicate**

16. Match items in column - I with the items of column – II and assign the correct code.

Column-I		Column-II	
A	Borazole	1	$B(OH)_3$
B	Boric acid	2	$B_3N_3H_6$
C	Quartz	3	$Na_2[B_4O_5(OH)_4]\ 8H_2O$
D	Borax	4	SiO_2

	A	B	C	D
(a)	**2**	**1**	**4**	**3**
(b)	1	2	4	3
(c)	1	2	4	3
(d)	None of these			

17. Duralumin is an alloy of

a) Cu,Mn b) Cu,Al,Mg c) Al,Mn **d) Al,Cu,Mn,Mg**

18. Thermodynamically the most stable form of carbon is

a) Diamond **b) graphite** c) Fullerene d) none of these

19. The compound that is used in nuclear reactors as protective shields and control rods is **a) Metal borides** b) metal oxides c) Metal carbonates d) metal carbide

20. The stability of +1 oxidation state increases in the sequence

a) Al < Ga < In < Tl b) Tl < In < Ga < Al c) In < Tl < Ga < Al d) Ga< In < Al < Tl

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UNIT 3 : P-BLOCK ELEMENTS-II

1. In which of the following, NH_3 is not used?

a) Nessler's reagent

b) Reagent for the analysis of IV group basic radical

c) Reagent for the analysis of III group basic radical

d) Tollen's reagent

2. Which is true regarding nitrogen?

a) least electronegative element b) has low ionisation enthalpy than oxygen

c) d – orbitals available **d) ability to form pπ -pπ bonds with itself**

3. An element belongs to group 15 and 3rd period of the periodic table, its electronic configuration would be

a) $Is^2\ 2s^2\ 2p^4$ b) $Is^2\ 2s^2\ 2p^3$ c) $Is^2\ 2s^2\ 2p^6\ 3s2^2\ 3p^2$ **d) $Is^2\ 2s^2\ 2p^6\ 3s^2\ 3p^3$**

4. Solid (A) reacts with strong aqueous NaOH liberating a foul smelling gas(B) which spontaneously burn in air giving smoky rings. A and B are respectively

a) P_4(red) and PH_3 **b) P_4 (white) and PH_3** c) S_8 and H_2S d) P_4(white) and H_2S

5. On hydrolysis, PCl_3 gives

a) H_3PO_3 b) PH_3 c) H_3PO_4 d) $POCl_3$

6. P_4O_6 reacts with cold water to give

a) H_3PO_3 b) $H_4P_2O_7$ c) HPO_3 d) H_3PO_4

7. The basicity of pyrophosphorous acid ($H_4P_2O_3$) is

a) 4 **b) 2** c) 3 d) 5

8. The molarity of given orthophosphoric acid solution is 2M. Its normality is

a) 6N b) 4N c) 2N d) none of these

9. Assertion : bond dissociation energy of fluorine is greater than chlorine gas
Reason : chlorine has more electronic repulsion than flourine

a) Both assertion and reason are true and reason is the correct explanation of assertion.

b) Both assertion and reason are true bu t reason is not the correct explanation of assertion

c) Assertion is true bu t reason is false **d) Both assertion and reason are false**

10. Among the following, which is the strongest oxidizing agent?

a) Cl_2 **b) F_2** c) Br_2 d) I_2

11. The correct order of the thermal stability of hydrogen halide is

a) HI > HBr > HCl > HF **b) HF > HCl > HBr > HI**

c) HCl > HF > HBr > HI d) HI > HCl > HF > HBr

12. Which one of the following compounds is not formed?

a) $XeOF_4$ b) XeO_3 c) XeF_2 **d) NeF_2**

13. Most easily liquefiable gas is

a) Ar b) Ne **c) He** d) Kr

14. XeF_6 on complete hydrolysis produces

a) $XeOF_4$ b) XeO_2F_2 **c) XeO_3** d) XeO_2

15. Which of the following is strongest acid among all?

a) HI b) HF c) HBr d) HCl

16. Which one of the following orders is correct for the bond dissociation enthalpy of halogen molecules?

a) $Br_2 > I_2 > F_2 > Cl_2$ b) $F_2 > Cl_2 > Br_2 > I_2$

c) $I_2 > Br_2 > Cl_2 > F_2$ **d) $Cl_2 > Br_2 > F_2 > I_2$**

17. Among the following the correct order of acidity is

a) $HClO_2 < HClO < HClO_3 < HClO_4$ b) $HClO_4 < HClO_2 < HClO < HClO_3$

c) $HClO_3 < HClO_4 < HClO_2 < HClO$ **d) $HClO < HClO_2 < HClO_3 < HClO_4$**

18. When copper is heated with cone HNOs it produces

a) Cu $(NO_3)_2$, NO and NO_2 b) Cu $(NO_3)_2$ and N_2O

c) Cu $(NO_3)_2$ and NO_2 d) Cu $(NO_3)_2$ and NO

UNIT 4 : TRANSITION AND INNER TRANSITION ELEMENTS

1. Sc (Z = 21) is a transition element but Zinc (Z = 30) is not because

a) both Sc^{3+} and Zn^{2+} ions are colourless and form white compounds

b) in case of Sc, 3d orbital are partially filled but in Zn these are completely filled

c) last electron as assumed to be added to 4s level in case of zinc

d) both Sc and Zn do not exhibit variable oxidation states

2. Which of the following d block element has half-filled penultimate d sub shell as well as half-filled valence sub shell? **a) Cr** b) Pd c) Pt d) none of these

3. Among the transition metals of 3d series, the one that has highest negative (M^{2+}/M) standard electrode potential is

a) Ti b) Cu c) Mn d) Zn

4. Which one of the following ions has the same number of unpaired electrons as present in V^{3+}? a) Ti^{3+} b) Fe^{3+} **c) Ni^{2+}** d) Cr^{3+}

5. The magnetic moment of Mn^{2+} ion is

a) 5.92BM b) 2.80BM c) 8.95BM d) 3.90BM

6. The catalytic behaviour of transition metals and their compounds is ascribed mainly due to

a) their magnetic behavior b) their unfilled d orbitals

c) their ability to adopt variable oxidation states d) their chemical reactivity

7. The correct order of increasing oxidizing power in the series

a) $VO^{2+} < Cr_2O_7^{2-} < MnO4^-$ b) $Cr_2O_7^{2-} < VO_2^+ < MnO_4^-$

c) $Cr_2O_7^{2-} < MnO_4^- < VO_2^+$ d) $MnO_4^- < Cr_2O_7^{2-} < VO_2^+$

8. In acid medium, potassium permanganate oxidizes oxalic acid to

a) oxalate **b) Carbon dioxide** c) acetate d) acetic acid

9. Which of the following statements is not true?

a) on passing H_2S, through acidified $K_2Cr_2O_7$ solution, a milky colour is observed

b) $Na_2Cr_2O_7$ is preferred over $K_2Cr_2O_7$ in volumetric analysis

c) $K_2Cr_2O_7$ solution in acidic medium is orange in colour

d) $K_2Cr_2O_7$ solution becomes yellow on increasing the pH beyond 7

10. Permanganate ion changes to _____ in acidic medium

a) MnO_4^{2-} **b) Mn^{2+}** c) Mn^{3+} d) MnO_2

11. How many moles of I_2 are liberated when 1 mole of potassium dichromate react with potassium iodide? a) 1 b) 2 **c) 3** d) 4

12. The number of moles of acidified $KMnO_4$ required to oxidize 1 mole of ferrous oxalate (FeC_2O_4) is a) 5 b) 3 **c) 0.6** d) 1.5

13. Which one of the following statements related to lanthanons is incorrect?

a) Europium shows +2 oxidation state

b) The basicity decreases as the ionic radius decreases from Pr to Lu.

c) All the lanthanons are much more reactive than aluminium.

d) Ce^{4+} solutions are widely used as oxidising agents in volumetric analysis

14. Which of the following lanthanoid ions is diamagnetic?

a) Eu^{2+} **b) Yb^{2+}** c) Ce^{2+} d) Sm^{2+}

15. Which of the following oxidation states is most common among the lanthanoids?

a) 4 b) 2 c) 5 **d) 3**

16. Assertion : Ce^{4+} is used as an oxidizing agent in volumetric analysis

Reason : Ce^{4+} has the tendency of attaining +3 oxidation state.

a) Both assertion and reason are true and reason is the correct explanation of assertion.

b) Both assertion and reason are true but reason is not the correct explanation of assertion.

c) Assertion is true but reason is false

d) Both assertion and reason are false.

17. The most common oxidation state of actinoids is

a) +2 **b) +3** c) +4 d) +6

18. The actinoid elements which show the highest oxidation state of +7 are

a) **Np, Pu, Am** b) Li, Fm, Th c) U, Th, Md d) Es, No, Lr

19. Which one of the following is not correct?

a) La $(OH)_3$, is less basic than Lu $(OH)_3$

b) In lanthanoid series ionic radius of Ln^{3+} ions decreases

c) La is actually an element of transition metal series rather than lanthanide series

d) Atomic radii of Zr and Hf are same because of lanthanide contraction,

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UNIT 5 : COORDINATION CHEMISTRY

1. The sum of primary valence and secondary valance of the metal M in the complex $[M(en))_2$ (Ox)] Cl is a) 3 b) 6 c) -3 **d) 9**

2. An excess of silver nitrate is added to 100ml of a O.O1 M solution of pentaaquachloridochromium (III) chloride. The number of moles of AgCl precipitated would be a) 0.02 **b) 0.002** c) 0.01 d) 0.2

3. A complex has a molecular formula $MSO_4Cl.6H_2O$. The aqueous solution of it gives white precipitate with Barium chloride solution and no precipitate is obtained when it is treated with silver nitrate solution. If the secondary valence of the metal is six, which one of the following correctly represents the complex?

a) $[M(H_2O)_4Cl]\ SO_4.2H_2O$ b) $[M(H_2O)_6]\ SO_4$

c) $[M(H_2O)_5Cl]SO_4.H_2O$ d) $[M\ (H_2O)_3Cl]\ SO_4.3H_2O$

4. Oxidation state of Iron and the charge on the ligand NO in $[Fe\ (H_2O)_5\ NO]\ SO_4$ are

a) +2 and 0 respectively b) +3 and 0 respectively

c) +3 and -1 respectively **d) +1 and +1 respectively**

5. As per IUPAC guidelines, the name of the complex [Co(en)2 (ONO)Cl] Cl is

a) chlorobisethylenediaminenitritocobalt(III) chloride

b) chi or id obis (e thane-1, 2-diamine) nitrito K-Ocobaltate(III) chloride

c) chloridobis (ethane-1, 2-diammine) nitrito K -Ocobalt(II) chloride

d) chloridobis (ethane-1, 2-diamine) nitrito K -Ocobalt(III) chloride

6. IUPAC name of the complex $K_3[Al(C_2O_4)_3]$ is

a) potassiumtrioxalatoaluminium(III) b) potassiumtrioxalatoaluminate(II)

c) potassiumtrisoxalatoaluminate(III) **d) potassiumtrioxalatoaluminate(III)**

7. A magnetic moment of 1.73BM will be shown by one among the following

a) $TiCl_4$ b) $[CoCl_6]^{4-}$ **c) $[Cu(NH_3)_4]^{2+}$** d) $[Ni(CN)_4]^{2-}$

8. Crystal field stabilization energy for high spin d^5 octahedral complex is

a) $-0.6\Delta_0$ **b) 0** c) $2(P - \Delta_0)$ d) $2(P + \Delta_0)$

9. In which of the following coordination entities the magnitude of Δ_0 will be maximum? a) $[Co(CN)_6]^{3-}$ b) $[Co(C_2O_4)_3]^{3-}$ c) $[Co(H_2O)_6]^{3+}$ d) $[Co(NH_3)_6]^{3+}$

10. Which one of the following will give a pair of enantiomorphs?

a) $[Cr(NH_3)_6][Co(CN))_6]$ **b) $[Co(en)_2Cl_2]Cl$**

c) $[Pt(NH_3)_4][FtCl_4]$ d) $[CO(NH_3)_4Cl_2]NO_2$

11. Which type of isomerism is exhibited by $[Pt(NH_3)_2Cl_2]$?

a) Coordination isomerism b) Linkage isomerism

c) Optical isomerism **d) Geometrical isomerism**

12. How many geometrical isomers are possible for $[Pt(Py)(NH_3)(Br)(Cl)]$?

a) 3 b) 4 c) 0 d) 15

13. Which one of the following pairs represents linkage isomers?

a) $[Cu(NH_3)_4]$ $[PtCl_4]$ and $[Pt(NH_3)_4]$ $[CuCl_4]$

b) $[Co(NH_3)_5(NO_3)]SO_4$ and $[CO(NH_3)_5(ONO)]$

c) $[Co(NH_3)_4(NCS)_2]Cl$ and $[Co(NH_3)_4(SCN)_2]Cl$

d) both (b) and (c)

