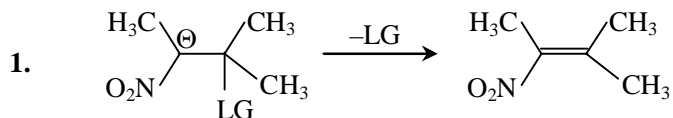


ASSOCIATION OF CHEMISTRY TEACHERS

NATIONAL STANDARD EXAMINATION IN CHEMISTRY 2013-2014

Date of Examination 24th November 2013

[Ques. Paper Code : 205]

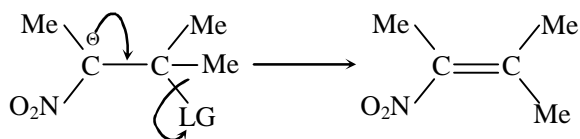


The carbanion expels a leaving group LG to yield an alkene as shown above by -

- (A) E₁cB mechanism (B) E₁ mechanism
(C) E₂ mechanism (D) Such a reaction does not take place

Ans. [A]

Sol. Intermediate carbonion is form in E_{1-cb} elimination reaction is Ist step and then by the removal of L.G. product is form.



(1) E_{1-cb} mechanism.

2. A DNA sample stored at 4°C was removed from the refrigerator and heated in a hot water bath with temperature increasing gradually. Which bond of the DNA molecule will break first ?

- (A) Phosphodiester bond (B) Glycoside linkage
(C) Hydrogen bond (D) Covalent bond

Ans. [C]

Sol. Hydrogen bonds will break first because it is weakest bond.

3. Which of the following salts produces the most basic solution ?

- (A) Al(CN)₃ (B) KC₂H₃O₂ (C) BF₃ (D) CHCl₃

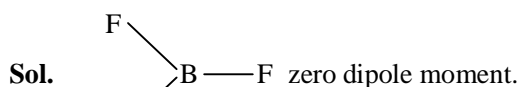
Ans. [B]

Sol. KC₂H₃O₂ is a salt of WASB therefore such solution is most basic.

4. Which of the following compounds has zero dipole moment ?

- (A) NH₃ (B) NF₃ (C) BF₃ (D) CHCl₃

Ans. [C]

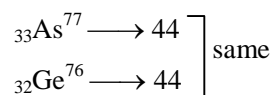


BF₃ trigonal planer shape so resultant dipole moment is zero.

5. An isotope of ${}_{32}\text{Ge}^{76}$ is -
 (A) ${}_{32}\text{Ge}^{77}$ (B) ${}_{33}\text{As}^{77}$ (C) ${}_{34}\text{Se}^{77}$ (D) ${}_{35}\text{Br}^{80}$

Ans. [B]

Sol. **Isotone** : Element which contain same no. of neutrons are known as a isotones.



6. One of the constituents of German silver is -
 (A) Ag (B) Mg (C) Cu (D) Al

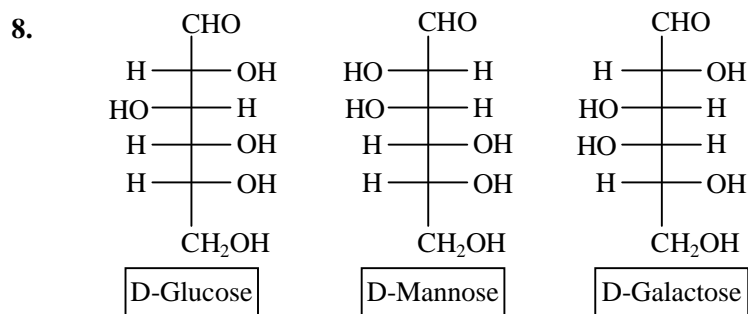
Ans. [C]

Sol. German silver \Rightarrow Cu + Zn + Ni

7. A catalyst is a substance that -
 (A) undergoes chemical change to accelerate the rate of the reaction
 (B) decreases the energy of activation of the reaction
 (C) increases the kinetic energy of the reaction
 (D) lowers the potential energy of the products with respect to that of the reactants

Ans. [B]

Sol. By definition.

