BYJU'S Full Test for Board Term I

(CBSE Grade 12)

ANSWER KEYS and SOLUTIONS

ANSWER KEYS

Q1	D.	Q29	C.
Q2	A.	Q30	B.
Q3	C.	Q31	D.
Q4	B.	Q32	A.
Q5	C.	Q33	C.
Q6	B.	Q34	A.
Q7	C.	Q35	B.
Q8	B.	Q36	A.
Q9	D.	Q37	C.
Q10	C.	Q38	A.
Q11	A.	Q39	A.
Q12	C.	Q40	C.
Q13	B.	Q41	B.
Q14	C.	Q42	C.
Q15	C.	Q43	C.
Q16	B.	Q44	B.
Q17	D.	Q45	A.
Q18	B.	Q46	B.
Q19	C.	Q47	C.
Q20	A.	Q48	D.
Q21	D.	Q49	B.
Q22	B.	Q50	D.
Q23	C.	Q51	C.
Q24	D.	Q52	B.
Q25	D.	Q53	A.
Q26	B.	Q54	B.

Q27	C.	Q55	A.
Q28	A.		

SOLUTIONS

SECTION - A

Q1 Which of the following is an amorphous solid?

A. Graphite
B. Ice
C. NaCl
D. Glass

Ans. 1. (D)

Amorphous solids consist of particles of irregular shape whereas crystalline solids consist of particles having definite characteristic geometrical shape.

Glass is an amorphous solid and graphite, Ice and NaCl are crystalline solids.

Q2 Amalgam of mercury with sodium is a solution of

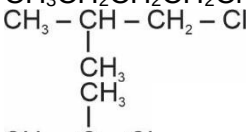
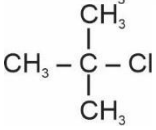
A. Liquid into solid
B. Solid into liquid
C. Solid into solid
D. Liquid into liquid

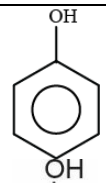
Ans. 2. (A)

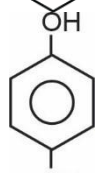
Amalgam of mercury with sodium is a solid solution of liquid into solid in which mercury is a solute and sodium is a solvent.

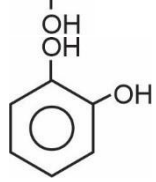
Q3 Which of the following hydrides is thermally most stable?

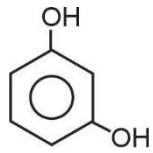
A. SbH_3
B. AsH_3

	C. NH_3 D. PH_3 **Ans. 3.** (C) The thermal stability of hydrides of group 15 elements decreases down the group because of decrease in bond dissociation enthalpy. $NH_3 > PH_3 > AsH_3 > SbH_3$
Q4	Which of the following haloalkanes has the highest boiling point? A. $CH_3CH_2CH_2Cl$ B. $CH_3CH_2CH_2CH_2Cl$ C.  D.  **Ans. 4.** (B) The boiling point increases with increase in intermolecular forces of attraction and decreases with increase in branching in isomeric haloalkanes.
Q5	The incorrect statement regarding S_N1 reaction is A. It follows first order kinetics B. It is favoured by polar protic solvent C. It takes place through single step concerted mechanism D. Benzylic halides generally react through this mechanism **Ans. 5.** (C) S_N1 reaction is unimolecular nucleophilic substitution reaction. It is generally carried out in polar protic solvent and follows first order kinetic i.e. rate of reaction depend only upon concentration of one reactant not on the nucleophile taken. The reaction occurs in 2 steps which involves formation of carbocation as intermediate followed by attacking of nucleophile.
Q6	Which of the following compounds will be most soluble in water?

A. 

B. 

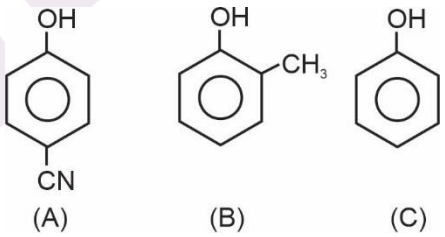
C. 

D. 

Ans. 6. (B)

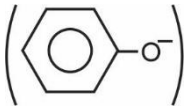
- Phenols are water soluble due to their ability to form H-bonding with water.
- Among dihydric phenols, para isomer will be most soluble in water due to more efficient inter-molecular H-bonding with water.