14. Which kind of isomerism is possible for a complex $[Co(NH_3)_4Br_2]Cl$?

a) geometrical and ionization b) geometrical and optical

c) optical and ionization d) geometrical only

15. Which one of the following complexes is not expected to exhibit isomerism?

a) $[Ni(NH_3)_4(H_2O)_2]^{2+}$ b) $[Pt(NH_3)_2Cl_2]$ c) $[Co(NH_3)_5SO_4]Cl$ **d) $[FeCl_6]^{3-}$**

16. A complex in which the oxidation number of the metal is zero is

a) $K_4[Fe(CN)_6]$ b) $[Fe(CN)_3(NH_3)_3]$ **c) $[Fe(Co)_5]$** d) both (b) and (c)

17. Formula of tris(ethane-l,2-diamine) iron (II) phosphate

a) $[Fe(CH_3 - CH(NH_2)_2)_3](PO_4)_3$ b) $[Fe(H_2N - CH_2 - CH_2 - NH_2)_3](PO_4)$

c) $[Fe(H_2N\text{-}CH_2\text{-}CH_2\text{-}NH_2)_3](PO_4)_2$ **d) $[Fe(H_2N\text{-}CH_2\text{-}CH_2\text{-}NH_2)_3]_3(PO_4)_2$**

18. Which of the following is paramagneticin nature?

a) $[Zn(NH_3)_4]^{2+}$ b) $[CO(NH_3)_6]^{3+}$ **c) $[Ni(H_2O)_6]^{2+}$** d) $[Ni(CN)_4]^{2-}$

19. Fac-mer isomerism is shown by

a) $[Co\ (en)_3]^{3+}$ b) $[Co(NH_3)_4(Cl)_2]^+$ **c) $[Co\ (NH_3)_3\ (Cl)_3]$** d) $[Co\ (NH_3)_5\ Cl]SO_4$

20. Choose the correct statement.

a) Square planar complexes are more stable than octahedral complexes

b) The spin only magnetic moment of $[Cu\ (Cl)_4]_4^{2-}$ is 1.732 BM and it has square planar structure.

c) Crystal field splitting energy (Δ_o) of $[FeF_6]^{4-}$ is higher than the (Ao) of [Fe (CN)6]4

d) Crystal field stabilization energy of $[V(H_2O)f_6]^{2+}$ is higher than the crystal field stabilization of $[Ti(H_2O)_6]^{2+}$

UNIT 6: SOLID STATE

1. Graphite and diamond are

a) Covalent and molecular crystals b) ionic and covalent crystals

c) both covalent crystals d) both molecular crystals

2. An ionic compound AxBy crystallizes in fcc type crystal structure with B ions at the centre of each face and A ion occupying entre of the cube. the correct formula of AxBy is a) AB **b) AB_3** c) A_3B d) A_8B_6

3. The ratio of close packed atoms to tetrahedral hole in cubic packing is

a) 1:1 **b) 1:2** c) 2:1 d) 1:4

4. Solid CO_2 is an example of

a) Covalent solid b) metallic solid **c) molecular solid** d) ionic solid

5. Assertion : monoclinic sulphur is an example of monoclinic crystal system

Reason: for a monoclinic system, a≠b≠c and α = γ = 90 0 , β ≠ 900

a) Both assertion and reason are true and reason is the correct explanation of assertion.

b) Both assertion and reason are true but reason is not the correct explanation of assertion.

c) Assertion is true but reason is false.

c) Both assertion and reason are false.

6. In calcium fluoride, having the flurite structure the coordination number of Ca^{2+} ion and F- Ion are a) 4 and 2 b) 6 and 6 **c) 8 and 4** d) 4 and 8

7. The number of unit cells in 8 gm of an element X (atomic mass 40) which crystallizes in bcc pattern is (NA is the Avogadro number)

a) 6.023×10^{23} **b) 6.023×10^{22}** c) 60.23 X 1023 d) ([6.023×10^{23}] / [8 x 40])

8. The number of carbon atoms per unit cell of diamond is

a) 8 b) 6 c) 1 d) 4

9. In a solid atom M occupies ccp lattice and (1/3) of tetrahedral voids are occupied by atom N. find the formula of solid formed by M and N.

a) MN b) M_3N c) MN_3 **d) M_3N_2**

10. The composition of a sample of wurtzite is Fe0.93 O1.00 what % of Iron present in the form of Fe^{3+}? a) 16.05% **b) 15.05%** c) 18.05% d) 17.05%

11. The ionic radii of A+ and B− are 0.98 × 10−10 m and 1.81 × 10−10 m . the coordination number of each ion in AB is

a) 8 b) 2 **c) 6** d) 4

12. CsCl has bcc arrangement, its unit cell edge length is 400pm, its inter atomic distance is a) 400pm b) 800pm c) √3 x100pm **d) (√3 / 2) x 400pm**

13. A solid compound XY has NaCl structure. if the radius of the cation is 100pm , the radius of the anion will be

a) (100/0.414) b) (0.732/100) c) 100x0.414 d) (0.414 / 100)

14. The vacant space in bcc lattice unit cell is

a) 48% b) 23% **c) 32%** d) 26%

15. The radius of an atom is 300pm, if it crystallizes in a face centered cubic lattice, the length of the edge of the unit cell is

a) 488.5pm **b) 848.5pm** c) 884.5pm d) 484.5pm

16. The fraction of total volume occupied by the atoms in a simple cubic is

a) π / 4√2 **b) π / 6** **c**) π / 4 d) π / 3√2

17. The yellow colour in NaCl crystal is due to

a) excitation of electrons in F centers

b) reflection of light from Cl^- ion on the surface

c) refraction of light from Na^+ ion

d) all of the above

18. if 'a' stands for the edge length of the cubic system ; sc , bcc, and fcc. Then the ratio of radii of spheres in these systems will be respectively.

a) $\left(\frac{1}{2}a:\frac{\sqrt{3}}{2}a:\frac{\sqrt{2}}{2}a\right)$ b) $\left(\sqrt{1}a:\sqrt{3}a:\sqrt{2}a\right)$ c) $\left(\frac{1}{2}a:\frac{\sqrt{3}}{4}a:\frac{1}{2\sqrt{2}}a\right)$ d) $\left(\frac{1}{2}a:\sqrt{3}a:\frac{1}{\sqrt{2}}a\right)$

Ans: c)

19. If 'a' is the length of the side of the cube, the distance between the body centered atom and one corner atom in the cube will be

a) $\left(\frac{2}{\sqrt{3}}\right)a$ b) $\left(\frac{4}{\sqrt{3}}\right)a$ c) $\left(\frac{\sqrt{3}}{4}\right)a$ d) $\left(\frac{\sqrt{3}}{2}\right)a$ **Ans: d)**

20. Potassium has a bcc structure with nearest neighbor distance 4.52 Aº.

Its atomic weight is 39. its density will be

a) 915 kg m^{-3} b) 2142 kg m^{-3} c) 452 kg m^{-3} d) 390 kg m^{-3}

21. Schottky defect in a crystal is observed when

a) unequal number of anions and anions are missing from the lattice

b) equal number of anions and anions are missing from the lattice

c) an ion leaves its normal site and occupies an interstitial site

d) no ion is missing from its lattice.

22. The cation leaves its normal position in the crystal and moves to some interstitial position, the defect in the crystal is known as

a) Schottky defect b) F center c**) Frenkel defect** d) non-stoichiometric defect

23. Assertion: due to Frenkel defect, density of the crystalline solid decreases.

Reason: in Frenkel defect cation and anion leaves the crystal.

a) Both assertion and reason are true and reason is the correct explanation of assertion.

b) Both assertion and reason are true but reason is not the correct explanation of assertion.

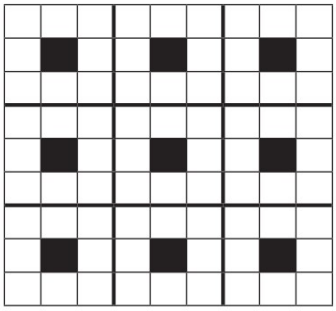
c) Assertion is true but reason is false.

d) Both assertion and reason are false

24. The crystal with a metal deficiency defect is

a) NaCl **b) FeO** c) ZnO d) KCl

25. A two dimensional solid pattern formed by two different atoms X and Y is shown below. The black and white squares represent atoms X and Y respectively. the simplest formula for the compound based on the unit cell from the pattern is



a) XY_8 b) X_4Y_9 c) XY_2 d) XY_4

UNIT 7: CHEMICAL KINETICS

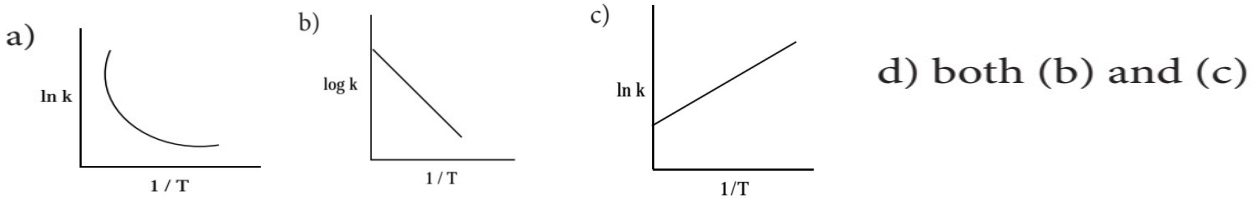
1. For a first order reaction A → B the rate constant is *x* min^{-1}. If the initial concentration of A is 0.01M , the concentration of A after one hour is given by the expression.

a) $0.01\ e^{-x}$ b) $1 \times 10^{-2}\ (1-e^{-60x})$ **(c) $(1\times10^{-2})\ e^{-60x}$** d) none of these

2. A zero order reaction X →Product , with an initial concentration 0.02M has a half life of 10 min. if one starts with concentration 0.04M, then the half life is

a) 10 s b) 5 min **c) 20 min** d) cannot be predicted using the given information

3. Among the following graphs showing variation of rate constant with temperature (T) for a reaction, the one that exhibits Arrhenius behavior over the entire temperature range is



d) both (b) and (c)

4. For a first order reaction A → product with initial concentration *x* mol L−1 , has a half life period of 2.5 hours . For the same reaction with initial concentration (x/2) mol L^{-1} the half life is

a) (2.5 × 2) hours b) (2.5 / 2) hours c) 2.5 hours

d) Without knowing the rate constant, t1/2 cannot be determined from the given data

5. For the reaction, $2NH_3 \rightarrow N_2 + 3H_2$

, if $\frac{-d[NH_3]}{dt} = k_1[NH_3]$,

$\frac{d[N_2]}{dt} = k_2[NH_3]$, $\frac{d[H_2]}{dt} = k_3[NH_3]$

then the relation between k1, k2 and k3 is

a) $k_1 = k_2 = k_3$ b) $k_1 = 3k_2 = 2k_3$ **c) $1.5\ k_1 = 3\ k_2 = k_3$** d) $2\ k_1 = k_2 = 3\ k_3$

6. The decomposition of phosphine (PH3) on tungsten at low pressure is a first order reaction. It is because the

a) rate is proportional to the surface coverage

b) rate is inversely proportional to the surface coverage

c) rate is independent of the surface coverage

d) rate of decomposition is slow

7. For a reaction Rate = k[acetone]3/2 acetone then unit of rate constant and rate of reaction respectively is

a) (mol $L^{-1}s^{-1}$), ($mol^{-1/2}$ $L^{1/2}$ s^{-1}) **b) ($mol^{-1/2}$ $L^{1/2}$ s^{-1}), (mol L^{-1} s^{-1})**

c) ($mol^{1/2}$ $L^{1/2}$ s^{-1}), (mol L^{-1} s^{-1}) d) (mol L s^{-1}), ($mol^{1/2}$ $L^{1/2}$ s^{-1})

8. The addition of a catalyst during a chemical reaction alters which of the following quantities?

a) Enthalpy **b)Activation energy** c) Entropy d) Internal energy

9. Consider the following statements :

(i) increase in concentration of the reactant increases the rate of a zero order reaction.

(ii) rate constant k is equal to collision frequency A if Ea = 0

(iii) rate constant k is equal to collision frequency A if Ea = ∞

(iv) a plot of ln(k) vs T is a straight line

(v) a plot of ln (k) vs 1/T is a straight line with a positive slope.