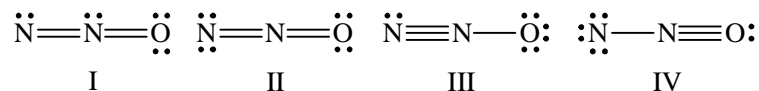


The above structures are related to each other as -

- (A) identical substances (B) diastereomers
 (C) enantiomers (D) epimers

Ans. [B]

9. Which one of the following is not a valid structure for dinitrogen oxide ?

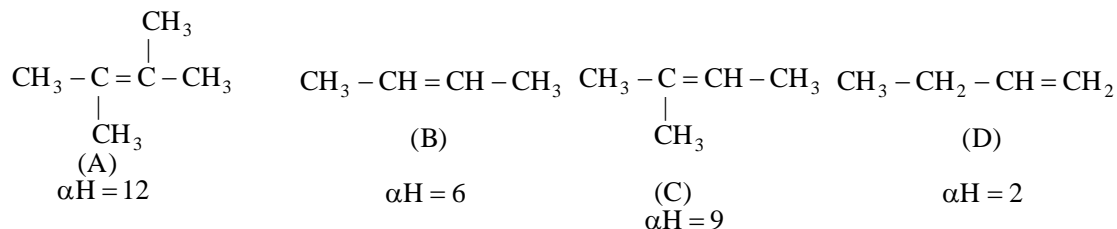


- (A) I (B) II (C) III (D) IV

Ans. [A]

Sol. $\ddot{\text{N}}=\ddot{\text{N}}=\ddot{\text{O}}$ not valid because middle nitrogen contain 10 electron.

Sol.

Most stable alkene \propto no. of α -H

(A) 2,3-dimethyl-2-butene.

16. RNA forms loop structure because -
 (A) It always contain uracyl instead of thymine
 (B) of presence of nearby complementary bases
 (C) all RNAs have to form loop structure to function
 (D) they are always single stranded

Ans. [B]

Sol. RNA forms loop structure due to presence of nearby complementary base.

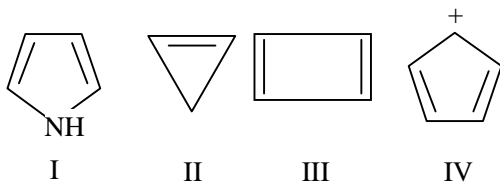
17. Which is the strongest oxidising agent among the species given below ?

(i) In^{3+} $E^\circ = -1.34$ V(ii) Au^{3+} $E^\circ = 1.40$ V(iii) Hg^{2+} $E^\circ = 0.867$ V(iv) Cr^{3+} $E^\circ = -0.786$ V(A) Cr^{3+} (B) Au^{3+} (C) Hg^{2+} (D) In^{3+}

Ans. [B]

Sol. Au^{+3} is strongest oxidising due to high S.R.P. value.

18. Which of the following structures is aromatic ?



(A) Structures I and II

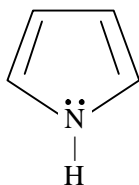
(C) Structure II only

(B) Structure I only

(D) Structure III only

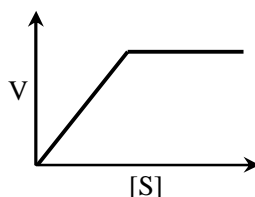
Ans. [B]

Sol.



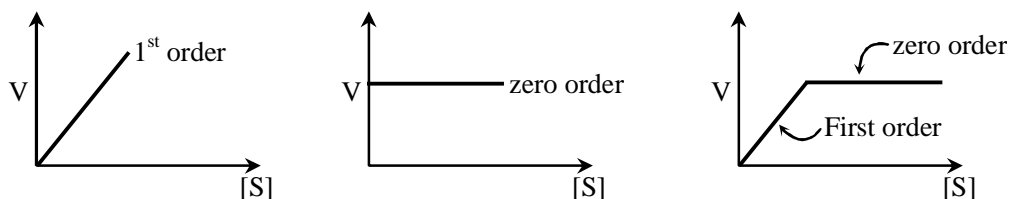
- Planar
 - Cyclic conjugation
 - $6\pi e^-$ in reso. follow $[4n + 2] \pi e^-$ Hückles rule
- \Rightarrow Aromatic.

