CHEMISTRY

Question Bank

Bihar Board

PHOTOGRAPH

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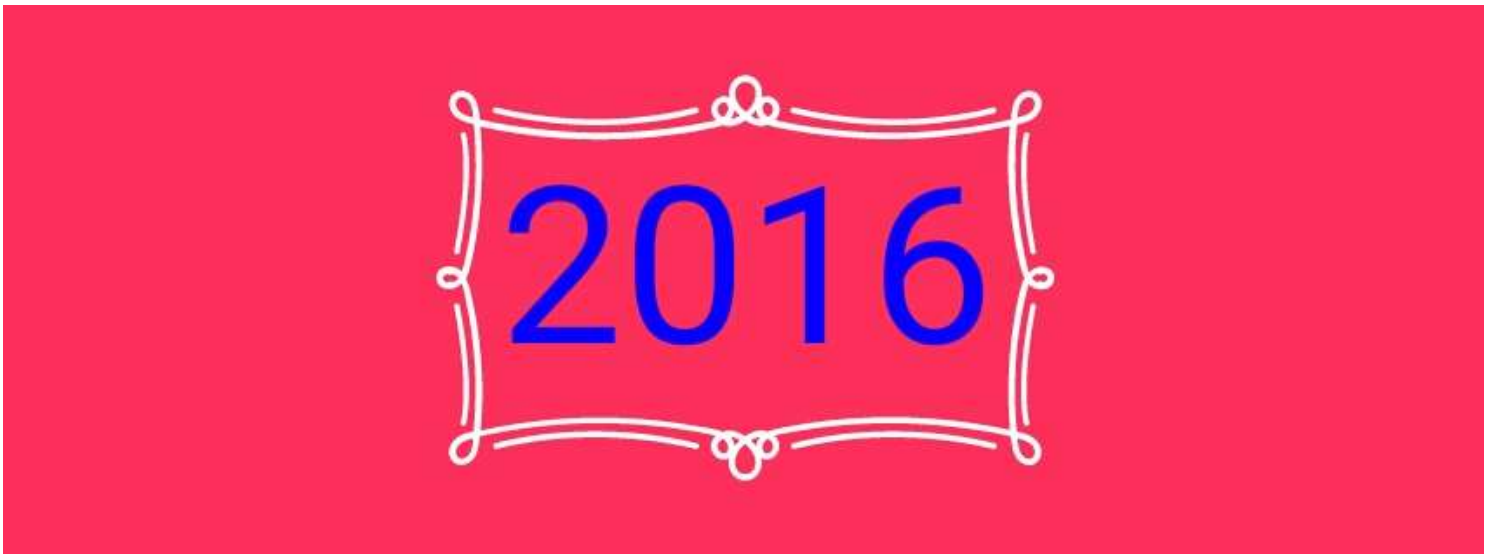


CHEMISTRY-XII

2016

CHEMISTRY

Section-I (Objective Type)

Time : 1 Hour 10 Minutes] [Marks : 28

Instructions to the Candidates :

1. Fill in your Roll No. in the space provided on the first page of this question paper.
2. This question paper consists of 28 objective type questions. Total marks allotted is 28.
3. The candidate has to answer all the questions in the OMR Answer-Sheet provided along with this question paper.
4. Before answering the candidate has to ensure that the OMR Answer-Sheet is available along with the question paper.
5. All entries must be confined to the area provided in the OMR Answer-Sheet.
6. Answer all the questions by completely darkening the circles against the question numbers in the OMR Answer-Sheet using Black/Blue Ball point pen only.
7. Do not fold or make any stray marks on the OMR Answer Sheet, failing which it would be difficult to evaluate the Answer Sheet.
8. Read all the instructions provided in the OMR Answer-Sheet carefully before answering. After you finish answering, hand over the OMR Answer-Sheet to the Invigilator. You are permitted to carry the question paper only along with you.