Correct statements are **a) (ii) only** b) (ii) and (iv) c) (ii) and (v) d) (i), (ii) and (v)

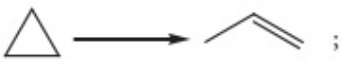
10. In a reversible reaction, the enthalpy change and the activation energy in the forward direction are respectively −*x* kJ mol−1 and *y* kJ mol−1 . Therefore , the energy of activation in the backward direction is

a) (*y* −*x*) kJ mol^{-1} b) (*x* + *y*)J mol^{-1} c) (*x* −*y*) kJ mol^{-1} **d) (*x* + *y*) × 103 J mol^{-1}**

11. What is the activation energy for a reaction if its rate doubles when the temperature is raised from 200K to 400K? (R = 8.314 JK-1mol-1)

a) 234.65 kJ $mol^{-1}K^{-1}$ b) 434.65 kJ $mol^{-1}K^{-1}$

c) 434.65 J $mol^{-1}K^{-1}$ d) 334.65 J $mol^{-1}K^{-1}$

12.  **; This reaction follows first order kinetics. The rate constant at particular temperature is 2.303 × 10−2 hour−1 . The initial concentration of cyclopropane is 0.25M. What will be the concentration of cyclopropane after 1806 minutes? (log 2 = 0.3010)**

a) 0.125M **b) 0.215M** c) 0.25 × 2.303M d) 0.05M

13. For a first order reaction, the rate constant is 6.909 min-1.the time taken for 75% conversion in minutes is

a) $\left(\frac{3}{2}\right)\log 2$ b) $\left(\frac{2}{3}\right)\log 2$ c) $\left(\frac{3}{2}\right)\log\left(\frac{3}{4}\right)$ d) $\left(\frac{2}{3}\right)\log\left(\frac{4}{3}\right)$

Ans: (b)

14. In a first order reaction $x \rightarrow y$; if k is the rate constant and the initial concentration of the reactant *x* is 0.1M, then, the half life is

a) $\left(\frac{\log 2}{k}\right)$ b) $\left(\frac{0.693}{(0.1)\,k}\right)$ c) $\left(\frac{\ln 2}{k}\right)$ d) none of these

Ans: (c)

15. Predict the rate law of the following reaction based on the data given below

$2A + B \rightarrow C + 3D$

Reaction number	[A] (min)	[B] (min)	Initial rate ($M\ s^{-1}$)
1	0.1	0.1	*x*
2	0.2	0.1	2*x*
3	0.1	0.2	4*x*
4	0.2	0.2	8*x*

a) rate = k $[A]^2$ [B] **b) rate = k $[A][B]^2$** c) rate = k [A][B] d) rate = k $[A]^{1/2}$ $[B]^{3/2}$

16. Assertion: rate of reaction doubles when the concentration of the reactant is doubles if it is a first order reaction.

Reason: rate constant also doubles

a) Both assertion and reason are true and reason is the correct explanation of assertion.

b) Both assertion and reason are true but reason is not the correct explanation of assertion.

c) Assertion is true but reason is false.

d) Both assertion and reason are false.

17. The rate constant of a reaction is $5.8 \times 10^{-2}\ s^{-1}$.The order of the reaction is

a) First order b) zero order c) Second order d) Third order

18. For the reaction $N2O5(g) \rightarrow 2NO_2(g) + ½\ O_2(g)$, the value of rate of disappearance of N_2O_5 is given as 6.5×10^{-2} mol $L^{-1}\ s^{-1}$. The rate of formation of NO_2 and O_2 is given respectively as

a) (3.25×10^{-2} mol $L^{-1}s^{-1}$) and (1.3×10^{-2} mol $L^{-1}s^{-1}$)

b) (1.3×10^{-2} mol $L^{-1}s^{-1}$) and (3.25×10^{-2} mol $L^{-1}s^{-1}$)

c) (1.3×10^{-1} mol $L^{-1}s^{-1}$) and (3.25×10^{-2} mol $L^{-1}s^{-1}$)

d) None of these

19. During the decomposition of H_2O_2 to give dioxygen, 48 g O_2 is formed per minute at certain point of time. The rate of formation of water at this point is

a) 0.75 mol min^{-1} b) 1.5 mol min^{-1} c) 2.25 mol min^{-1} **d) 3.0 mol min^{-1}**

20. If the initial concentration of the reactant is doubled, the time for half reaction is also doubled. Then the order of the reaction is

a) Zero b) one c) Fraction d) none

21. In a homogeneous reaction A →B + C + D , the initial pressure was P0 and after time t it was P. expression for rate constant in terms of P0, P and t will be

a) $k = \left(\frac{2.303}{t}\right)\log\left(\frac{2P_0}{3P_0 - P}\right)$ b) $k = \left(\frac{2.303}{t}\right)\log\left(\frac{2P_0}{P_0 - P}\right)$

c) $k = \left(\frac{2.303}{t}\right)\log\left(\frac{3P_0 - P}{2P_0}\right)$ d) $k = \left(\frac{2.303}{t}\right)\log\left(\frac{2P_0}{3P_0 - 2P}\right)$

Ans: (a)

22. If 75% of a first order reaction was completed in 60 minutes , 50% of the same reaction under the same conditions would be completed in

a) 20 minutes **b) 30 minutes** c) 35 minutes d) 75 minutes

23. The half life period of a radioactive element is 140 days. After 560 days, 1 g of element will be reduced to

a) (1/2)g b) (1/4)g c) (1/8)g **d) (1/16)g**

24. The correct difference between first and second order reactions is that

a) A first order reaction can be catalysed; a second order reaction cannot be catalysed.

b) The half life of a first order reaction does not depend on [A0]; the half life of a second order reaction does depend on [A_0].

c) The rate of a first order reaction does not depend on reactant concentrations; the rate of a second order reaction does depend on reactant concentrations.

d) The rate of a first order reaction does depend on reactant concentrations; the rate of a second order reaction does not depend on reactant concentrations.

25. After 2 hours, a radioactive substance becomes (1/16)th of original amount. Then the half life (in min) is

a) 60 minutes b) 120 minutes **c) 30 minutes** d) 15 minutes

Volume - II

UNIT 8 : IONIC EQUILIBRIUM

1. Concentration of the Ag^+ ions in a saturated solution of $Ag_2C_2O_4$ is 2.24×10^{-4} mol L^{-1} solubility product of $Ag_2C_2O_4$ is .....

(a) 2.42×10^{-8} mol^3 L^{-3} (b) 2.66×10^{-12} 12 mol^3 L^{-3}

(c) 45×10^{-11} mol^3 L^{-3} **(d) 5.619×10^{-12} mol^3 L^{-3}**

2. Following solutions were prepared by mixing different volumes of NaOH of HCl different concentrations.

i. 60 mL $\frac{M}{10}$ HCl + 40mL $\frac{M}{10}$ NaOH ii. 55 mL $\frac{M}{10}$ HCl + 45 mL $\frac{M}{10}$ NaOH

iii. 75 mL $\frac{M}{5}$ HCl + 25mL $\frac{M}{5}$ NaOH iv. 100 mL $\frac{M}{10}$ HCl + 100 mL $\frac{M}{10}$ NaOH

pH of which one of them will be equal to 1? (a) (iv) (b) (i) (c) (ii) **(d) (iii)**

3. The solubility of $BaSO_4$ in water is 2.42×10^{-3} gL^{-1} at 298K. The value of its solubility product (K_{sp}) will be ____ (Given molar mass of $BaSO_4$ = 233g mol^{-1})

(a) 1.08×10^{-14} mol^2L^2 (b) 1.08×10^{-12} mol^2L^2

(c) 1.08×10^{-10} mol^2 L^2 (d) 1.08×10^{-8} mol^2L^{-2}

4. pH of a saturated solution of $Ca(OH)_2$ is 9. The Solubility product (K_{sp}) of $Ca(OH)_2$ (a) 0.5×10^{-15} (b) 0.25×10^{-10} (c) 0.125×10^{-15} (d) 0.5×10^{-10}

5. Conjugate base for bronsted acids H_2O and HF are .....

(a) OH^- and H_2FH^+, respectively (b) H_3O^+ and F^-, respectively

(c) OH^- and F^-, respectively (d) H_3O^+ and H_2F^+, respectively

6. Which will make basic buffer?

(a) 50 mL of 0.1M NaOH + 25mL of 01M CH_3COOH

(b) 100 mL of 0.1M CH_3COOH + 100 mL of 0.1M NH_4OH

(c) 100 mL of 0.1M HCl + 200 mL of 0.1M NH_4OH

(d) 100 mL of 0.1M HCl + 100 mL of O.1 M NaOH

7. Which of the following fluro – compounds is most likely to behave as a Lewis base? (a) BF_3 **(b) PF_3** (c) CF_4 (d) SiF_4

8. Which of these is not likely to act as lewis base?

(a) BF_3 (b) PF_3 (c) CO (d) F^-

9. The aqueous solutions of sodium formate, anilinium chloride and potassium cyanide are respectively (a) acidic, acidic, basic **(b) basic, acidic, basic**

(c) basic, neutral, basic (d) none of these

10. The percentage of pyridine (C_5H_5N) that forms pyridinium ion (C_5H_5NH) in a 0.10 M aqueous pyridine solution (Kb for C_5H_5N = 1.7 x 10^{-9}) iS .....

(a) 0.006% **(b) 0.013%** (c) 0.77% (d) 1.6%

11. Equal volumes of three acid solutions of pH 1, 2 and 3 are mixed in a vessel. What will be the H^+ ion concentration in the mixture?

(a) 37 x 10^{-2} (b) 10^{-6} (c) 0.111 (d) none of these

12. The solubility of AgCl (s) with solubility product 1.6 x 10^{-10} in 0. 1 M NaCl solution would be .....

(a) 1.26 x 10^{-5} M **(b) 1.6 x 10^{-9} M** (c) 1.6 x 10^{-11} M (d) Zero

13. If the solubility product of lead iodide is 3.2 x 10^{-8}, its solubility will be .....

(a) 2 x 10^{-3}M (b) 4 x 10^{-4} M (c) 1.6 x 10^{-5} M (d) 1.8 x 10^{-5} M

14. Using Gibb's free energy change, ΔG^0 = 57.34 KJ mol^{-1}, for the reaction, $X_2Y_{(s)} \rightleftharpoons 2X^+ + Y^{2-}_{(aq),}$ calculate the solubility product of X_2Y in water at 300K (R = 8.3 J K^{-1} Mol^{-1})

(a) 10^{-10} (b) 10^{-12} (c) 10^{-14} (d) can not be calculated from the given data

15. MY and NY_3, are insoluble salts and have the same K_{sp} values of 6.2 x 10^{-13} at room temperature. Which statement would be true with regard to MY and NY_3?

(a) The salts MY and NY_3 are more soluble in O.5 M KY than in pure water

(b) The addition of the salt of KY to the suspension of MY and NY_3 will have no effect on

(c) The molar solubities of MY and NY_3 in water are identical

(d) The molar solubility of MY in water is less than that of NY_3

16. What is the pH of the resulting solution when equal volumes of 0.1M NaOH and 0.01M HCl are mixed? (a) 2.0 (b) 3 (c) 7.0 **(d) 12.65**

17. The dissociation constant of a weak acid is 1 x 10^{-3} . In order to prepare a buffer solution with a pH =4, the [Acid] / [Salt] ratio should be .....

(a) 4:3 (b) 3:4 (c) 10:1 **(d) 1:10**

18. The pH of 10^{-5} M KOH solution will be .....

(a) 9 (b) 5 (c) 19 (d) none of these

19. $H_2PO_4^-$ the conjugate base of .....

(a) PO_4^{3-} (b) P_2O_5 **(c) H_3PO_4** (d) HPO_4^{2-}

20. Which of the following can act as lowery – Bronsted acid well as base?

(a) HCl (b) SO_4^{2-} **(c) HPO_4^{2-}** (d) Br^-

21. The pH of an aqueous solution is Zero. The solution is .....

(a) slightly acidic **(b) strongly acidic** (c) neutral (d) basic

22. The hydrogen ion concentration of a buffer solution consisting of a weak acid and its salts is given by .....

a) $[H^+]=\frac{K_a[acid]}{[salt]}$ b) $[H^+]= K_a[salt]$ c) $[H^+]=K_a[acid]$ d) $[H^+]=\frac{K_a[salt]}{[acid]}$

Ans: a)

23. Which of the following relation is correct for degree of hydrolysis of ammonium acetate?

a) $h=\sqrt{\frac{K_h}{C}}$ b) $h=\sqrt{\frac{K_a}{K_b}}$ c) $h=\sqrt{\frac{K_w}{K_a.K_b}}$ d) $h=\sqrt{\frac{K_a.K_b}{K_w}}$

Ans: c)

24. Dissociation constant of NH_4OH is 1.8×10^{-5} the hydrolysis constant of NH_4Cl would be .....

(a) 1.8×10^{-19} **(b) 5.55×10^{-10}** (c) 5.55×10^{-5} (d) 1.80×10^{-5}

UNIT 9: ELECTRIC CHEMISTRY

1. The number of electrons that have a total charge of 9650 coulombs is .....

(a) 6.22×10^{23} (b) 6.022×10^{24} **(c) 6.022×10^{22}** (d) 6.022×10^{-34}

2. Consider the following half cell reactions:

$Mn^{2+} + 2e^- \rightarrow Mn$ $E^\circ = -1.18V$ **$Mn^{2+} \rightarrow Mn^{3+} + e^-$ $E = -1.51V$**

The E for the reaction $3Mn^{2+} \rightarrow Mn+2Mn^{3+}$, and the possibility of the forward reaction are respectively.