19. The kinetics of an enzyme-catalysed hydrolysis reaction is represented by the following graph, where [S] is the substrate concentration, and v is the rate of the reaction :
The kinetic course of the reaction can be described as -



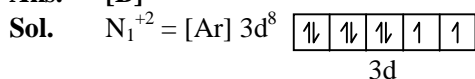
- (A) First order, zero order
(B) zero order, first order
(C) First order, second order
(D) Second order, first order

Ans. [A]
Sol.



20. The number of unpaired electrons in Ni^{2+} is -
(A) 0 (B) 2 (C) 3 (D) 4

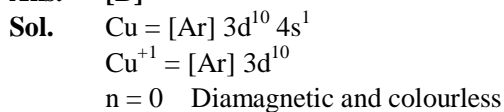
Ans. [B]



$$n = 2$$

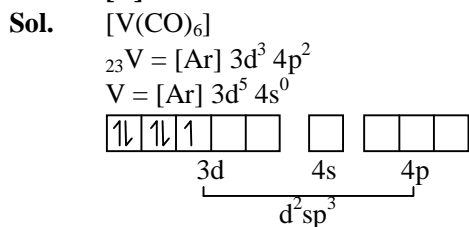
21. The colourless ion from among the following is -
(A) Mn^{2+} (B) Cu^+ (C) Cr^{3+} (D) Fe^{2+}

Ans. [B]

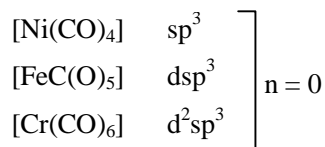


22. The metal carbonyl which is paramagnetic is -
(A) $\text{Ni}(\text{CO})_4$ (B) $\text{V}(\text{CO})_6$ (C) $\text{Cr}(\text{CO})_6$ (D) $\text{Fe}(\text{CO})_5$

Ans. [B]



$$n = 1$$



23. The percentage composition of nitrogen in an organic compound can be determined by -
(A) Dumas method (B) Kjeldahl method (C) Victor's Method (D) Hoffman's Method

Ans. [A,B]

Sol. % of N in organic compound can be estimated by

- (a) DUMAS method \rightarrow as N_2
(b) KJeldahl method \rightarrow as NH_3

So ans. should be A and B.

24. High spin complexes having coordination number '6' are usually formed through -

- (A) sp^3d^2 hybridisation (B) d^2sp^3 hybridisation
(C) sp^3 hybridisation (D) sp^3d hybridisation

Ans. [A]

Sol. High spin octahedral complex form in sp^3d^2 hybridisation.

25. The blood red color obtained in the detection of nitrogen and sulphur together in an organic compound in Lassaigne's test is due to -

- (A) $[Fe(CNS)]^+$ (B) $[Fe(CNS)_2]^+$ (C) $[Fe(CNS)_3]^-$ (D) $[Fe(CNS)_2]^{2+}$

Ans. [B]

Sol. Fe^{+3} give blood red colour with KCNS.



$$x - 2 = + 1$$

$$x = + 3$$

26. A protein attached to a carbohydrate moiety is called as -

- (A) Lipoprotein (B) Nucleoprotein (C) Apoprotein (D) Glycoprotein

Ans. [D]

Sol. Glycoprotein = Carbohydrate + protein.

27. Which of the following aqueous solution has the lowest electrical conductance ?

- (A) 0.01 M $CaCl_2$ (B) 0.01 M KNO_2 (C) 0.01 M CH_3COOH (D) 0.01 M CH_3COCH_3

Ans. [D]

Sol. Because CH_3COCH_3 is not electrolyte.

28. The reddish-brown gas formed when nitric oxide is oxidized by air is -

- (A) NO_2 (B) N_2O_4 (C) N_2O_5 (D) N_2O_3

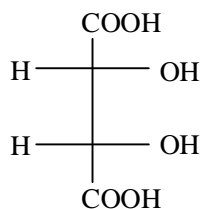
Ans. [A]

Sol. $2NO + O_2 \rightarrow 2NO_2$, n = 1 paramagnetic and reddish brown.