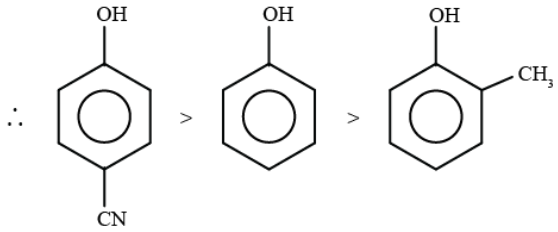
Q7 The correct order of acidic strength of the following compounds is

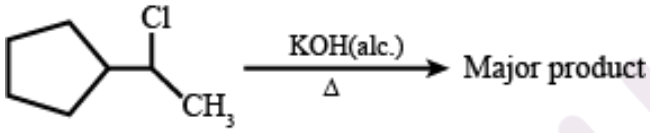
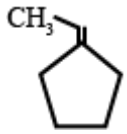
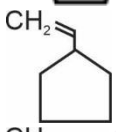
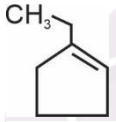
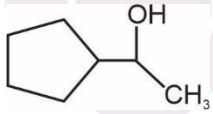
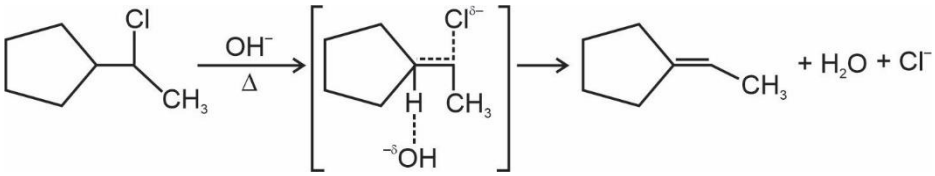


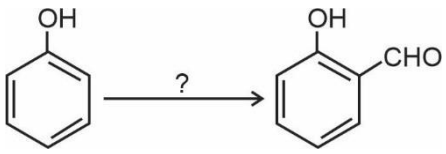
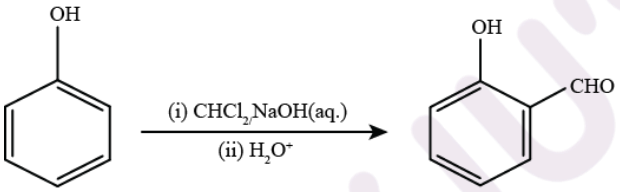
A. A > B > C
B. C > B > A
C. A > C > B
D. B > C > A

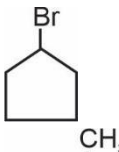
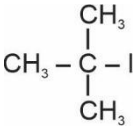
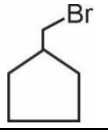
Ans. 7. (C)

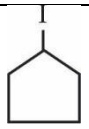
- The acidic strength of phenols depends upon the stability of phenoxide  ion after releasing H^+ ion.

	• Electron withdrawing group such as –CN stabilizes the phenoxide ion by dispersing the negative charge whereas electron donating group such as $–CH_3$ destablizes it. 
Q8	Which of the following amino acids is optically inactive? A. Valine B. Glycine C. Leucine D. Arginine **Ans. 8.** (B) Except glycine, all the amino acids are optically active.
Q9	Which of the following is **not** a stoichiometric defect? A. Vacancy defect B. Interstitial defect C. Dislocation defect D. Metal excess defect **Ans. 9.** (D) Vacancy, interstitial and dislocation defect, are stoichiometric defect, whereas metal excess defect (either due to anionic vacancies or presence of extra cations) is a non-stoichiometric defect.

Q10	Which of the following gas is produced when zinc is treated with concentrated nitric acid? A. NO B. N_2O C. NO_2 D. N_2O_3 **Ans. 10.** (C) Zinc reacts with concentrated nitric acid to give NO_2 $Zn + 4HNO_3(conc.) \rightarrow Zn(NO_3)_2 + 2H_2O + 2NO_2$
Q11	The major product obtained in the following reaction is  A.  B.  C.  D.  **Ans. 11.** (A) Haloalkanes with two or more □-H atoms with alc. KOH undergoes E2 elimination and the major product is decided on the basis of Saytzeff's rule i.e. more substituted alkene will be the major product. 

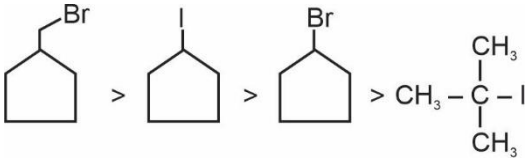
Q12	The suitable reagent for the following conversion is  A. $KMnO_4/H_3O^+$ B.NaOH, CO_2/H_2O C.$CHCl_3$, NaOH(aq)/H_3O^+ D. Zn/heat **Ans. 12.** (C)  Reimer - Tiemann reaction
Q13	An element crystallizes into FCC structure. If the molar of element is 12.04 g mol^{-1} and the edge length is 400 pm, then the density of the unit cell is [Take Avogadro's number = 6.02×10^{23}] A. 2.50 g cm^{-3} B. 1.25 g cm^{-3} C. 3.15 g cm^{-3} D. 0.75 g cm^{-3} **Ans. 13.** (B) Molar mass (M) = 12.04 g mol^{-1} Edge length (a) = 400 pm = (400×10^{-10}) cm Density (□) = ? Z = 4 (for FCC) $\rho = \frac{Z \times M}{N_A \times a^3}$ $= \frac{4 \times 12.04}{6.02 \times 10^{23} \times (400 \times 10^{-10})^3}$ = 1.25 g cm^{-3}