(a) 2.69V and spontaneous **(b) – 2.69 and non spontaneous**

(c) 0.33V and Spontaneous (d) 4.18V and non spontaneous

3. The button cell used in watches function as follows

$Zn_{(s)} + Ag_2O_{(s)} + H_2O_{(1)} \rightleftharpoons 2Ag_{(s)} + Zn^{2+}_{(aq)} + 2OH^-_{(aq)}$ the half cell potentials are

$Ag_2O_{(s)} + H_2O_{(1)} + 2e^- \rightarrow 2Ag_{(S)} + 2OH^-_{(aq)}$ $E^\circ = 034V$. The cell potential will be

(a) 0.84V (b) 1.34V **(c) 1.10V** (d) 0.42V

4. The molar conductivity of a 0.5 mol dm^{-3} solution of $AgNO_3$ with electrolytic conductivity of 5.76×10^{-3} S cm^{-1} at 298 K is .....

(a) 2.88 S cm^2 mo1^{-1} **(b) 11.52 S cm^2 mol^{-1}** (c) 0.086 S cm^2 mol^{-1} (d) 28.8 S cm^2 mol^{-1}

5.

Electrolyte	KCl	KNO_3	HCl	NaOAC	NaCl
Λ_m ($S\ cm^2\ mol^{-1}$)	149.9	145.0	426.2	91.0	126.5

Calculate A^0_{HOAC} using appropriate molar conductances of the electrolytes listed above at infinite dilution in water at 25°C.

(a) 517.2 (b) 552.7 **(c) 390.7** (d) 217.5

6. Faradays constant is defined as

(a) charge carried by I electron

(b) charge carried by one mole of electrons

(c) charge required to deposit one mole of substance

(d) charge carried by 6.22×10^{10} electrons

7. How many faradays of electricity are required for the following reaction to occur $MnO^-_4 \rightarrow Mn^{2+}$ **(a) 5F** (b) 3F (C) IF (d) 7F

8. A current strength of 3.86 A was passed through molten Calcium oxide for 41 minutes and 40 seconds. The mass of Calcium in grams deposited at the cathode is (atomic mass of Ca is 40g / mol and IF = 96500C).

(a) 4 **(b) 2** (c) 8 (d) 6

9. During electrolysis of molten sodium chloride, the time required to produce 0.1 mol of chlorine gas using a current of 3A is ……..

(a) 55 minutes **(b) 107.2 minutes** (c) 220 minutes (d) 330 minutes

10. The number of electrons delivered at the cathode during electrolysis by a current of 1 A in 60 seconds is (charge of electron = 1.6×10^{-19}C)

(a) 6.22×10^{23} (b) 6.022×10^{20} **(c) 3.75×10^{20}** (d) 7.48×10^{23}

11. Which of the following electrolytic solution has the least specific conductance?

(a) 2N **(b) 0.002N** (c) 0.02N (d) 0.2N

12. While charging lead storage battery

(a) $PbSO_4$ on cathode is reduced to Pb (b) $PbSO_4$ on anode is oxidised to PbO_4

(c) $PbSO_4$ on anode is reduced to Pb (d) $PbSO_4$ on cathode is oxidised to Pb

13. Among the following cells

I. Leclanche cell

II. Nickel – Cadmium cell

III. Lead storage battery

IV. Mercury cell

Primary cells are ……

(a) I and IV (b) I and III (c) III and IV (d) II and III

14. Zinc can be coated on iron to produce galvanized iron but the reverse is not possible. It is because

(a) Zinc is lighter than iron (b) Zinc has lower melting point than iron

(c) Zinc has lower negative electrode potential than iron

(d) Zinc has higher negative electrode potential than iron

15. Assertion: pure iron when heated in dry air is converted with a layer Of rust.

Reason: Rust has the composition Fe_3O_4

(a) If both assertion and reason are true and reason is the correct explanation of assertion.

(b) If both assertion and reason are true but reason is not the correct explanation of assertion.

(c) assertion is true but reason is false

(d) both assertion and reason are false.

16. In H_2 – O_2 fuel cell the reaction occur at cathode is …….

(a) $O_2(g) + 2H_2O(l) + 4e^- \rightarrow 4OH^-(aq)$ (b) $H^+(aq) + OH^-(aq) \rightarrow H_2O(l)$

(c) $2H_2(g) + O_2(g) \rightarrow 2H_2O(g)$ (d) $H^+ + e^- \rightarrow 1/2\ H_2$

17. The equivalent conductance of M/36 solution of a weak monobasic acid is 6mho cm^2 and at infinite dilution is 400 mho cm^2. The dissociation constant of this acid is

(a) 1.25×10^{-16} **(b) 6.25×10^{-6}** (c) 1.25×10^{-4} (d) 6.25×10^{-5}

18. A conductivity cell has been calibrated with a 0.01M, 1:1 electrolytic solution (specific conductance ($K = 1.25 \times 10^{-3}$ S cm^{-1}) in the cell and the measured resistance was 800Ω at 25^0 C . The cell constant is,

(a) 10^{-1} cm^{-1} (b) 10^{-1} cm^{-1} **(c) 1 cm^{-1}** (d) 5.7×10^{-12}

19. Conductivity of a saturated solution of a sparingly soluble salt AB (1:1 electrolyte) at 298K is 1.85×10^{-5} S m^{-1}. Solubility product of the saltAB at 298K $(\Lambda^0_m)_{AB} = 14 \times 10^{-3}$ S m^2 mol^{-1}.

(a) 5.7×10^{-2} (b) 1.32×10^{12} (c) 7.5×10^{-12} (d) 1.74×10^{-12}

20. In the electrochemical cell: $Zn|ZnSO_4$ (0.01M)$||CuSO_4$ (1.0M)$|Cu$, the emf of this Daniel cell is E_1. When the concentration of $ZnSO_4$ is changed to 1.0 M and that $CuSO_4$ changed to 0.0 1M, the emf changes to E_2. From the followings, which one is the relationship between E_1 and E_2?

(a) $E_1 < E_2$ **(b) $E_1 > E_2$** (c) $E_2 = 0 \uparrow E_1$ (d) $E_1 = E_2$

21. Consider the change in oxidation state of Bromine corresponding to different emf values as shown in the diagram below:

$BrO_4^- \xrightarrow{1.82\,V} BrO^- \xrightarrow{1.5\,V} HBrO \xrightarrow{1.595\,V} Br_2 \xrightarrow{1.0652\,V} Br^-$

Then the species undergoing disproportional is .....

(a) Br_2 (b) BrO_4^- (c) BrO_3^- **(d) HBrO**

22. For the cell reaction

$2Fe^{3+}(aq) + {}^{2I}(aq) \rightarrow 2Fe^{2+}(aq) + I_2(aq)$ $EC^0_{cell} = 0.24V$ at 298K.

The standard Gibbs energy (ΔG^0) of the cell reactions is .....

(a) – 46.32 KJ mol^{-1} (b) – 23.16 KJ mol^{-1} (c) 46.32 KJ mol^{-1} (d) 23.16 KJ mor^{-1}

23. A certain current liberated 0.504gm of hydrogen in 2 hours. How many grams of copper can be liberated by the same current flowing for the same time in a copper sulphate solution?

(a) 31.75 **(b) 15.8** (c) 7.5 (d) 63.5

24. A gas X at 1 atm is bubble through a solution containing a mixture of $1MY^-$ and $1MZ^{-1}$ at 25°C . If the reduction potential of Z > Y> X, then

(a) Y will oxidize X and not Z

(b) Y will oxidize Z and not X

(c) Y will oxidize both X and Z

(d) Y will reduce both X and Z

25. Cell equation: $A^{2+} + 2B^- \rightarrow A^{2+} + 2B$ $A^{2+} + 2e^- \rightarrow AE^\circ = + 0.34V$ and $\log_{10} K = 15.6$ at 300K for cell reactions find E° for $B^1 + e^- \rightarrow B$

(a) 0.80 (b) 1.26 (c) – 0.54 (d) – 10.94

UNIT 10: SURFACE CHEMISTRY

1. For Freundlich isotherm a graph of log (x/m) is plotted against log p. The slope of the line and its y – axis intercept respectively corresponds to

a) 1/n , k b) log 1/n , k **c) 1/n , log k** d) log 1/n , log k

2. Which of the following is incorrect for physisorption?

a) reversible **b) increases with increase in temperature**

c) low heat of adsorption d) increases with increase in surface area

3. Which one of the following characteristics are associated with adsorption?

a) ΔG and ΔH are negative but ΔS is positive

b) ΔG and ΔS are negative but ΔH is positive

c) ΔG is negative but ΔH and ΔS are positive

d) ΔG, ΔH and ΔS all are negative.

4. Fog is colloidal solution of

a) solid in gas b) gas in gas **c) liquid in gas** d) gas in liquid

5. Assertion : Coagulation power of Al3+ is more than Na+ .

Reason : greater the valency of the flocculating ion added, greater is its power to cause precipitation

a) if both assertion and reason are true and reason is the correct explanation of assertion.

b) if both assertion and reason are true but reason is not the correct explanation of assertion.

c) assertion is true but reason is false

d) both assertion and reason are false.

6. Statement : To stop bleeding from an injury, ferric chloride can be applied. Which comment about the statement is justified?

a) It is not true, ferric chloride is a poison.

b) It is true, Fe^{3+} ions coagulate blood which is a negatively charged sol

c) It is not true; ferric chloride is ionic and gets into the blood stream.

d) It is true, coagulation takes place because of formation of negatively charged sol with Cl-.

7. Hair cream is

a) gel **b) emulsion** c) solid sol d) sol.

8. Which one of the following is correctly matched?

a) Emulsion – Smoke **b) Gel – butter** c) foam – Mist d) whipped cream – sol

9. The most effective electrolyte for the coagulation of As_2S_3 Soils

(a) NaCl (b) $Ba(NO_3)_2$ (c) $K_3[Fe(CN)_6]$ **(d) $Al_2(SO_4)_3$**

10. Which one of the is not a surfactant?

(a) $CH_3 – (CH_2)_{15} – N – (CH_3)_2CH_2Br$ **(b) $CH_3 – (CH_2)_{15} – NH_2$**
(c) $CH_3 – (CH_2)_{16} – CH_2OSO_2 – Na^+$ (d) $OHC – (CH_2)_{14} – CH_2 – COO^-Na^+$

11. The phenomenon observed when a beam of light is passed through a colloidal solution is

a) Cataphoresis b) Electrophoresis c) Coagulation **d) Tyndall effect**

12. In an electrical field, the particles of a colloidal system move towards cathode. The coagulation of the same sol is studied using K_2SO_4 (i), Na_3PO_4 (ii),$K_4[Fe(CN)_6]$ (iii) and NaCl (iv) Their coagulating power should be

a) II > I>IV > III **b) III > II > I > IV** c) I > II > III > IV d) none of these

13. Collodion is a 4% solution of which one of the following compounds in alcohol – ether mixture?

a) Nitroglycerine b) Cellulose acetate c) Glycoldinitrate **d) Nitrocellulose**

14. Which one of the following is an example for homogeneous catalysis?

a) manufacture of ammonia by Haber's process

b) manufacture of sulphuric acid by contact process

c) hydrogenation of oil

d) Hydrolysis of sucrose in presence of dil HCl

15. Match the following

A) V_2O5 i) High density polyethylene

B) Ziegler – Natta ii) PAN

C) Peroxide iii) NH_3

D) Finely divided Fe iv) H_2SO_4

A B C D

a) (iv) (i) (ii) (iii)

b) (i) (ii) (iv) (iii)

c) (ii) (iii) (iv) (i)

d) (iii) (iv) (ii) (i)

16. The coagulation values in millimoles per litre of the electrolytes used for the coagulation of As_2S_3 are given below

(I) (NaCl)=52 (II) (($BaCl_2$)=0.69 (III) ($MgSO_4$)=0.22

The correct order of their coagulating power is

a) III > II > I b) I > II > III c) I > III > II d) II > III>I

17. Adsorption of a gas on solid metal surface is spontaneous and exothermic, then

a) ΔH increases b) ΔS increases c) ΔG increases **d) ΔS decreases**

18. If x is the amount of adsorbate and m is the amount of adsorbent, which of the following relations is not related to adsorption process?

a) $x/m = f(P)$ at constant T b) $x/m = f(T)$ at constant P

c) P = f(T) at constant x/m **d) x/m = PT**

19. On which of the following properties does the coagulating power of an ion depend ?

a) Both magnitude and sign of the charge on the ion.

b) Size of the ion alone

c) the magnitude of the charge on the ion alone

d) the sign of charge on the ion alone.

20. Match the following

A) Pure nitrogen i) Chlorine

B) Haber process ii) Sulphuric acid

C) Contact process iii) Ammonia

D) Deacons Process iv) sodium azide (or) Barium azide

Which of the following is the correct option?