29. The number of optically active stereoisomers of tartaric acid, (HOOC. CHOH. CHOH. COOH) is -
 (A) 4 (B) 2 (C) 1 (D) 3

Ans. [B]

Sol.



Tartaric acid

$$n = 2 \text{ (even)}$$

optically active form

$$= 2^{n-1} = 2^{2-1} = 2^1$$

30. The electronic level which allows the hydrogen atom to absorb, but not emit a photon is -
 (A) 1s (B) 2s (C) 2p (D) 3s

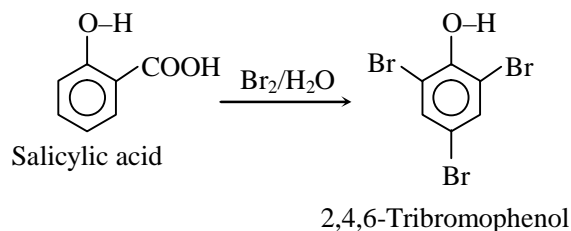
Ans. [A]

Sol. 1s is lowest energy subshell.

31. Salicylic acid on treatment with bromine water will give -
 (A) 2-bromo-6-hydroxybenzoic acid (B) 2,4,6-tribromophenol
 (C) 2,6-dibromobenzoic acid (D) 1,3-dibromo-6-hydroxybenzoic acid

Ans. [B]

Sol.



32. In which of the following compounds is the oxidation number of the transition metal, zero ?

- (A) $[\text{Fe}(\text{H}_2\text{O})_3](\text{OH})_2$ (B) $[\text{Co}(\text{NH}_3)_6]\text{Cl}_2$
 (C) $[\text{Ni}(\text{CO})_4]$ (D) $[\text{Pt}(\text{C}_2\text{H}_4)\text{Cl}_3]$

Ans. [C]

Sol. $\text{Ni}(\text{CO})_4$

$$x + 0 = 0$$

$$x = 0$$

33. If each of the following salts has solubility product $K_{sp} = 1 \times 10^{-9}$, which of them is least soluble in water ?

- (A) XY (B) X_2Y (C) XY_2 (D) X_3Y

Ans. [A]

Sol. For XY $\Rightarrow s = \left(\frac{10^{-9}}{1}\right)^{1/2}$

$$X_2Y \Rightarrow S = \left(\frac{10^{-9}}{4}\right)^{1/3}$$

$$XY_2 \Rightarrow S = \left(\frac{10^{-9}}{4}\right)^{1/3}$$

$$X_3Y \Rightarrow S = \left(\frac{10^{-9}}{27}\right)^{1/4}$$

\therefore least soluble is XY.

34. Bell metal is an alloy of copper and -

- (A) tin (B) aluminium (C) zinc (D) nickel

Ans. [A]

Sol. Bell metal = Cu + Sn

35. Europium (Eu) and Terbium (Tb) attain stable $4f^7$ configuration by exhibiting oxidation states of -

- (A) +2 and +4 (B) +3 and +4 (C) + 2 and + 3 (D) + 1 and + 3

Ans. [A]

Sol. Eu = [Xe] $4f^7 5d^0 6s^2$

$$Eu^{+2} = [Xe] 4f^7$$

Tb = [Xe] $4f^9 5d^0 6s^2$

$$Tb^{+4} = [Xe] 4f^7$$

36. Which of the following reaction parameters will change due to addition of a catalyst states of -

- (A) free energy (B) only equilibrium constant
(C) only rate constant (D) both equilibrium constant and rate constant

Ans. [C]

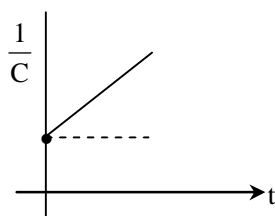
Sol. by definition.