Q14	Which of the following relation is not true with respect to positive deviation from Raoult's law? A. $\Delta G_{mix} < 0$ B $\Delta H_{mix} > 0$ C. $\Delta S_{mix} < 0$ D. $\Delta V_{mix} > 0$ **Ans. 14.** (C) For positive deviation, E_{A-A} and $E_{B-B} > E_{A-B}$ Where E_{A-A}, E_{B-B} and E_{A-B} are intermolecular energies between solvent and solute molecules (A and B) The condition leads to the following results • $\Delta G_{mix} < 0$, $\Delta H_{mix} > 0$ • $\Delta S_{mix} > 0$ as in the process of formation of solution forces of attraction are decreasing. • $\Delta V_{mix} > 0$ due to decreases in intermolecular forces.
Q15	The maximum oxidation state shown by nitrogen is A. –3 B. +3 C. +5 D. +1 **Ans. 15.** (C) Nitrogen has 5 valence electrons, therefore it can show the maximum oxidation state of +5.
Q16	Which of the following compounds is least reactive toward S_N2 mechanism? A.  B.  C. 

D. 

Ans. 16. (B)

Order of reactivity towards S_N2 :



- The reactivity of S_N2 depends upon two factors : Steric hinderance and ease of leaving group. Lesser the steric hinderance and greater the leaving tendency of halogen, more will be the reactivity towards S_N2.

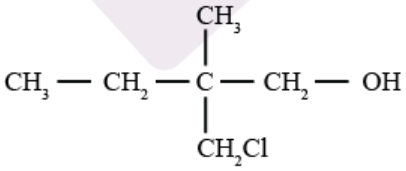
Q17 Which of the following is/are reducing sugar(s)?

A. Galactose
B. Fructose
C. Glucose
D. All of these

Ans. 17. (D)

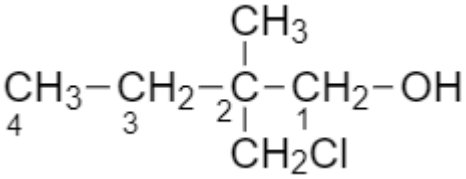
- The carbohydrates which can reduce Fehling's solution and Tollen's reagent are called reducing sugars.
- All monosaccharides are reducing sugars.

Q18 The IUPAC name of the following compound is



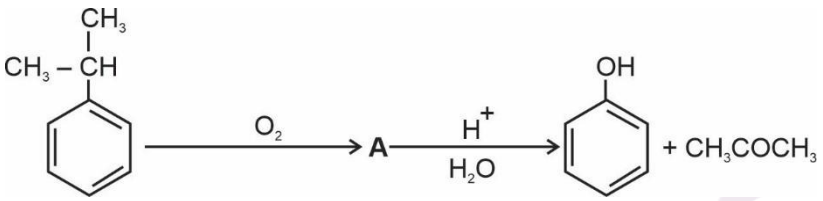
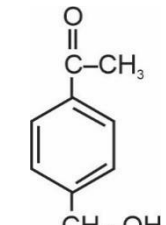
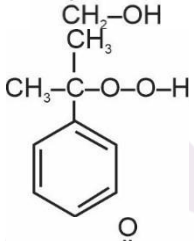
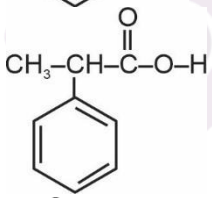
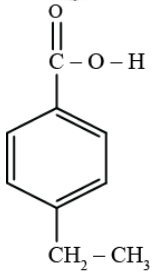
A. 1-Chloro-2-methyl-2-ethylbutan-3-ol
B. 2-(Chloromethyl)-2-methylbutan-1-ol
C. 3-(Chloromethyl)-3-methylbutan-1-ol
D. 1-Chloro-2-ethyl-2-methylpropan-3-ol

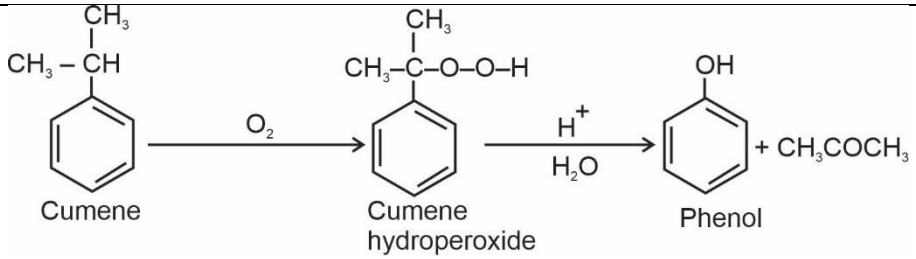
Ans. 18. (B)