For the following Question Nos. 1 to 28 there is only one correct answer against each question. For each question, mark the correct option on the answer sheet. $28 \times 1 = 28$

1. Oxidation number of gold metal is

(A) +1 (B) 0 (C) – 1 (D) all of these

2. Which one of the following is lyophilic colloid?

(A) Milk (B) Gum (C) Fog (D) Blood

3. Which one in the following is the strongest oxidising agent?

(A) F_2 (B) Cl_2 (C) Br_2 (D) I_2

4. Which of the following compounds has tetrahedral geometry?

(A) $[Ni(CN)_4]^{2-}$ (B) $[Pd(CN)_4]^{2-}$ (C) $[PdCl_4]^{2-}$ (D) $[NiCl_4]^{2-}$

5. $t_{1/2}$ for first order reaction is

(A) $\frac{0.6}{k}$ (B) $\frac{0.693}{k}$ (C) $\frac{0.683}{k}$ (D) $\frac{0.10}{k}$

6. Faraday's law of elecrolysis is related to

(A) atomic number of cation (B) speed of cation
(C) speed of anion (D) equivalent weight of electrolyte

7. Cinnabar is

(A) HgS (B) PbS (C) ZnS (D) H_2S

8. Atomic mass is equal to

(A) number of electrons of an atom
(B) sum of the numbers of electrons and protons of an atom
(C) sum of the numbers of neutrons and protons of an atom
(D) none of these

9. When Quicklime is immersed in water the reaction is

(A) exothermic (B) endothermic (C) explosive (D) none of these

10. Shape of *d*-orbital is

(A) spherical (B) dumb-bell
(C) double dumb-bell (D) none of these

11. Washing soda is

(A) $Na_2CO_3 \cdot 10H_2O$ (B) $Na_2CO_3 \cdot 5H_2O$
(C) Na_2CO_3 (D) NaOH

12. Electronic configuration of alkaline earth elements is

(A) ns^2 (B) ns^1 (C) np^6 (D) ns^0

13. Slaked lime is

(A) CaO (B) $CaCO_3$ (C) $Ca(OH)_2$ (D) $CaCl_2$

14. Outermost configuration $3d^6\,4s^2$ is of

(A) Ca (B) Zn (C) Mg (D) Cu

15. Chemical name of borax is

(A) Sodium tetraborate (B) Sodium metaborate
(C) Sodium orthoborate (D) none of these

16. Boron shows diagonal relation with

(A) Al (B) C (C) Si (D) Sn

17. Good conductor of electricity and heat is

(A) Anthracite coke (B) Diamond (C) Graphite (D) Charcoal

18. In which of the following allotropes of carbon, percentage of carbon is maximum?

(A) Wood charcoal (B) Coconut charcoal
(C) Graphite (D) None of these

19. The hybridisation of carbon in diamond is

(A) sp^3 (B) sp^2 (C) sp (D) dsp^2

20. Organic compound must contain an element

(A) oxygen (B) carbon (C) hydrogen (D) nitrogen

21. Catenation property is maximum in

(A) phosphorus (B) carbon (C) sulphur (D) zinc

22. Which one of the following is an electrophillic reagent?

(A) BF_3 (B) NH_3 (C) H_2O (D) none of these

23. Alkene gives which of the following reactions?

(A) Addition reaction (B) Substitution reaction
(C) Both (A) and (B) (D) None of these

24. Single bond length between carbon-carbon is

(A) 1.34 Å (B) 1.20 Å (C) 1.54 Å (D) none of these

25. Valency of carbon is

(A) 1 (B) 2 (C) 3 (D) 4

26. Criteria for purity of organic solid is

(A) boiling point (B) melting point
(C) specific gravity (D) none of these

27. Element found from sea water is

(A) Magnesium (B) Sodium (C) Iodine (D) none of these

28. The main constituent of CNG is

(A) Methane (B) Ethane (C) Butane (D) Isobutane

ANSWERS

1. (B)	2. (B)	3. (A)	4. (D)	5. (B)	6. (D)	7. (A)
8. (C)	9. (A)	10. (C)	11. (A)	12. (A)	13. (C)	14. No Answer
15. (A)	16. (C)	17. (C)	18. (C)	19. (A)	20. (B)	21. (B)
22. (A)	23. (A)	24. (C)	25. (D)	26. (B)	27. (C)	28. (A)