37. A plot of $1/[\text{NO}_2]$ verses time for decomposition of NO_2 was found to be linear. This means that the reaction -

- (A) is zero order with respect to $[\text{NO}_2]$ (B) is first order with respect to $[\text{NO}_2]$
(C) is second order with respect to $[\text{NO}_2]$ (D) order cannot be determined from the information given

Ans. [C]

Sol.



$$\frac{1}{C_t} = kt + \frac{1}{C_0}$$

2nd order reaction

plot between $\frac{1}{\text{conc.}}$ v/s time is straight line for 2nd order reaction

38. Select the most correct statement among the following -

- (A) S_N1 mechanism takes place in non-polar solvents
 (B) S_N2 mechanism in chiral substrates gives racemic mixtures as products
 (C) S_N1 mechanism is encouraged by polar solvents
 (D) The solvent never influences the mechanism

Ans. [C]

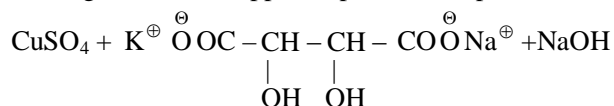
Sol. In S_N1 mechanism intermediate. Carbocation is formed so polar solvent-favour S_N1 mechanism.

39. Fehlings solutions is -

- (A) $AgNO_3$ solution + NaOH solution + NH_4OH
 (B) Alkaline solution of Cupric ion complexed with citrate ion
 (C) Copper sulphate + sodium potassium tartrate + NaOH
 (D) Copper sulphate solution

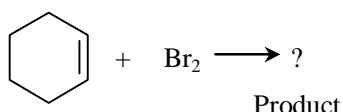
Ans. [C]

Sol. Fehling solution = copper sulphate + sod.pot. tartarate + NaOH



Fehling solution

40.



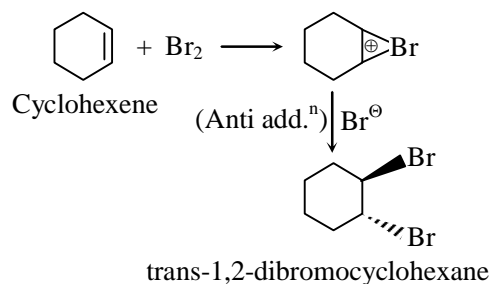
Cyclohexene

The correct name of the product obtained is -

- (A) cis-1,2-dibromocyclohexane
 (B) cis 1,4-dibromocyclohexane
 (C) trans-1,2-dibromocyclohexane
 (D) trans-1,4-dibromocyclohexane

Ans. [C]

Sol.



41. A solution of sodium metal in liquid ammonia is strongly reducing due to the presence of -
 (A) sodium atoms (B) sodium hydride (C) sodium amide (D) solvated electrons

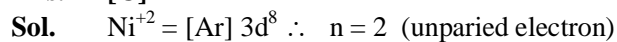
Ans. [D]



solution of sodium metal in liquid ammonia is strongly reducing due to the presence of solvated electron or ammoniated electron.

42. The number of unpaired electrons in Ni^{+2} ion is 2, therefore its spin multiplicity is -
 (A) 2 (B) 1 (C) 3 (D) 4

Ans. [C]

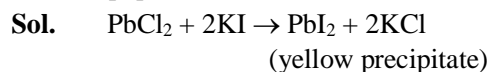


$$\text{spin multiplicity} = 2|s| + 1$$

$$2 \times 1 + 1 = 3$$

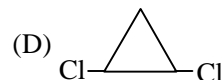
43. A cold KCl solution of PbCl_2 gives golden yellow precipitate on addition of -
 (A) KCl solution (B) KI solution (C) NaCl solution (D) K_2SO_4 solution

Ans. [B]



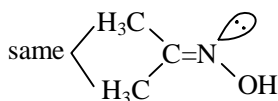
44. Which of the following molecules cannot show geometric isomerism ?

- (A) $\text{CH}_3\text{CH}=\text{NOH}$ (B) $(\text{CH}_3)_2\text{C}=\text{NOH}$ (C) $\text{HO}-\text{N}=\text{N}-\text{OH}$



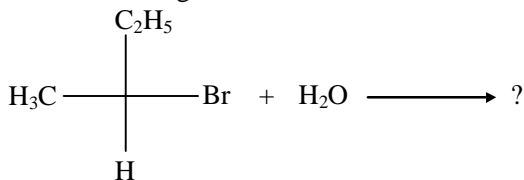
Ans. [B]

Sol.