2-(chloromethyl)-2-methylbutan-1-ol

Q19	20 g of a substance is dissolved in 100 g water which lowers the freezing point by 1.5°C. What is the molar mass of the substance? [K_f of water = 1.86] A. 124 g mol^{-1} B. 290 g mol^{-1} C. 248 g mol^{-1} D. 175 g mol^{-1} **Ans. 19.** (3) (w_1) mass of substance = 20 g (w_2) mass of water = 100 g ΔT_f = 1.5°C K_f of water = 1.86 $\Delta T_f = K_f.m$ $m = \frac{\text{moles of solute}}{\text{mass of solvent (kg)}}$ $\Rightarrow \Delta T_f = K_f \cdot \frac{w_1 \times 1000}{M \times w_2}$ $M = \frac{K_f \times w_1 \times 1000}{\Delta T_f \times w_2}$ $= \frac{1.86 \times 20 \times 1000}{1.5 \times 100}$ M = 248 g mol^{-1}
Q20	The brown coloured substance obtained in brown ring test is A. $[Fe(H_2O)_5(NO)]^{2+}$ B. $[Fe(H_2O)_6]^{1+}$ C. $[Fe(H_2O)_4(NO)_2]^{3+}$ D. $[Fe(H_2O)_3(NO)]^{1+}$ **Ans. 20.** (A) **Brown ring test :** To test nitrates ions. $NO_3^- + 3Fe^{2+} + 4H^+ \rightarrow NO + 3Fe^{3+} + 2H_2O$ $[Fe(H_2O)_6]^{2+} + NO \rightarrow \underset{\text{Brown}}{[Fe(H_2O)_5(NO)]^{2+}} + H_2O$
Q21	Which of the following is an ambident nucleophile? A. Cl^- B. OH^- C. OCH_3^- D. CN^- **Ans. 21.** (D)

	• CN^- is an ambident nucleophile as it possess two nucleophilic centres. It is a hybrid of two contributing structures and can act as nucleophile in two different ways [$^{\ominus}C \equiv N \longleftrightarrow :C = N^{\ominus}$], i.e. as linking through C atom results in alkyl cyanides and through N atom leading to isocyanides.
Q22	Identify the structure of 'A' in the following reaction  A.  B.  C.  D.  **Ans. 22.** (B) • Preparation of phenol from cumene.



Q23

Which of the following is an essential amino acid?

A. Glutamine
B. Alanine
C. Methionine
D. Aspartic acid

Ans. 23. (C)

- Amino acids which cannot be synthesized in the body are known as essential amino acids, For e.g. Methionine.
- Glutamine, alanine and aspartic acid are non-essential amino acids as they can be synthesized in the body.

Q24

The product obtained when sucrose is made to react with conc. H_2SO_4 is

A. S
B. O_2
C. H_2
D. C

Ans. 24. (D)

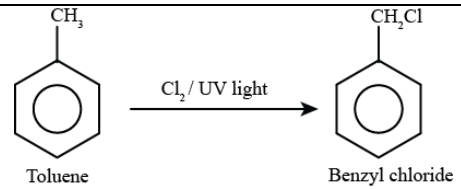
$$C_{12}H_{22}O_{11} \xrightarrow{H_2SO_4} 12C + 11H_2O$$

Q25

When toluene is made to react with chlorine in presence of sunlight, the product obtained is

A. o-Chlorotoluene
B. p-Chlorotoluene
C. 2, 4,6-Chlorotoluene
D. Benzyl chloride

Ans. 25. (D)



SECTION - B

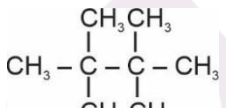
Q26 Which of the following oxides is neutral?

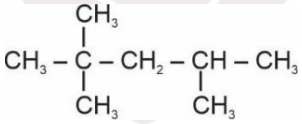
A. SO_2
B. NO
C. CaO
D. Al_2O_3

Ans. 26. (B)

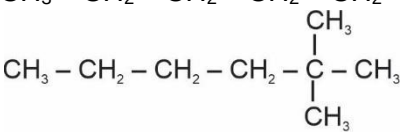
NO is a neutral oxide whereas SO_2 is acidic, CaO is basic and Al_2O_3 is an amphoteric oxide.

Q27 When 1-butyl bromide is made to react with Na metal in presence of dry ether, the major product obtained is

A. 

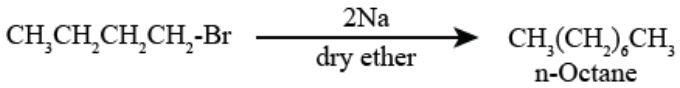
B. 