Section-II (Non-Objective Type)

Time : 2 Hour 05 Minutes] [Marks : 42

Instructions to the Candidates :

1. Candidates are required to give their answers in their own words as far as practicable.
2. Figures in the right-hand margin indicate full marks.
3. Section II of this question paper consists of 15 non-objective type questions having total marks 42.
4. The candidate has to answer all the short answer questions from Q. No. 1 to Q. No. 11 and all 4 long answer type questions from Q. No. 12 to Q. No. 15 in his/her answer-book which is provided separately. Q.Nos. 1 to 11 carry 2 marks each and Q. Nos. 12 to 15 carry 5 marks each.
5. Write the question number with every answer.

Question Nos. 1 to 11 are of short answer type. Each question carries 2 marks.

$11 \times 2 = 22$

Short Answer Type Questions

1. Define standard electrode potential.

Ans. The potential difference between electrode and its solution containing concentration at 298 K is known as standard electrode potential. It is denoted by $E°$.

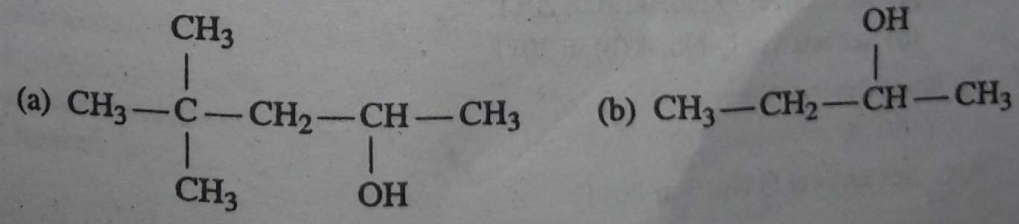
2. Transititon elements from coloured compound. Explain.

Ans. Due to electron transition when an electron transits from one *d*-orbital to other *d*-orbitals, then certain wave length of wave is absorbed. So, it forms coloured compound.

3. Write the structural formulae of the following :

(a) 4, 4 dimethyl-2-pentanol (b) 2-butanol

Ans.



4. Give IUPAC names of the following :

(a) $CH_2(COOH)-CH_2(COOH)$

(b) $CH_3-CH(OH)-COOH$

Ans. (a) 1, 4-Butanedioic acid (b) 2-Hydroxypropanoic acid

5. Define heat of neutralisation.

Ans. The amount of heat evolved when one gram equivalent of an acid is neutralised by one gram equivalent of a base and vice-versa is known as heat of neutralization.

Heat of neutralization of strong acid and strong base is always 13.7 k cal.

$$NaOH(aq) + HCl(aq) \rightarrow NaCl(aq) + H_2O + 13.7 \text{ k cal}$$

6. (a) State law of mass action.

(b) What is the effect of temperature on reaction?

Ans. (a) The rate of reaction is directly proportional to the product of active mass of reacting substances.

$$A + B \rightarrow \text{Product}$$

$$A + B \rightleftharpoons C + D$$

Rate of reaction $\propto [A][B]$

$$r = k[A][B]$$

(b) Temperature increases rate of reaction increases. It means rate of reaction is directly proportional to temperature.

7. Discuss the following terms :

(a) Coordination number (b) Effective atomic number.

Ans. (a) Coordination number : The number of donar atoms of the ligands to which the central atom a ion is directly linked is called co-ordination number.

(b) Effective atomic number : The resultant number of electrons associated with the central metal atom, after gaining electrons from the donor atoms is called effective atomic number.