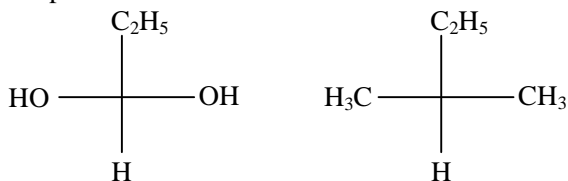


do not show G.I.

45. In the reaction given below :



the product obtained will contain :



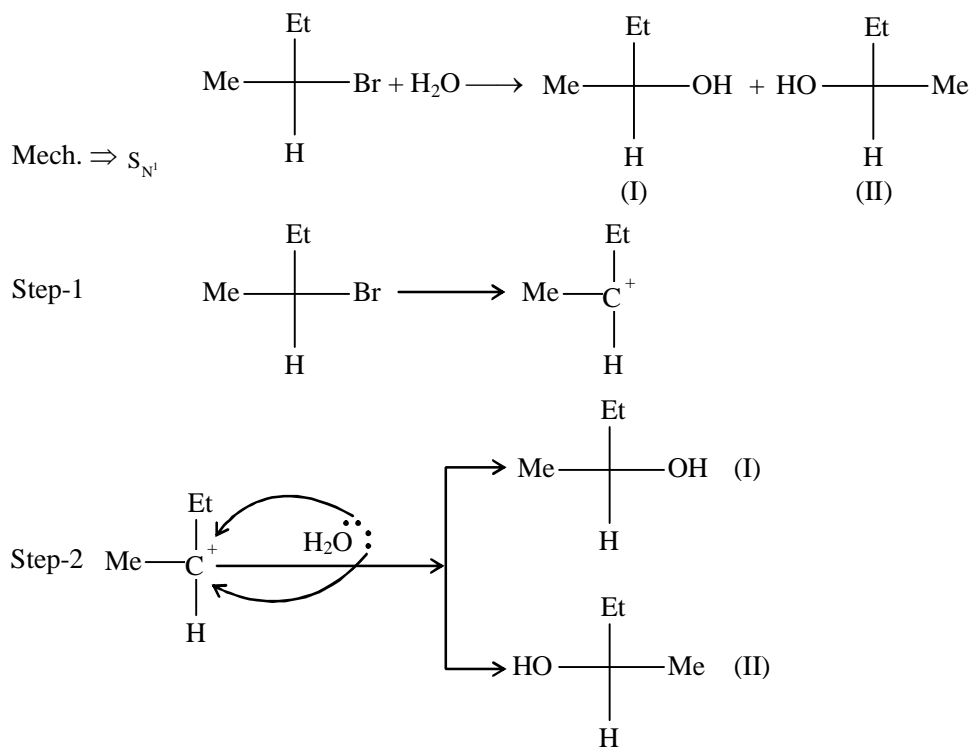
I

II

- (A) Only compound I
 (B) Only compound II
 (C) Both compounds I and II
 (D) This substitution cannot take place

Ans. [C]

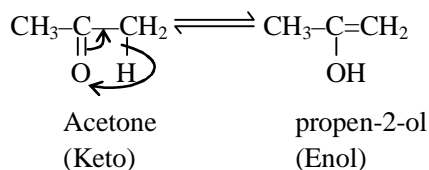
Sol.



46. Acetone and propen-2-ol are -
 (A) enantiomers (B) keto-enol tautomers (C) diastereoisomers (D) meso compounds

Ans. [B]

Sol.



Keto-Enol tautomer

47. How old is a fossil bone whose ^{14}C content is 15.0% of that living bone? Half life of ^{14}C isotope is 5.73×10^3 yr -
 (A) 25488 yr (B) 15688 yr (C) 388 yr (D) 6818 yr

Ans. [B]

Sol.

$$t_{\text{age}} = \frac{t_{1/2}}{0.693} \ln \frac{[\text{C}-14]_{\text{living}}}{[\text{C}-14]_{\text{dead}}}$$

$$t_{\text{age}} = \left\{ \frac{5.73 \times 10^3}{0.693} \ln \left(\frac{100}{15} \right) \right\} \text{ year}$$

$$t_{\text{age}} \approx 15688 \text{ year}$$

48. How much chemical energy is fixed in the form of ATP upon complete oxidation of one mole of glucose? (hydrolysis of ATP yields 7.5 kcal/mole) -
 (A) 360 (B) 300 (C) 270 (D) 200