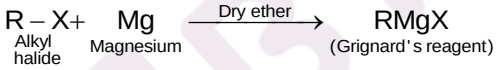
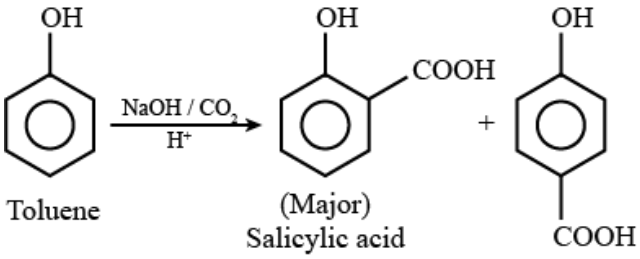
C. $CH_3-CH_2-CH_2-CH_2-CH_2-CH_2-CH_2-CH_3$

D. 

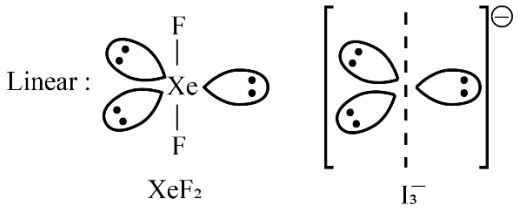
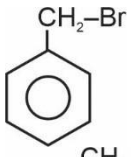
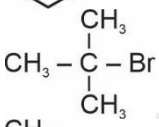
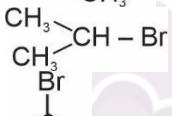
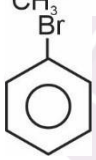
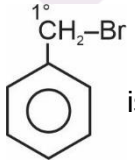
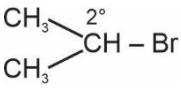
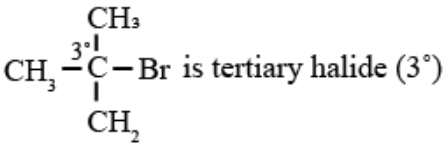
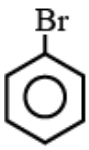
Ans. 27. (3)

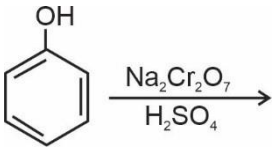
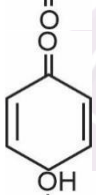
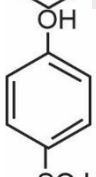
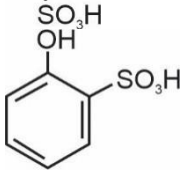
Wurtz reaction : From alkyl halide, alkane is formed.

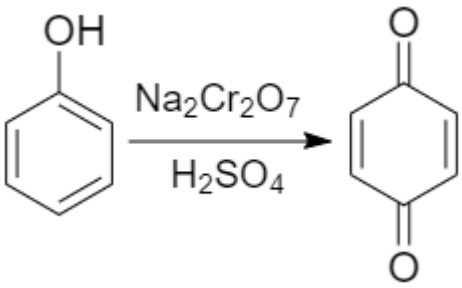


Q28	Which of the following base is not present in RNA? A. Thymine B. Guanine C. Adenine D. Cytosine **Ans. 28.** (A) • Two types of heterocyclic bases are present in RNA and DNA i.e., purine and pyrimidine. • In both DNA and RNA, the purines are adenine and guanine but the pyrimidine is uracil in RNA and thymine in DNA.
Q29	Grignard reagent is prepared by the reaction between A. Magnesium and aliphatic alcohols B. Zinc and alkyl halide C. Magnesium and alkyl halide D. Sodium and ethyne **Ans. 29.** (C) Grignard reagent is prepared by reaction of alkyl halides with metals like magnesium in the presence of dry ether to form organometallic compound. 
Q30	Which of the following product can be obtained through Kolbe's reaction of phenol? A. Salicylaldehyde B. Salicylic acid C. Benzoic acid D. Phthalic acid **Ans. 30.** (B) Kolbe's reaction : 