A B C D	A B C D	A B C D	A B C D
a) (i) (ii) (iii) (iv)	b) (ii) (iv) (i) (iii)	c) (iii) (iv) (ii) (i)	**d) (iv) (iii) (ii) (i)**

UNIT 11: HYDROXY COMPOUNDS AND ETHERS

1. An alcohol (x) gives blue colour in victormayer's test and 3.7g of X when treated with metallic sodium liberates 560 mL of hydrogen at 273 K and 1 atm pressure what will be the possible structure of X?

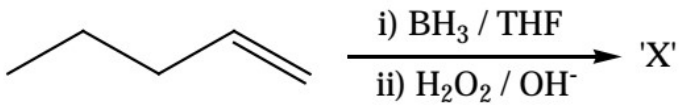
(a) CH_3 CH (OH) CH_2CH_3 (b) CH_3 – CH(OH) – CH_3

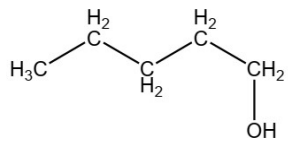
(c) CH_3 – C (OH) $(CH_3)_2$ (d) CH_3 – CH_2 – CH (OH) – CH_2 – CH_3

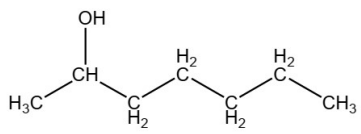
2. Which of the following compounds on reaction with methyl magnesium bromide will give tertiary alcohol.

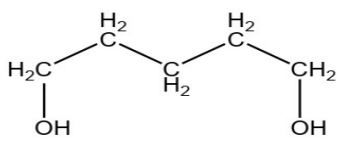
(a) benzaldehyde (b) propanoic acid **(c) methyl propanoate** (d) acetaldehyde

3.



a) 

b) 

c) 

d) none of these **Ans: a)**

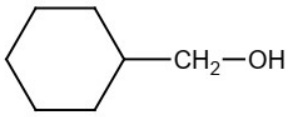
4. In the reaction sequence, Ethene $\xrightarrow{HOCl}$ A $\xrightarrow{X}$ ethan -1, 2 - diol . A and X respectively are

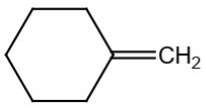
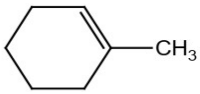
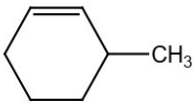
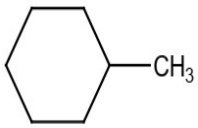
(a) Chloroethane and NaOH (b) ethanol and H_2SO_4

(c) 2 – chloroethan – 1 – ol and $NaHCO_3$ (d) ethanol and H_2O

5. Which one of the following is the strongest acid

a) 2 – nitrophenol (b) 4 – chlorophenol **(c) 4 – nitrophenol** (d) 3 – nitrophenol

6.  **on treatment with Con. H_2SO_4, predominately gives** .....

a)  b)  c)  d)  **Ans: b**

7. Carbolic acid is ...

(a) Phenol (b) Picric acid (c) benzoic acid (d) phenylacetic acid

8. Which one of the following will react with phenol to give salicyladehyde after hydrolysis ...

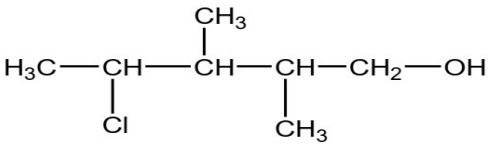
(a) Dichioro methane (b) trichioroethane **(c) trichloro methane** (d) CO_2

9. $(CH_3)_3 - C - CH(OH)\,CH_3 \xrightarrow{Con\ H_2SO_4} X$ (major product)

(a) $(CH_3)_3\,CCH = CH_2$ **(b) $(CH_3)_2\,C = C\,(CH_3)_2$**

(c) $CH_2 = C(CH_3)CH_2 - CH_2 - CH_3$ (d) $CH_2 = C\,(CH_3) - CH_2 - CH_2 - CH_3$

10. The correct IUPAC name of the compound,



(a) 4 – chloro – 2, 3 – dimethyl pentan – 1 – ol

(b) 2, 3 – dimethyl – 4 – chloropentan – 1 – ol

(c) 2, 3, 4 – trimethyl – 4 – chiorobutan – 1 – ol

(d) 4 – chioro – 2, 3, 4 – trimethyl pentan – 1 – ol

11. Assertion: Phenol is more acidic than ethanol

Reason: Phenoxide ion is resonance stabilized

(a) if both assertion and reason are true and reason is the correct explanation of assertion.

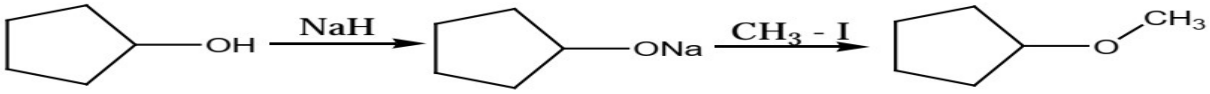
(b) if both assertion and reason are true but reason is not the correct explanation of assertion.

(c) assertion is true but reason is false (d) both assertion and reason are false.

12. In the reaction Ethanol $\xrightarrow{PCl_5}$ X $\xrightarrow{alc.KOH}$ Y $\xrightarrow[298K]{H_2SO_4/H_2O}$ Z. The 'Z' is

(a) ethane (b) ethoxyethane (c) ethylbisuiphite **(d) ethanol**

13. The reaction



can be classified as (a) dehydration (b) Williams on alcohol synthesis
(c) Williamson ether synthesis (d) dehydrogenation of alcohol

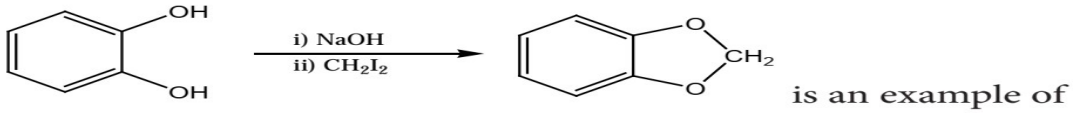
14. Isoprophylbcnzene on air oxidation in the presence of dilute acid gives .....
(a) C_6H_5COOH (b) $C_6H_5COCH_3$ (c) $C_6H_5COC_6H_5$ **(d) C_6H_5 – OH**

15. Assertion: Phenol is more reactive than benzene towards electrophilic substitution reaction
Reason: In the case of phenol. the intermediate arenium ion is more stabilized by resonance.
(a) if both assertion and reason are true and reason is the correct explanation of assertion.
(b) if both assertion and reason are true but reason is not the correct explanation of assertion.
(c) assertion is true but reason is false
(d) both assertion and reason are false,.

16. HO CH_2 CH_2 – OH on heating with periodic acid gives .....
(a) methanoic acid (b) Glyoxal **(c) methanol** (d) CO_2

17. Which of the following compound can be used as artireeze in automobile radiators? (a) methanol (b) ethanol (c) Neopentyl alcohol **(d) ethan -1, 2-diol**

18. The reactions



is an example of

(a) Wurtz reaction (b) cyclic reaction (c) Williamson reaction **(d) Kolbe reactions**

19. One mole of an organic compound (A) with the formula C_3H_8O reacts completely with two moles of HI to form X and Y. When Y is boiled with aqueous alkali it forms Z. Z answers the iodoform test. The compound (A) is .....
(a) propan – 2 – ol (b) propan- 1- ol (c) ethoxy ethane **(d) methoxy ethane**

20. Among the following ethers which one will produce methyl alcohol on treatment with hot HI?

a) $(H_3C)_3C-O-CH_3$

b) $(CH_3)_2-CH-CH_2-O-CH_3$

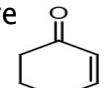
c) $CH_3(CH_2)_3-O-CH_3$

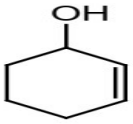
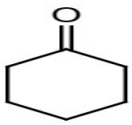
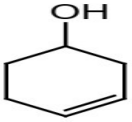
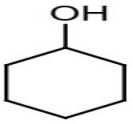
d) $CH_3-CH_2-\underset{\displaystyle CH_3}{\underset{|}{CH}}-O-CH_3$

21. Williamson synthesis of preparing dimethyl ether is a / an
(a) SN^1 reactions **(b) SN^2 reaction** (c) electrophilic addition (d) electrophilic substitution

22. On reacting with neutral ferric chloride, phenol gives
(a) red colour **(b) violet colour** (c) dark green colour (d) no colouration

UNIT 12: CARBONYL COMPOUNDS AND CARBOXYLIC ACIDS

1. The correct structure of the product 'A' formed in the re  $\xrightarrow[\text{Pd / C, ethanol}]{H_2\ (gas,\ 1\ atm)}$ A is

a)  b)  c)  d)  Ans: b)

2. The formation of cyanohydrin from acetone is an example of

a) nucleophilic substitution b) electrophilic substitution

c) electrophilic addition **d) Nucleophilic addition**

3. Reaction of acetone with one of the following reagents involves nucleophilic addition followed by elimination of water. The reagent is

a) Grignard reagent b) Sn / Hcl

c) hvdrazine in presence of slightly acidic solution d) hvdrocvanic acid

4. In the following reacı $HC\equiv CH \xrightarrow[HgSO_4]{H_2SO_4} X$ Product 'X' will not give

a) Tollens test **b) Victor meyer test** c) lodoform test d) Fehling solution test

5. $CH_2=CH_2 \xrightarrow[ii)\ Zn\ /\ H_2O]{i)\ O_3} X \xrightarrow{NH_3} Y$ 'Y' is

a) formaldehyde b) di acetone ammonia

c) hexamethvlene tetraamine d) oxime

6. Predict the product Z in the following series of reactions

$$\text{Ethanoic acid} \xrightarrow{PCl_5} X \xrightarrow[\text{Anhydrous}AlCl_3]{C_6H_6} Y \xrightarrow[ii)H_3O^+]{i)CH_3MgBr} Z\ .$$

a) $(CH_3)_2C(OH)C_6H_5$ b) $CH_3CH(OH)C_6H_5$

c) $CH_3CH(OH)CH_2-CH_3$ d)

Ans: a)

7. Assertion: 2,2 – dimethyl propanoic acid does not give HVZ reaction.

Reason: 2 – 2, dimethyl propanoic acid does not have a – hydrogen atom

a) if both assertion and reason are true and reason is the correct explanation of assertion.

b) if both assertion and reason are true but reason is not the correct explanation of assertion.

c) assertion is true but reason is false d) both assertion and reason are false.

8. Which of the following represents the correct order of acidity in the given compounds

a) $FCH_2COOH > CH_3COOH > BrCH_2COOH > ClCH_2COOH$

b) $FCH_2COOH > ClCH_2COOH > BrCH_2COOH > CH_3COOH$

c) $CH_3COOH > C1CH_2COOH > FCH_2COOH > Br\text{-}CH_2COOH$

d) $ClCH_2COOH > CH3COOH > BrCH_2COOH > ICH_2COOH$

9. Benzoic acid $\xrightarrow[ii)\ \Delta]{i)\ NH_3}$ A $\xrightarrow{NaOBr}$ B $\xrightarrow{NaNO_2/HCl}$ C 'C' is

a) anilinium chloride b) o - nitro aniline

c) benzene diazonium chloride d) m – nitro ben.zoic acid

10. Ethanoic acid $\xrightarrow{P/Br_2}$ 2 – bromoethanoic acid. This reaction is called

a) Finkeistein reaction b) Haloform reaction

c) Hell – Volhard – Zelinsky reaction d) none of these

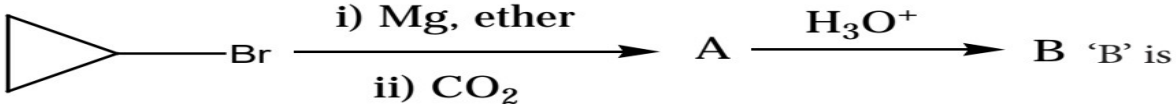
11. $CH_3Br \xrightarrow{KCN} (A) \xrightarrow{H_3O^+} (B) \xrightarrow{PCl_5} (C)$ product (C) is

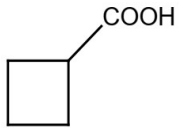
a) acetylchloride b) chloro acetic acid

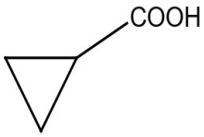
c) α- chlorocyano ethanoic acid d) none of these

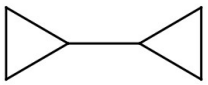
12. Which one of the following reduces Tollens reagent

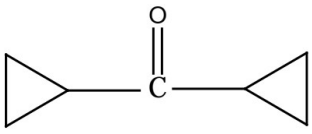
a) formic acid b) acetic acid c) benzophenone d) none of these

13. 