Ans. [C]

Sol. In oxidation of 1 mole of glucose 36 ATP is involve
 $\therefore 36 \times 7.5 \text{ KCal} = 270$

49. The value of the constant in Nernst equation

$$E = E^\circ - \frac{\text{const } \ln Q}{n} \text{ at } 25^\circ\text{C is}$$

- (A) 0.592 (B) 0.0592 (C) 0.292 (D) 0.0296

Ans. [D]

Sol. $E = E^\circ - \frac{0.0296}{n} \ln Q$

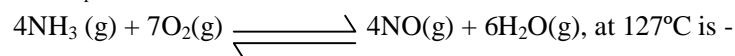
50. The chemical formula of Plaster of Paris is -

- (A) $2\text{CaSO}_4 \cdot \text{H}_2\text{O}$ (B) $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ (C) $3\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ (D) $\text{CaSO}_4 \cdot \text{H}_2\text{O}$

Ans. [A]

Sol. Plaster of paris $\Rightarrow 2\text{CaSO}_4 \cdot \text{H}_2\text{O}$.

51. The K_p/K_c ratio for the reaction :



- (A) 0.0301 (B) 0.0831 (C) 1.0001 (D) 33.26

Ans. [A]

Sol. $\frac{K_p}{K_c} = (RT)^{\Delta n_g}$

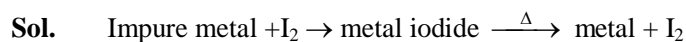
$$\frac{K_p}{K_c} = \{0.0821 \times 400\}^{-1}$$

$$\frac{K_p}{K_c} = 0.0301$$

52. Van Arkel method of purification of metals involves converting the metal to a -

- (A) Volatile compound (B) Volatile unstable compound
(C) Non-volatile stable compound (D) Non-volatile unstable compound

Ans. [B]



During van Arkel method volatile unstable compound form.

53. Which of the following reaction mechanisms does not involve carbocation as an intermediate ?

- (A) Baeyer-Villiger Oxidation
(B) Beckman rearrangement
(C) Fries Rearrangement
(D) Diels-Alder Reaction

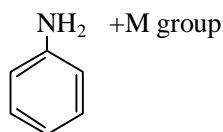
Ans. [D]

Sol. In Diels-Alder reaction intermediate carbocation is not formed.

54. Which of the following statements is correct ?
- (A) $-\text{NO}_2$ group activates the benzene ring for attack of electrophile at ortho and para position
- (B) $-\text{NH}_2$ group activates the benzene ring for attack of electrophile at ortho and para positions
- (C) Both $-\text{NO}_2$ group as well as $-\text{NH}_2$ group activate the benzene ring for attack of electrophile at ortho and para positions
- (D) Neither $-\text{NO}_2$ group nor $-\text{NH}_2$ group activate the benzene ring for attack of electrophile at ortho and para positions

Ans. [B]

Sol.



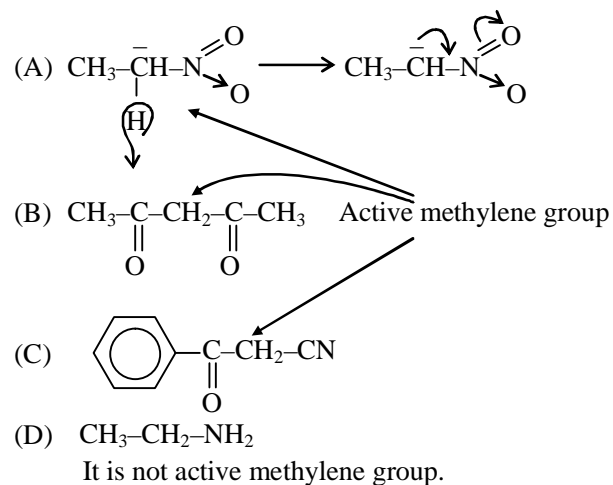
$-\text{NH}_2$ group increase the e^- density in benzene ring that why attack of electrophile becomes easy in benzene ring so $-\text{NH}_2$ group activate the benzene ring.