Q31	The most unsymmetrical crystal system is A. Cubic B. Monoclinic C. Tetragonal D. Triclinic **Ans. 31.** (D) Most unsymmetrical crystal system → Triclinic a □ b □□c □□□□□□□□□□□□90°
Q32	Calculate the vapour pressure of water when 50 g of urea (NH_2CONH_2) is present in 900 g of solution. (Vapour pressure of pure water at 298 K is 23.8 mm Hg) A. 23.3 mm Hg B. 50.1 mm Hg C. 38.5 mm Hg D. 42.3 mm Hg **Ans. 32.** (A) Weight of solute, urea (w_2) = 50 g Weight of solvent, water (w_1) = 900 – 50 = 850 g From Raoult's law, $\frac{p_1^o - p_1}{p_1^o} = \frac{n_2}{n_1 + n_2}$ $\Rightarrow \frac{p^o - p_1}{p_1^o} = \frac{\frac{w_2}{M_2}}{\frac{w_1}{M_1} + \frac{w_2}{M_2}} \left[\begin{matrix} M_1 = 18\ g\ mol^{-1} \\ M_2 = 60\ g\ mol^{-1} \end{matrix}\right]$ $\frac{23.8 - p_1}{23.8} = \frac{\frac{50}{60}}{\frac{850}{18} + \frac{50}{60}} = \frac{0.83}{47.22 + 0.83} = 0.0172 \approx 0.02$ $\Rightarrow \frac{23.8 - p_1}{23.8} = 0.02$ □ P_1 = 23.3 mm Hg

Q33	XeF_2 is isostructural to A. H_2O B. NO_2 C. I_3^- D. O_3 **Ans. 33.** (C)  • H_2O, NO_2 and O_3 are bent shaped.
Q34	Which of the following is a primary halide? A.  B.  C.  D.  **Ans. 34.** (A) •  is a primary halide (1°) •  secondary halide (2°) •  is tertiary halide (3°) •  is an aryl halide •

Q35	Which of the following is an ideal solution? A. Ethanol and water B. n-hexane and n-heptane C. Acetone and ethanol D. Phenol and aniline **Ans. 35.** (B) • n-hexane and n-heptane is an example of ideal solution whereas ethanol and water, acetone and ethanol and phenol and aniline are non-ideal solutions.
Q36	Complete the following reaction :  A.  B.  C.  D.  **Ans. 36.** (A)



- Phenol oxidises to benzoquinone when treated with acidified sodium chromate.

Q37 The products obtained upon hydrolysis of XeF_4 is

A. XeO_3 + HF
B. Xe + HF + O_2
C. Xe + XeO_3 + HF + O_2
D. $XeOF_4$ + HF

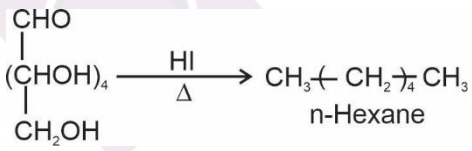
Ans. 37. (C)

$$6XeF_4 + 12H_2O \rightarrow 4Xe + 2XeO_3 + 24HF + 3O_2$$

Q38 The major product obtained when glucose is heated with HI is

A. n-Hexane
B. Gluconic acid
C. Glucose cyanohydrin
D. Saccharic acid

Ans. 38. (A)

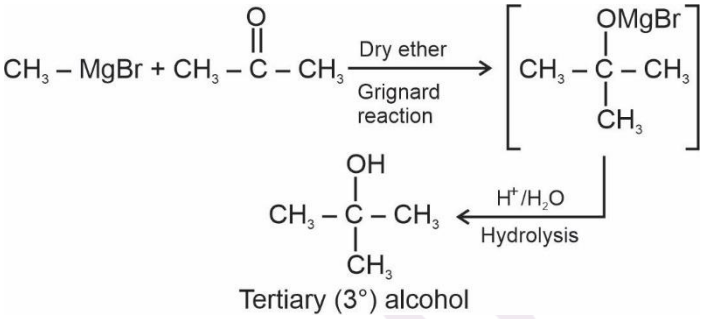


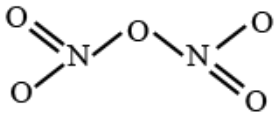
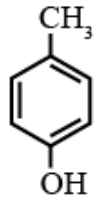
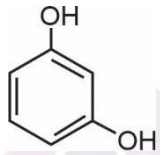
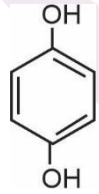
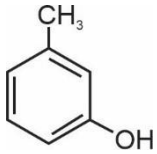
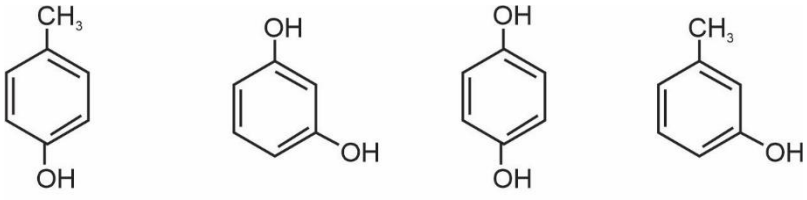
Q39 When ethyl bromide is treated with sodium cyanide, then the product obtained is

A. Ethyl cyanide
B. Ethyl isocyanide
C. Methyl cyanide
D. Methyl isocyanide

Ans. 39. (A)

$$\underset{\text{Ethyl bromide}}{CH_3-CH_2-Br} + \underset{\text{Sodium cyanide}}{NaCN} \rightarrow \underset{\text{Ethyl cyanide}}{CH_3-CH_2-CN} + \underset{\text{Sodium bromide}}{NaBr}$$