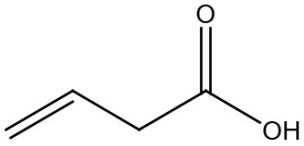
a) 

b) 

c) 

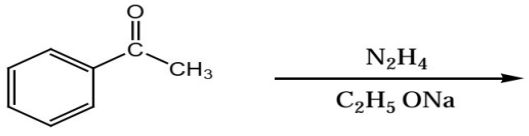
d) 

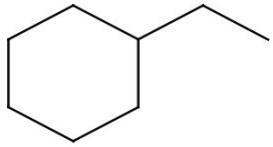
Ans: b)

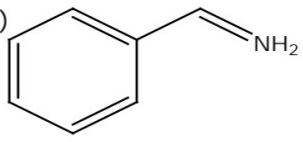
14. The IUPAC name of 

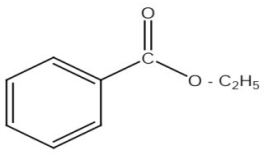
a) but- 3- enoicacid b) but – 1- ene-4-oic acid

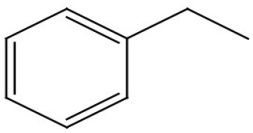
c) but – 2- ene-1-oic acid d) but -3-ene-1-oicacid

15. Identify the product formed in the reaction 

a) 

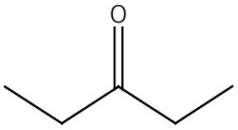
b) 

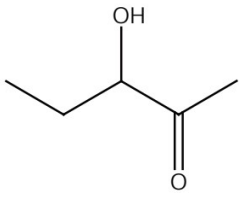
C) 

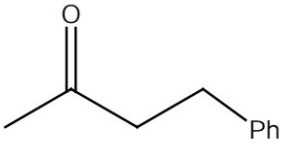
d) 

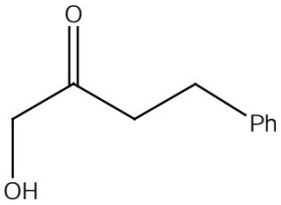
Ans: d

16. In which case chiral carbon is not generated by reaction with HCN

a) 

b) 

C) 

d) 

Ans: a)

17. Assertion : p – N, N – dimethyl aminobenzaldehyde undergoes benzoin condensation

Reason : The aldehydic (-CHO) group is meta directing

a) if both assertion and reason are true and reason is the correct explanation of assertion.

b) if both assertion and reason are true but reason is not the correct explanation of assertion.

c) assertion is true but reason is false d) both assertion and reason are false.

18. Which one of the following reaction is an example of disproportionation reaction

a) Aldol condensation **b) cannizaro reaction** c) Benzoin condensation d) none of these

19. Which one of the following undergoes reaction with 50% sodium hydroxide solution to give the corresponding alcohol and acid

a) Phenylmethanal b) ethanol c) ethanol d) methanol

20. The reagent used to distinguish between acetaldehyde and benzaldehyde is

a) Tollens reagent **b) Fehling's solution**

c) 2,4 – dinitrophenyl hydrazine d) semicarbazide

21. Phenyl methanal is reacted with concentrated NaOH to give two products X and Y. X reacts with metallic sodium to liberate hydrogen X and Y are

a) sodiumbenzoate and phenol b) Sodium benzoate and phenyl methanol

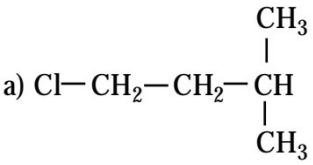
c) phenyl methanol and sodium benzoate d) none of these

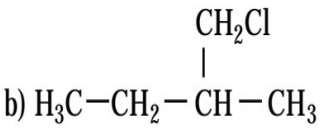
22. In which of the following reactions new carbon – carbon bond is not formed?

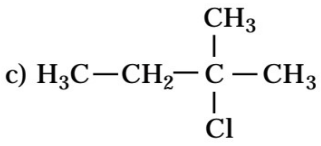
a) Aldol condensation b) Friedel craft reaction

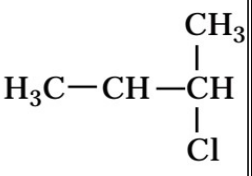
c) Kolbe's reaction **d) Wolf kishner reduction**

23. Alkene "A" on reaction with O_3 and Zn – H_2O gives propanone and ethanal in equimolar ratio. Addition of HCl to alkene "A" gives "B" as the major product. The structure of product "B" is

a) 

b) 

c) 

d) 

Ans: c)

24. Carboxylic acids have higher boiling points than aldehydes, ketones and even alcohols of comparable molecular mass. It is due to their

a) more extensive association of carboxylic acid via van der Waals force of attraction

b) formation of carboxylate ion

c) formation of intramolecular H-bonding

d) formation of intermolecular H – bonding

UNIT 13: ORGANIC NITROGEN COMPOUNDS

1. Which of the following reagent can be used to convert nitrobenzene to aniline

a) Sn/HCl b) ZnHg/NaOH c) $LiAlH_4$ d) All of these

2. The method by which aniline cannot be prepared is

a) degradation of benzamide with Br_2/NaOH

b) potassium salt of phthalimide treated with chlorobenzene followed by hydrolysis with aqueous NaOH solution.

c) Hydrolysis of phenylcyanide with acidic solution.

d) reduction of nitrobenzene by Sn/HCl

3. Which one of the following will not undergo Hofmann bromamide reaction

a) $CH_3CONHCH_3$ b) $CH_3CH_2CONH_2$ c) CH_3CONH_2 d) $C_6H_5CONH_2$

4. Assertion: Acetamide on reaction with KOH and bromine gives acetic acid

Reason: Bromine catalyses hydrolysis of acetamide.

a) if both assertion and reason are true and reason is the correct explanation of assertion

b) if both assertion and reason are true but reason is not the correct explanation of assertion.

c) assertion is true but reason is false

d) both assertion and reason are false

5.

$$CH_3CH_2Br \xrightarrow[\Delta]{\text{aq NaOH}} A \xrightarrow[\Delta]{KMnO_4/H^+} B \xrightarrow[\Delta]{NH_3} C \xrightarrow{Br_2/NaOH} D$$ 'D' is

a) bromomethane b) α -Bromo sodium acetate **c) methanamine** d) acetamide

6. **Which one of the following nitro compounds does not react with nitrous acid?**

a) $CH_3\text{-}CH_2\text{-}CH_2\text{-}NO_2$

b) $(CH_3)_2CH\text{-}CH_2NO_2$

c) $(CH_3)_3C\,NO_2$

d) $CH_3-\underset{\underset{O}{\|}}{C}-\underset{\underset{CH_3}{|}}{CH}-NO_2$

Ans: c)

7. Aniline + benzoylchloride $\xrightarrow{NaOH}$ $C_6H_5\text{-}NH\text{-}COC_6H_5$ this reaction is known as

a) Friedel – Crafts reaction b) HVZ reaction

c) Schotten – Baumann reaction d) None of these

8. The product formed by the reaction of an aldehyde with a primary amine

a) carboxylic acid b) aromatic acid **c) Schiff's base** d) ketone

9. Which of the following reaction is not correct?

a) $CH_3CH_2NH_2 \xrightarrow{HNO_2} CH_3CH_2OH + N_2$

b) $(CH_3)_2N$–C$_6$H$_4$ $\xrightarrow{NaNO_2 / HCl}$ $(CH_3)_2N$–C$_6$H$_4$–N = NCl

c) $CH_3CONH_2 \xrightarrow{Br_2/NaOH} CH_3NH_2$ d) none of these

Ans: b)

10. When aniline reacts with acetic anhydride the product formed is

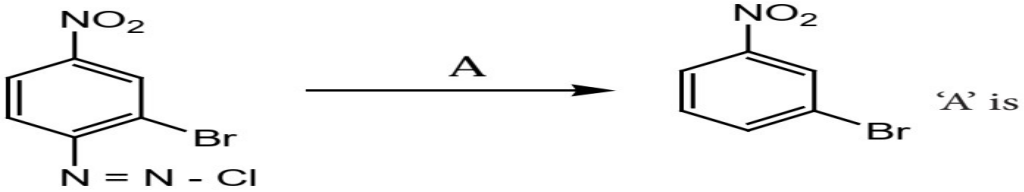
a) o – amirìoacetophenone b) m – aminoacetophenone

c) p – aminoacetophenone **d) acetanilide**

11. The order of basic strength for methyl substituted amines in aqueous solution is

a) $N(CH_3)_3 > N(CH_3)_2H > N(CH_3)H_2 > NH_3$ b) $N(CH_3)H, > N(CH_3)_2H > N(CH_3)_3 > NH_3$

c) $NH_3 > N(CH_3)H_2 > N(CH_3)_2H > N(CH_3)_3$ **d) $N(CH_3)_2H > N(CH_3)H_2 > N(CH_3)_3 > NH_3$**

12. 

a) H_3PO_2 and H_2O b) H^+/H_2O c) $HgSO_4$ / H_2SO_4 d) Cu_2Cl_2

13. $C_6H_5NO_2 \xrightarrow{Fe / Hcl} A \xrightarrow[273K]{NaNO_2 / HCl} B \xrightarrow[283K]{H_2O} C$ 'C' is

a) C_6H_5-OH b) C_6H_5-CH_2OH c) C_6H_5-CHO d) $C_6H_5NH_2$

14. Nitrobenzene on reaction with Con HNO_3 / H_2SO_4 at 80- 100°C forms which one of the following products?

a) 1, 4 – dinitrobenzene b) 2, 4, 6 – tirnitrobenzene

c) 1, 2 – dinitrobenzene **d) 1, 3 – dinitrobenzene**

15. $C_5H_{13}N$ reacts with HNO_2 to give an optically active compound – The compound is

a) pentan-1 –amine b) pentan-2-amine

c) N, N – dimethyipropan -2-amine **d) N-methylbutan-2-amine**

16. Secondary nitro alkanes react with nitrous acid to form

a) red solution **b) blue solution** c) green solution d) yellow solution

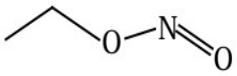
17. Which of the following amines does not undergo acetylation?

a) t-butylamine b) ethylamine c) diethylamine **d) triethylamine**

18. Which one of the following is most basic?

a) 2, 4 – dichloroaniline **b) 2, 4 – dimethylaniline**

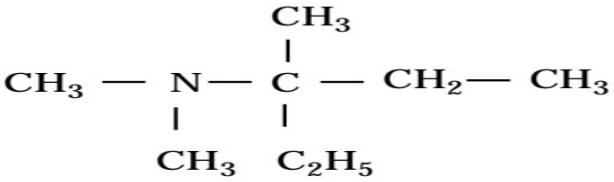
c) 2, 4 – dinitroaniline d) 2, 4 – dibromoaniline

19. When  is reduced with Sn / HCl the pair of compounds formed are

a) Ethanol, hydroxylamine hydrochloride b) Ethanol, ammonium hydroxide

c) Ethanol, NH_2OH d) $C_3H_5NH_2$, H_2O

20. IUPAC name for the amine



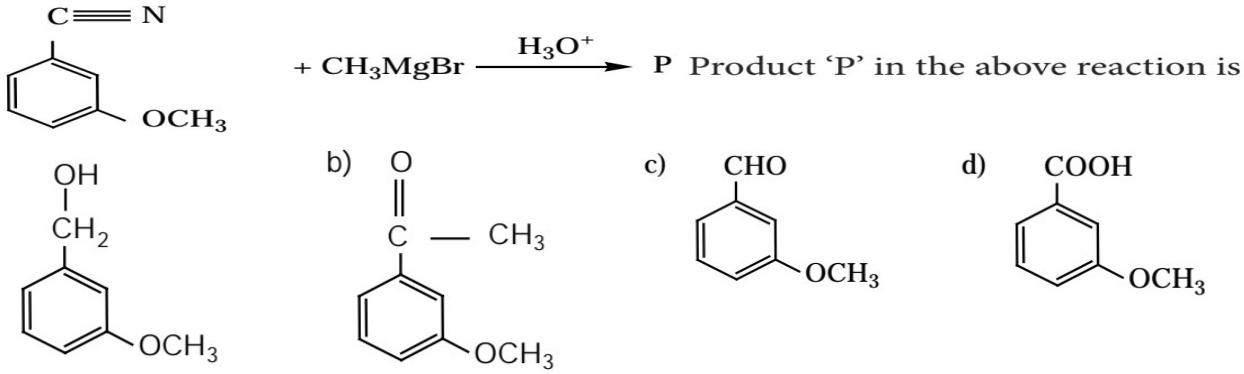
a) 3 – Bimethy lamino – 3 – methyl pentane

b) 3(N,N – Triethyl) – 3 – amino pentane

c) 3-N,N – trimethyl pentanamine

d) 3 – (N,N – Dimethyl amino) – 3- methyl pentane

21.