EAN = Atomic number of metal – Number of electrons lost in ion formation + 2 × CN

8. What is the difference beteween Schottky defect and Frenkel defect?

Ans. See answer Q.No. 1 in 2011.

9. When 10 gm of a non-volatile solute is dissolved in 100 gm of benzene its boiling point raised by 1°. What is the molecular mass of the solute?
[K_4 for benzene = 2.53 Km^{-1}]

Ans. See answer Q.No. 2 in 2011.

10. (a) State Faraday's 1st law of electrolysis.

(b) Define electrochemical equivalent.

Ans. (a) See answer Q.No. 4 (a) in 2011.

(b) See answer Q.No. 4 (b) in 2011.

11. Define the following :

(a) Order of reaction (b) Threshold energy.

Ans. See answer Q.No. 3 in 2011.

Question Nos. 12 to 15 are of long answer type. Each question carries 5 marks. $4 \times 5 = 20$

Long Answer Type Questions

12. (a) What do you mean by the term 'elevation of boiling point'?

(b) State Raoult's law. How is it useful in determining the molecular weight of non-electrolyte solute?

Ans. (a) When a non-volatile solute is dissolved in solvent, then boiling point of solvent in solution is increased.

The increase in the boiling point is called elevation of boiling point. It is denoted by ΔT_b.

$$\Delta T_b = T_b^s - T_b^o$$

where T_b^s = B.P. of solution, T_b^o = B.P. of pure solvent.

(b) Blevation of boiling point is directly proportional to its molality.

$$\Delta T_b \propto m$$

$$\Delta T_b = K_b \cdot m$$

where K_b is proportionality constant.

It is also known as molal elvation constant.

$$\Delta T_b = K_b \cdot \frac{\text{Wt. of solute} \times 1000}{\text{Mol. wt. of solute} \times \text{wt. of solvent / gram}}$$

$$\text{Mol. wt. of solute} = \frac{K_b \times \text{wt. of solute} \times 1000}{\Delta T_b \times \text{wt. of solvent / gram}}.$$

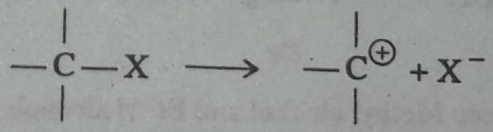
Or,

(a) What is carbocation? Explain.

(b) How will you convert Aniline into Benzoic acid?

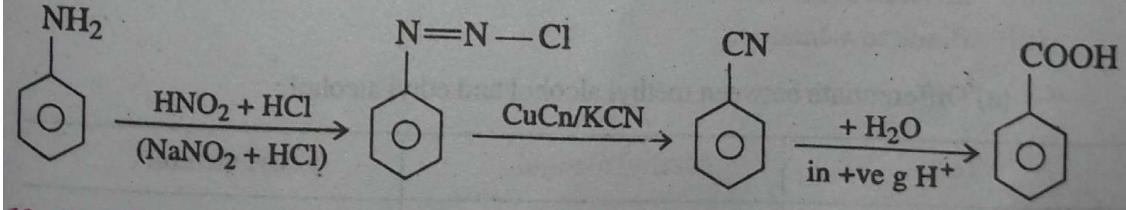
Ans. (a) When a carbon atom gets positively charged due to hetrolytic bond fission then it is known as carbocation. It is denoted by C^+.

Let X is a substituent group which is attached to carbon atom. E.N. of X is more than C. Hence carbon gets positive charge due to bond fission.



Stability of 3° carbocation > 2° carbocation > 1° carbocation > $-\overset{+}{C}H_3$

(b)



13. (a) Differentiate between Osmosis and Dispersion. How is osmotic pressure determined by Berkeley-Hartlay method?

(b) 18 g of glucose ($C_6H_{12}O_6$) was added to 1 kg water at 1.013 bar atmospheric pressure in a vessel. At which temperature will water boil? K_b for water is 0.52 K kg mol^{-1}.