Q40	Methyl magnesium bromide is made to react with acetone in the presence of dry ether, a compound X is obtained which is further subjected to hydrolysis to give compound Y. The compound Y is A. Primary alcohol B. Secondary alcohol C. Tertiary alcohol D. Aromatic alcohol **Ans. 40.** (C)  Tertiary (3°) alcohol
Q41	Aluminium crystallizes into FCC structure. If the atomic radius of the metal is 150 pm, then the edge length of the unit cell of metal is (approximately) A. 318 pm B. 424 pm C. 300 pm D. 212 pm **Ans. 41.** (B) r = 150 pm $r = \frac{a}{2\sqrt{2}}$ $a = 2\sqrt{2}r = 2 \times 1.414 \times 150 = 424$ pm (approx.)

Q42	What is the covalency of nitrogen in N_2O_5? A. 2 B. 3 C. 4 D. 5 **Ans. 42.** (C) The covalency of nitrogen in N_2O_5 is 4 as each nitrogen atom has four shared pairs of electrons. 
Q43	The correct structure of quinol is A.  B.  C.  D.  **Ans. 43.** (C)  p-Cresol Resorcinol Quinol m-Cresol

Q44	Which of the following is **not** formed when Cl_2 is made to react with hot and concentrated NaOH? A. NaCl B. NaOCl C. $NaClO_3$ D. H_2O **Ans. 44.** (B) $6NaOH + 3Cl_2 \rightarrow 5NaOH + \underset{\text{Sodium chlorate}}{NaClO_3} + 3H_2O$
Q45	Given below are two statements labelled as Assertion (A) and Reason (R). **Assertion (A) :** Crystalline solids are anisotropic in nature. **Reason (R) :** They have different arrangement of particles in different directions. Select the most appropriate answer from the options given below: A. Both A and R are true and R is the correct explanation of A B. Both A and R are true but R is not the correct explanation of A. C. A is true but R is false. D. A is false but R is true. **Ans. 45.** (A) Crystalline solids are anisotropic in nature i.e. some of their physical properties like electrical resistance show different values in different directions in the same crystal. It arises due to different arrangement of particles in different directions.
Q46	Given below are two statements labelled as Assertion (A) and Reason (R). **Assertion (A) :** Bond enthalpy of fluorine molecule is lower than chlorine molecule. **Reason (R) :** Fluorine is the most electronegative element. Select the most appropriate answer from the options given below: A. Both A and R are true and R is the correct explanation of A B. Both A and R are true but R is not the correct explanation of A. C. A is true but R is false. D. A is false but R is true. **Ans. 46.** (B)

	Bond enthalpy of fluorine molecule is lower than chlorine molecule because fluorine is very small in size and its interelectronic repulsions between the lone pairs is very large not because it is the most electronegative element.
Q47	Given below are two statements labelled as Assertion (A) and Reason (R). **Assertion (A) :** o-nitrophenol has lower boiling point than p-nitrophenol. **Reason (R) :** p-nitrophenol forms intramolecular H-bonding. Select the most appropriate answer from the options given below: A. Both A and R are true and R is the correct explanation of A B. Both A and R are true but R is not the correct explanation of A. C. A is true but R is false. D. A is false but R is true. **Ans. 47.** (C) Ortho-nitrophenol has lower boiling point because it forms intramolecular H-bonding whereas p-nitro phenol forms intermolecular H-bonding.
Q48	Given below are two statements labelled as Assertion (A) and Reason (R). **Assertion (A) :** Haloalkanes are highly soluble in water. **Reason (R) :** The new attractions between haloalkanes and water molecules are weaker than the H-bonding of water. Select the most appropriate answer from the options given below: A. Both A and R are true and R is the correct explanation of A B. Both A and R are true but R is not the correct explanation of A. C. A is true but R is false. D. A is false but R is true. **Ans. 48.** (D) Haloalkanes are very slightly soluble in water as the new attraction between haloalkane and water are not as strong as the original H-bonding in water.
Q49	Given below are two statements labelled as Assertion (A) and Reason (R). **Assertion (A) :** □-amino acids exist as Zwitter ions at certain pH. **Reason (R) :** □-amino acids are the building blocks of proteins. Select the most appropriate answer from the options given below: A. Both A and R are true and R is the correct explanation of A

B. Both A and R are true but R is not the correct explanation of A.

C. A is true but R is false.

D. A is false but R is true.

Ans. 49. (B)

□-amino acids exist as dipolar ions or Zwitter ions at certain pH which varies for each amino acid.