Product 'P' in the above reaction is

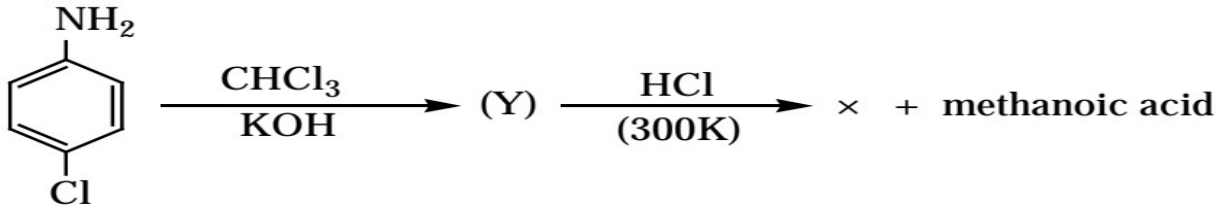
Ans: b)

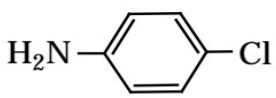
22. Ammonium salt of benzoic acid is heated strongly with P_2O_5 and the product so formed is reduced and then treated with $NaNO_2$/ HCl at low temperature. The final compound formed is

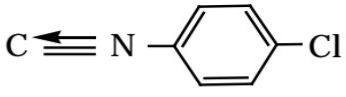
a) Benzene diazonium chloride **b) Benzyl alcohol**

c) Phenol d) Nitrosobenzene

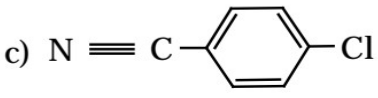
23. Identify X in the sequence given below.

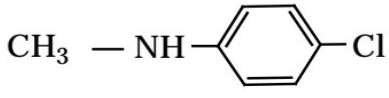


a) 

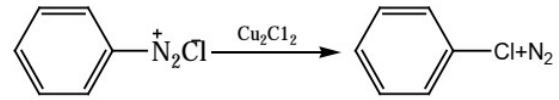
b) 

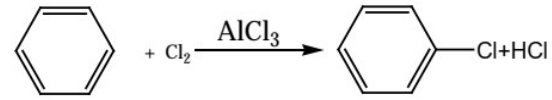
Ans: a)

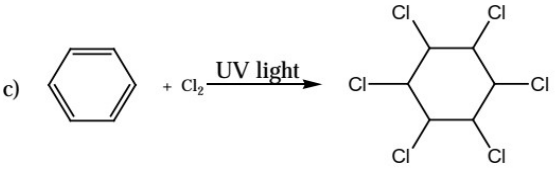
c) 

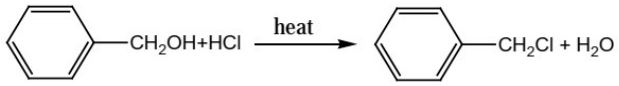
d) 

24. Among the following, the reaction that proceeds through an electrophilic substitution, is :

a) 

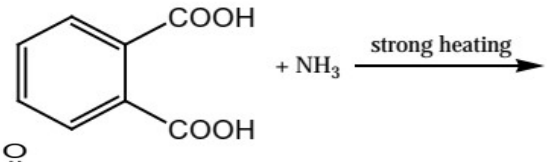
b) 

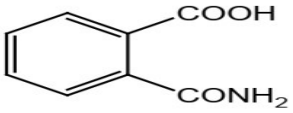
c) 

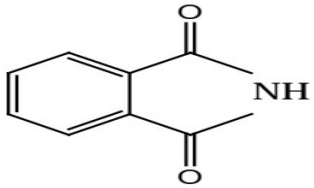
d) 

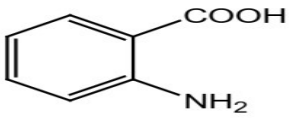
Ans: b)

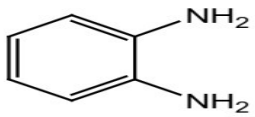
25. The major product of the following reaction



a) 

b) 

c) 

d) 

Ans: b)

UNIT 14: BIOMOLECULES

1. Which one of the following rotates the plane polarized light towards left?

a) D(+) Glucose (b) L(+) Glucose **(c) D(-) Fructose** d) D(+) Galactose

2. The correct corresponding order of names of four aldoses with configuration given below Respectively is,

a) *L*-Erythrose, *L*-Threose, *L*-Erythrose, *D*-Threose

b) *D*-Threose,*D*-Erythrose, *L*-Threose, *L*-Erythrose,

c) *L*-Erythrose, *L*-Threose, *D*-Erythrose, *D*-Threose

d) *D*-Erythrose, *D*-Threose, *L*-Erythrose, *L*-Threose

3. Which one given below is a non-reducing sugar?

a) Glucose **b) Sucrose** c) maltose d) Lactose.

4. Glucose $\xrightarrow{(HCN)}$ Product $\xrightarrow{(hydrolysis)}$ Product $\xrightarrow{(HI + Heat)}$ A, the compound A is

a) Heptanoic acid b) 2-Iodohexane c) Heptane d) Heptanol

5. Assertion: A solution of sucrose in water is dextrorotatory. But on hydrolysis in the presence of little hydrochloric acid, it becomes levorotatory.

Reason: Sucrose hydrolysis gives equal amounts of glucose and fructose. As a result of this change in sign of rotation is observed.

a) If both accretion and reason are true and reason is the correct explanation of assertion

b) If both assertion and reason are true but reason is not the correct explanation of assertion

c) If assertion is true but reason is false.

d) if both assertion and reason are false.

6. The central dogma of molecular genetics states that the genetic information flows from

a) Amino acids → Protein → DNA b) DNA → Carbohydrates → Proteins

c) DNA → RNA → Proteins d) DNA → RNA → Carbohydrates

7. In a protein, various amino acids linked together by

a) Peptide bond b) Dative bond c) α - Glycosidic bond d) β - Glycosidic bond

8. Among the following the achiral amino acid is

a) 2-ethylalanine b) 2-methylglycine

c) 2-hydroxymethylserine d) Tryptophan

9) The correct statement regarding RNA and DNA respectively is

a) the sugar component in RNA is an arabinos and the sugar component in DNA is ribose

b) the sugar component in RNA is 2'-deoxyribose and the sugar component in DNA is arabinose

c) the sugar component in RNA is an arabinose and the sugar component in DNA is 2'-deoxyribose

d) the sugar component in RNA is ribose and the sugar component in DNA is 2'-deoxyribose

10. In aqueous solution amino acids mostly exist in,

a) NH_2-CH(R)-COOH b) NH_2-CH(R)-COO- c) H_3N^+-CH(R)-COOH **d) H_3N^+-CH(R)-COO-**

11. Which one of the following is not produced by the body?

a) DNA b) Enzymes c) Hormones **d) Vitamins**

12. The number of sp^2 and sp^3 hybridised carbon in fructose are respectively

a) 1 and 4 b) 4 and 2 c) 5 and 1 **d) 1 and 5**

13. Vitamin B_2 is also known as

a) Riboflavin b) Thiamine c) Nicotinamide d) Pyridoxine

14. The pyrimidine bases present in DNA are

a) Cytosine and Adenine b) Cytosine and Guanine

c) Cytosine and Thiamine d) Cytosine and Uracil

15. The secondary structure of a protein refers to

a) fixed configuration of the polypeptide backbone

b) hydrophobic interaction

c) sequence of a-amino acids

d) α -the helical backbone

16. Which of the following vitamins is water-soluble?

a) Vitamin E b) Vitamin K c) Vitamin A **d) Vitamin B**

17. Complete hydrolysis of cellulose gives

a) L-Glucose b) D-Fructose c) D-Ribose **d) D-Glucose**

18. Which of the following statement is incorrect?

a) Ovalbumin is a simple food reserve in the egg- white

b) Blood proteins thrombin and fibrinogen are involved in blood clotting

c) Denaturation makes the protein more active

d) Insulin maintains the sugar level in the human body.

19. Glucose is an aldose. Which one of the following reactions is not expected with glucose?

a) It does not form an oxime **b) It does not react with the Grignard reagent**

c) It does not form osazones d) It does not reduce tollens reagent

20. If one strand of the DNA has the sequence 'ATGCTTGA', then the sequence of complementary strand would be

a) TACGAACT b) TCCGAACT c) TACGTACT d) TACGRAGT

21. Insulin, a hormone chemically is

a) Fat b) Steroid **c) Protein** d) Carbohydrates

22. α -D (+) Glucose and β -D (+) glucose are

a) Epimers **b) Anomers** c) Enantiomers d) Conformational isomers

23. Which of the following are epimers

a) D(+)-Glucose and D(+)-Galactose b) D(+)-Glucose and D(+)-Mannose

c) Neither (a) nor (b) **d) Both (a) and (b)**

24. Which of the following amino acids is achiral?

a) Alanine b) Leucine c) Proline **d) Glycine**

UNIT 15: CHEMISTRY IN EVERYDAY LIFE

1. Which of the following is an analgesic?

a) Streptomycin b) Chloromycetin **c) Asprin** d) Penicillin

2. Antiseptics and disinfectants either kill or prevent growth of microorganisms. Identify which of the following statement is not true.

a) dilute solutions of boric acid and hydrogen peroxide are strong antiseptics.

b) Disinfectants harm the living tissues.

c) A 0.2% solution of phenol is an antiseptic while 1% solution acts as a disinfectant.

d) Chlorine and iodine are used as strong disinfectants.

3) Drugs that bind to the receptor site and inhibit its natural function are called

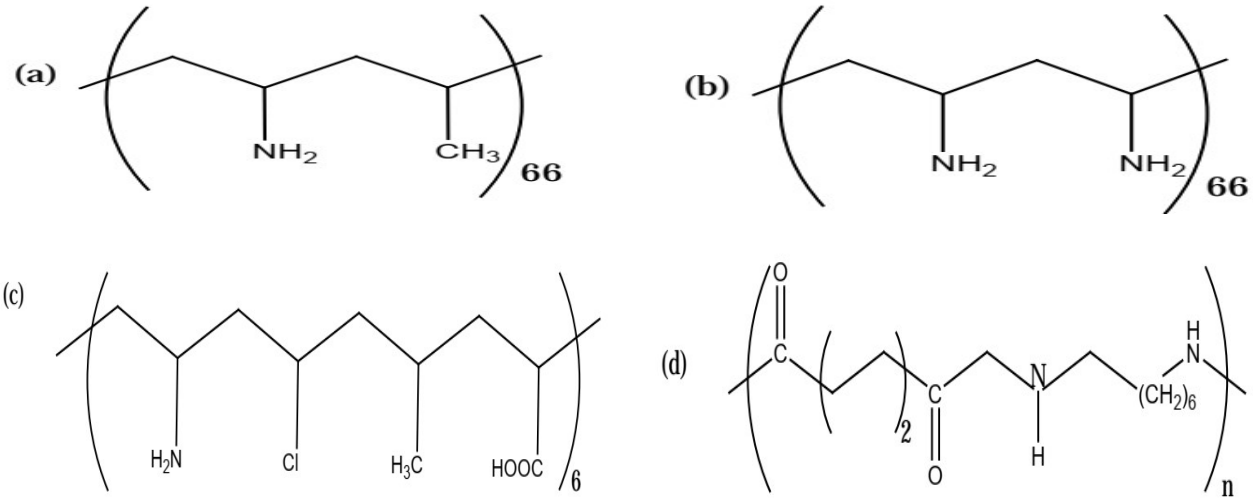
a) antagonists b) agonists c) enzymes d) molecular targets

4. Aspirin is a/an

a) acetylsalicylic acid b) benzoyl salicylic acid

c) chlorobenzoic acid d) anthranilic acid

5. Which one of the following structures represents nylon 6,6 polymer?



[Ans: d]

6. Natural rubber has

a) alternate cis- and trans-configuration b) random cis- and trans-configuration

c) all cis-configuration d) all trans-configuration

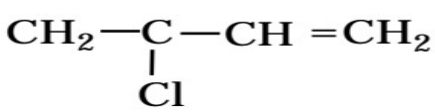
7. Nylon is an example of

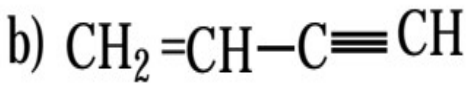
a) polyamide b) polythene c) polyester d) poly saccharide

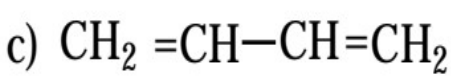
8. Terylene is an example of

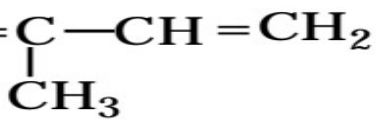
a) polyamide b) polythene **c) polyester** d) polysaccharide

9. Which is the monomer of neoprene in the following?

a) 

b) 

c) 

d) 

[Ans: a]

10. Which one of the following is a bio-degradable polymer?

a) HDPE b) PVC c) Nylon 6 **d) PHBV**

11. Non stick cook wares generally have a coating of a polymer, whose monomer is

a) ethane b) prop-2-enenitrile c) chloroethene **d) 1,1,2,2-tetrafluoroethane**

12. Assertion: 2-methyl-1,3-butadiene is the monomer of natural rubber

Reason: Natural rubber is formed through anionic addition polymerisation.

a) If both assertion and reason are true and reason is the correct explanation of assertion.

b) if both assertion and reason are true but reason is not the correct explanation of assertion.

c) assertion is true but reason is false.

d) both assertion and reason are false.