Ans. (a) See answer Q.No. 40 (a) in 2014.

(b) See answer Q.No. 40 (b) in 2014.

Or,

(a) Give the principle for the manufacture of nitric acid from ammonia.

(b) Give the reaction of copper with 50% dilute nitric acid.

Ans. (a) See answer Q.No. 13 (a) in 2011.

(b) See answer Q.No. 13 (b) in 2011.

14. What happens when

(a) Ethylene is allowed to react with cold basic $KMnO_4$ solution?

(b) Acetaldehyde is heated with bleaching powder?

(c) Ethyl alcohol is oxidised?

Ans. (a) Ethyne is allowed to react with cold basic $KMnO_4$ solution, oxalic acid is obtained.

$$H-C\equiv C-H + 4[O] \xrightarrow[(KMnO_4 + KOH)]{\text{Basic } KMnO_4} \begin{matrix} COOH \\ | \\ COOH \end{matrix}$$

(b) Acetaldehyde is heated with bleaching powder paste, chloroform is obtained

$$Ca(OCl)Cl + H_2O \longrightarrow Ca(OH)_2 + Cl_2$$

$$CH_3-\overset{\overset{O}{\|}}{C}-H + 3Cl_2 \longrightarrow CCl_3-\overset{\overset{O}{\|}}{C}-H + 3HCl$$

$$2CCl_3-\overset{\overset{O}{\|}}{C}-H + Ca(OH)_2 \longrightarrow 2CHCl_3 + (HCOO)_2Ca$$

(C) Ethyl alcohol is oxidised, finally acetic acid is obtained.

$$CH_3-CH_2OH \xrightarrow{[O]} CH_3-CHO \xrightarrow{[O]} CH_3-COOH$$

Or,

(a) Differentiate beween Methyl alcohol and Ethyl alcohol.

(b) How will you convert the following?

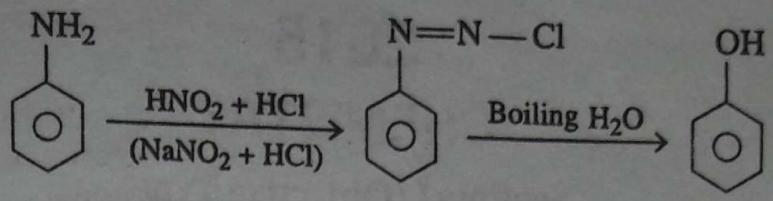
(i) Phenol from aniline

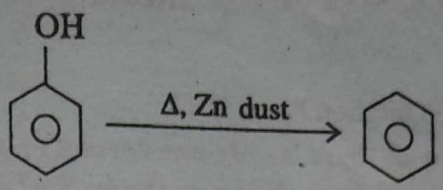
(ii) Phenol to benzene

(iii) Ethane to *n*-butane.

Ans. (a) Differentiate between methyl alcohol and ethyl alcohol :

Test	Methyl alcohol	Ethyl alcohol
(i) Heated with I_2 and NaOH	CHI_3 is not formed.	CHI_3 is formed.
(ii) Heated with salicylic acid and conc. H_2SO_4.	Gives odour of oil of winter green.	Does not give odour of oil of winter green.

(b) (i) 

(ii) 

(iii) $C_2H_6 \xrightarrow{+Cl_2} C_2H_5Cl \xrightarrow[\text{Dry ether (WR)}]{+Na} C_4H_{10}$

15. Name two important ores of iron. How is iron extracted from its ore? Give reactions.

Ans. See answer Q.No. 12 in 2013.

Or,

Name the important ore of Al. How is aluminium extracted from its ore? Give reactions.

Ans. See answer Q.No. 12 (Or) in 2013.

Or,

What are the main sources of iodine? How is iodine extracted from sea weeds?

Ans. See answer Q.No. 13 (Or) in 2015.

□