SECTION – C

Q50 Match the following :

I	**II**
(i) XeF_4	(A) Distorted octahedral
(ii) $XeOF_4$	(B) Square planar
(iii) XeF_6	(C) Pyramidal
(iv) XeO_3	(D) Square pyramidal
(v) XeO_2F_2	

Which of the following is best matched option.

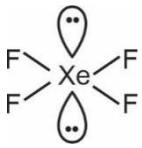
A. (i)-(B), (ii)-(D), (v)-(A), (iv)-(C)

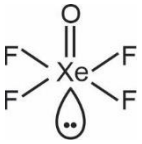
B. (i)-(A), (ii)-(C), (iii)-(B), (iv)-(D)

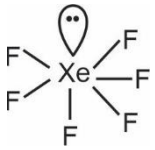
C. (i)-(C), (v)-(B), (iii)-(A), (iv)-(D)

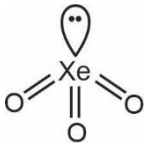
D. (i)-(B), (ii)-(D), (iii)-(A), (iv)-(C)

Ans. 50. (D)

XeF_4 :  Square planar

$XeOF_4$:  Square Pyramidal

XeF_6 :  Distorted Octahedral

XeO_3 :  Pyramidal

Q51	Which of the following analogies is incorrect? A. CsCl : Schottky defect : : AgCl : Frenkel Defect B. Hexagonal closed packing : ABAB … : : Cubic closed packing : ABCABC.. C. SiC : Molecular solid : : MgO : Ionic solid D. Crystalline solid : Long range order : : Amorphous solid : Short range order **Ans. 51.** (C) SiC is a covalent solid, and MgO is an ionic solid.
Q52	Complete the analogy : Protein : A : : Nucleic acids : B A. A : Glycosidic linkage : : B : Phosphodiester linkage B. A : Peptide linkage : : B : : Phosphodiester linkage C. A : Peptide linkage : : B : Glycosidic linkage D. A : Glycosidic linkage : : Peptide linkage **Ans. 52.** (B) • Proteins are the polypeptides with more than hundreds of amino acids which are joined together by peptide linkage. • Nucleic acids are the natural biopolymers made of polynucleotides which are joined together with phosphodiester linkage.
Q53	**CASE1:** Read the passage given below and answer the following questions 53-55. When a non-volatile solute is added to a solvent, the boiling point of the solutions is always higher than that of the pure solvent. The deviation of boiling point depends on the number of solute molecules rather than their nature. If T_b^0 be the boiling point of pure solvent and T_b be the boiling point of solution. Then, the increase in the boiling point $\Delta T_b = T_b - T_b^0$ is known as elevation of boiling point. For dilute solutions, $\Delta T_b = K_b m$ (Where m = molality of the solutions and K_b = molal elevation constant) The unit of molal elevation constant is A. K kg mol^{-1} B. K^{-1} kg mol^{-1} C. K kg mol D. K^{-1} kg^{-1} mol **Ans. 53.** (A) $\Delta T_b = K_b m$ $K_b = \frac{\Delta T_b}{m} = \frac{K}{mol\ kg^{-1}}$

	Hence, the unit of molal elevation constant is K kg mol^{-1}
Q54	The correct relation between the molar mass of solute (M_2) and the elevation in boiling point is given by [w_2 = mass of solute taken] [w_1 = mass of solvent taken] A. $M_2 = \frac{\Delta T_b \times w_1}{1000 \times w_2 \times K_b}$ B. $M_2 = \frac{1000 \times w_2 \times K_b}{\Delta T_b \times w_1}$ C. $M_2 = \frac{\Delta T_b \times w_2}{1000 \times w_1 \times K_b}$ D. $M_2 = \frac{1000 \times w_1 \times K_b}{\Delta T_b \times w_2}$ **Ans. 54.** (B) $m = \frac{w_2 / M_2}{w_1 / 1000} = \frac{1000 \times w_2}{M_2 \times w_1}$ $\Delta T_b = \frac{K_b \times 1000 \times w_2}{M_2 \times w_1}$ $M_2 = \frac{1000 \times w_2 \times K_b}{\Delta T_b \times w_1}$
Q55	The boiling point of benzene is 353.25 K. When 18 g of glucose, $C_6H_{12}O_6$ was dissolved in 90 g benzene, the boiling point is raised to 354.05 K. Calculate the molal elevation constant for benzene. A. 0.72 B. 2.18 C. 1.44 D. 1.24 **Ans. 55.** (A) $\Delta T_b = K_b \cdot m$ ΔT_b = 354.05 – 353.25 = 0.80 K $m = \frac{\text{no. of moles of solute}}{\text{mass of solvent (kg)}}$ $= \frac{18 \times 1000}{180 \times 90} = 1.11 m$ = $K_b = \frac{0.80}{1.11}$ K_b = 0.72 K kg mol^{-1}