13. Which of the following is a co-polymer?

a) Orlon b) PVC c) Teflon **d) PHBV**

14. The polymer used in making blankets (artificial wool) is

a) polystyrene **b) PAN** c) polyester d) polythene

15. Regarding cross-linked or network polymers, which of the following statement is incorrect?

a) Examples are Bakelite and melamine

b) They are formed from bi and tri-functional monomers

c) They contain covalent bonds between various linear polymer chains

d) They contain strong covalent bonds in their polymer chain

IMPORTANT QUESTIONS IN CHEMISTRY XII STD

LESSON -1 METALLURGY

BOOK BACK QUESTIONS:

1. What is the difference between minerals and ores?
2. Which type of ores can be concentrated by froth floatation method?
3. Describe a method for refining nickel.
4. Explain zone refining process with an example.
5. Give the uses of zinc.
6. Explain the following terms with suitable examples. i) Gangue ii) Slag
7. Give the basic requirement for vapour phase refining.
8. Explain the principle of electrolytic refining with an example.
9. Limitations of Ellingham diagram.
10. What is the role of Limestone in the extraction of Iron from its oxide Fe_2O_3?

BOOK INTERIOR:

1. What is roasting?
2. Define Calcination.
3. What is smelting?
4. Explain Van-Arkel method.

LESSON -2 P-BLOCK ELEMENTS-I

BOOK BACK QUESTIONS:

1. Write a short note on anamolous properties of the first element of p-block.
2. Give the uses of Borax.
3. What is catenation? Describe briefly the catenation property of carbon.
4. Write a note on Fisher Tropsch synthesis.
5. Give the uses of silicones.
6. Describe the structure of diborane.
7. Write a short note on hydroboration.
8. How will you identify borate radical?
9. How will you convert boric acid to boron nitride?
10. CO is a reducing agent, justify with an example.
11. Write a note on zeolites.

BOOK INTERIOR:

1. Give the uses of Boric acid.
2. Structure Boric acid

LESSON -3 P-BLOCK ELEMENTS-II

BOOK BACK QUESTIONS:

1. What is the inert pair effect?
2. Why fluorine is more reactive than other halogens?
3. Give the uses of helium.
4. What is the hybridisation of iodine in IF_7? Give its structure.
5. Give the uses of sulphuric acid.
6. Give a reason that sulphuric acid is a dehydrating agent.
7. What type of hybridisation occur in a) BrF_5 b) BrF_3
8. Write the molecular formula and structural formula for the following molecules a) Nitric acid b) dinitrogen pentoxide c) phosphoric acid d) phosphine
9. Give the balanced equation for the reaction between chlorine with cold NaOH and hot NaOH.
10. What are interhalogen compounds? Give examples.

BOOK INTERIOR:

1. How is chlorine is manufactured by Deacon's process?
2. How is bleaching powder prepared?
3. Write about Holmes signal.
4. Give the test for sulphate / sulphuric acid.
5. HF acid is not stored in glass bottles why?
6. Mention the characteristic of interhalogen compounds.

LESSON -4 TRANSITION AND INNER TRANSITION ELEMENTS

BOOK BACK QUESTIONS:

1. Explain the oxidation states of 4d series elements.
2. What are inner transition elements?
3. Justify the position of lanthanides and actinides in the periodic table.
4. Describe the preparation of potassium dichromate.
5. What is lanthanide contraction and what are the effects of lanthanide contraction
6. What are interstitial compounds?
7. Which is more stable? Fe^{3+} or Fe^{2+} – explain.
8. Compare lanthanides and actinides.

BOOK INTERIOR:

1. State Hume – Rothery rule for alloy formation.
2. Why do transition elements and its compounds act as catalyst
3. Explain Ziegler-Natta catalyst.
4. Explain Chromyl chloride test.
5. Write the oxidizing property of $K_2Cr_2O_7$.

LESSON -5 COORDINATION CHEMISTRY

BOOK BACK QUESTIONS:

1. What is linkage isomerism? Explain with an example.
2. Write the postulates of Werner's theory?
3. What are hydrate isomers? Explain with an example.
4. What is crystal field splitting energy?
5. What are the limitations of VB theory?

6. Discuss briefly the nature of bonding in metal carbonyls.
7. Give an example of a coordination compound used in medicine and two examples of biologically important coordination compounds.
8. Give one test to differentiate $[Co(NH_3)_5Cl]SO_4$ and $[Co(NH_3)_5\ SO_4]Cl$
9. Give the difference between double salts and coordination compounds.
10. Why tetrahedral complexes do not exhibit geometrical isomerism
11. What is crystal field stabilization energy?
12. $[Sc\ (H_2O)_6]^{3+}$ is colourless why?
13. ased on VB theory explain why $[Cr(NH_3)_6]^{3+}$ is paramagnetic, while $[Ni(CN)_4]^{2-}$ is diamagnetic.

BOOK INTERIOR:
1. Coordination number and sphere
2. IUPAC name of coordination compounds.

LESSON -6 SOLID STATE

BOOK BACK QUESTIONS:
1. Define unit cell.
2. Give any three characteristics of ionic crystals.
3. Differentiate crystalline solids and amorphous solids.
4. Distinguish tetrahedral and octahedral voids.
5. What are point defects?
6. Explain Schottky and Frenkel defect.
7. Write short note on metal excess and metal deficiency defect with an example
8. Calculate the number of atoms in a fcc, bcc and sc in unit cell.
9. What is meant by the term "coordination number"?
10. What is the coordination number of atoms in a bcc structure?
11.Why ionic crystals are hard and brittle?

BOOK INTERIOR:
1. Bragg's equation. 2. Isotropy and anisotropy solids.
3. Packing efficiency of FCC
4. Stoichiometric defects in ionic solids.
5. Define primitive& non-primitive unit cells?

LESSON -7 CHEMICAL KINETICS

BOOK BACK QUESTIONS:
1. Define average rate and instantaneous rate.
2. Define rate law and rate constant.
3. Define the half-life of a reaction. Show that for a first-order reaction half-life is independent of initial concentration.
4. Derive integrated rate law for a zero-order reaction A → product
5. Differences between the order and molecularity.
6. Write Arrhenius equation and explains the terms involved.
7. Explain pseudo-first-order reaction with an example.
8. Give examples for a zero-order reaction.
9. Identify the order for the following reactions

i) Rusting of Iron

ii) Radioactive disintegration of $_{92}U^{23}$

iii) $2A+ B \rightarrow$ products; rate = $k\ [A]^{1/2}\ [B]^2$

10. Factors affecting reaction rate.

LESSON -8 IONIC EQUILIBRIUM

BOOK BACK QUESTIONS:
1. What are lewis acids and bases? Give two example for each.
2. Identify the conjugate acid base pairs.
3. Define solubility product.
4. Define ionic product of water. Give its value at room temperature.
5. Explain common ion effect with an example.
6. Derive an expression for Ostwald's dilution law.
7. Define pH.
8. Write the expression for the solubility product of $Ca_3(PO_4)$, Hg_2CI_2.

BOOK INTERIOR:
1. What are buffer solutions? Give an example.
2. What is Buffer index?
3. Explain the buffer action of a solution.
4. Explain buffer action of acidic buffer.
5. Derive Henderson-Hasselbalch equation
6. Explain intermediate compound formation theory of catalysis with an example.
7. What is the difference between homogenous and hetrogenous catalysis?

LESSON -9 ELECTRO CHEMISTRY

BOOK BACK QUESTIONS:
1. Define anode and cathode.
2. Why does conductivity of a solution decrease on dilution of the solution?
3. State Kohlrausch Law. How is it useful to determine the molar conductivity of weak electrolyte at infinite dilution.
4. State Faraday's Laws of electrolysis.
5. Is it possible to store copper sulphate in an iron vessel for a long tim
6. Derive an expression for Nernst equation.
7. Write a note on sacrificial protection.
8. Explain the function of $H_2 - O_2$ fuel cell.

BOOK INTERIOR:
1. Define molar conductivity (Λ_m)
2. Define equivalent conductance (Λ)

3. What are the applications of Kohlrausch's law?
4. Write a note on Debye-Huckel and onsagar equation.
5. Write a note on lithium – ion battery.
6. What are the factors affecting electrolytic conductance

LESSON – 10 SURFACE CHEMISTRY

BOOK BACK QUESTIONS:

1. Differentiate physisorption and chemisorption.
2. What is the difference between sol and gel?
3. Give two important characteristics of physisorption.
4. Write a note on electro osmosis.
5. Write a note on catalytic poison.
6. Explain intermediate compound formation theory of catalysis with an example.
7. What is the difference between homogenous and hetrogenous catalysis?
8. Describe adsorption theory of catalysis.

BOOK INTERIOR:

1. What are promoters?
2. What is Tyndall effect?
3. What are emulsions? Write their types.
4. Write a note on Helmholtz double layer.
5. Explain various methods of purification of colloids.
6. Write a note on nano catalysis.

LESSON -11 HYDROXY COMPOUNDS AND ETHERS

1. Explain Kolbe's reaction.
2. What is metamerism?
3. What is Saytzeff's rule
4. Write a note on Swern Oxidation
5. What happens when ethylene glycol is heated with conc. HNO_3 and conc. H_2SO_4?
6. How is nitroglycerine prepared?
7. Convert aniline into phenol
8. Write a note on (i) Riemer Tiemann reaction (ii) Phthalein reaction (iii) coupling reaction
9. Write a note on williamson ether synthesis?
10. How is picric acid prepared?
11. Give four uses of diethyl ether.
12. Explain Lucas test of differentiating three types of alcohols.

LESSON -12 CARBONYL COMPOUNDS AND CARBOXYLIC ACIDS

1. What is the action of HCN on (i) propanone (ii) 2, 4 – dichlorobenzaldehyde (iii) ethanol
2. How will you prepare i) Cinnamic acid from benzaldehyde ii) Benzoic acid from toluene
3. Write all possible structural isomers and position isomers for the ketone represented by the molecular formula $C_5H_{10}O$
4. What happens when the following alkenes are subjected to reductive ozonolysis i) Propene ii) 1-butene
4. Write a note on Rosenmund reduction.
5. Illustrate Popoff's rule.
6. Write about Gattermann – Koch reaction.
7. What is Cannizaro reaction?
8. Mention the uses of formaldehyde.
9. Write about Kolbe's electrolytic decarboxylation.
10. Mention the tests for carboxylic acids
11. What is Urotropine? How is it prepared? Mention its uses.
12. Explain the reducing nature of formic acid.
13. Explain the mechanism of aldol condensation.
14. Explain the mechanism of cannizaro reaction.
15. Convert benzaldehyde into (i) Schiff's base (ii) Malachite green dye
16. How can you identify aldehydes.

LESSON -13 ORGANIC NITROGEN COMPOUNDS

1. Write down the possible isomers of the $C_4H_9NO_2$ and give their IUPAC names.
2. There are two isomers with the formula CH_3NO_2. How will you distinguish between them?
3. How will you convert nitrobenzene into i) 1, 3, 5 – trinitrobenzene ii) o and p – nitrophenol
iii) m – nitro aniline iv) aniline
4. Write short notes on the following i) Gabriel phthalimide synthesis ii) Schotten – Baurnann reaction iii) Carbylamine reaction iv) Mustard oil reaction v) Coupling reaction vi) Diazotisation vii) Gomberg reaction viii) Hofmann's bromamide reaction
5. How will you distinguish between Primary, Secondary, and tertiary aliphatic amines
6. Why Amines are more basic than amides?

7. Aniline does not undergo Friedel – Crafts reaction. Why?

LESSON -14 BIOMOLECULES

BOOK BACK QUESTIONS:

1. Give the differences between primary and secondary structure of proteins
2. Give any three difference between DNA and RNA.
3. Write a short note on peptide bond.
4. Give two difference between Hormones and vitamins.
5. Write a note on the denaturation of proteins.
6. What is reducing and non – reducing sugars?
7. How are vitamins classified?
8. Define enzymes.
9. Write the structure of α – D (+) glucopyranose.
10. What are different types of RNA which are found in cell?
11. What are the functions of lipids in living organisms?

BOOK INTERIOR:

1. What are epimers?
2. What are Zwitter ions?
3. What is glycosidic linkage?

LESSON -15 CHEMISTRY IN DAILY LIFE

BOOK BACK QUESTIONS:

1. How do antiseptics differ from disinfectants?
2. What are food preservatives?
3. Explain the mechanism of cleansing action of soaps and detergents.
4. What are narcotic and non – narcotic drugs. Give examples.
5. What are biodegradable polymers? Give examples.
6. How is terylene prepared?
7. Write a note on vulcanization of rubber.

BOOK INTERIOR:

1. What are food additives? What are the advantages of food additives?
2. What are artificial sweetening agents? Give example.
3. How is nylon 6,6 prepared? Mention its use.
4. Write about Neoprene preparation? Mention its use.
5. Write about antioxidants.