It increase e^- density at ortho and para positions so it is ortho para directing group.

55. Which of the following does not have an active methylene group ?
- (A) $\text{CH}_3\text{CH}_2\text{NO}_2$ (B) $\text{CH}_3\text{COCH}_2\text{COCH}_3$ (C) $\text{Ph COCH}_2\text{CN}$ (D) $\text{CH}_3\text{CH}_2\text{NH}_2$

Ans. [D]

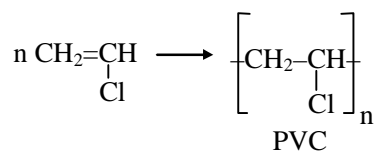
Sol.



56. $\text{CH}_2=\text{CHCl}$ is monomer of -
- (A) Poly styrene (B) Natural rubber (C) PVC (D) Nylon-6

Ans. [C]

Sol.



vinyl chloride (poly vinyl chloride)

57. A cell membrane acts as a semi-permeable selective boundary because it contains -
 (A) Lipids and carbohydrates (B) Proteins and carbohydrates
 (C) Proteins and Nucleic acids (D) Lipids and proteins

Ans. [D]

Sol. Cell membrane contain lipid and protein which causes its selectivity.

58. 4s orbital has lesser energy than 3d orbital because it has -
 (A) greater value of n (B) lesser value of l (C) lesser value of (n + l) (D) l = 0

Ans. [C]

Sol.

	4s	3d
n	4	3
l	0	2
n + l	4	5

59. When zinc rod is directly placed in copper sulphate solution -
 (A) the blue colour of the solution starts intensifying
 (B) the solution remains electrically neutral
 (C) the temperature of the solution falls
 (D) the weight of zinc rod starts increasing

Ans. [B]

Sol. $\text{Zn} + \text{Cu}^{2+} \rightarrow \text{Zn}^{2+} + \text{Cu} \downarrow$

60. The linear molecule among the following is -
 (A) CO_2 (B) NO_2 (C) SO_2 (D) ClO_2

Ans. [A]

Sol. $\text{O}=\text{C}=\text{O}$ (linear molecules) sp hybridisation.

61. In the compound $\text{Na}_2\text{S}_2\text{O}_3$, the oxidation state of sulphur is-
 (A) -2 (B) +2 (C) +4 (D) +6

Ans. [B]

Sol. $\text{Na}_2\text{S}_2\text{O}_3$

$$(+1 \times 2) + (x \times 2) + (-2 \times 3) = 0$$

$$x = \frac{4}{2} = 2$$

62. The pH of 0.1 M NH_4OH , ($K_b = 1.8 \times 10^{-5}$, $K_w = 10^{-14}$), is -
 (A) 1.0 (B) 5.7 (C) 11.1 (D) 13.0

Ans. [C]



$$t = 0 \quad 0.1 \quad 0 \quad 0$$

$$\text{Eq.} \quad 0.1(1 - \alpha) \quad 0.1\alpha \quad 0.1\alpha$$

$$1.8 \times 10^{-5} = \frac{(0.1\alpha)^1(0.1\alpha)^1}{(0.1)}$$

$$0.1 \alpha^2 = 1.8 \times 10^{-5}$$

$$\alpha^2 = 1.8 \times 10^{-4}$$

$$\alpha = \sqrt{1.8} \times 10^{-2}$$

$$[\text{OH}^-] = 0.1 \alpha = \sqrt{1.8} \times 10^{-3}$$

$$\text{pOH} = 3 - \frac{1}{2} \times 0.255 = 2.872$$

$$\text{pH} = 14 - 2.872 = 11.12$$

63. In animals, the stored carbohydrates is -
 (A) Starch (B) glycogen (C) Sucrose (D) Fructose

Ans. [B]

Sol. Glycogen is stored in animals as a extra carbohydrates.

64. For a chemical reaction ΔH is negative and ΔS is positive. This reaction is -
 (A) spontaneous at all temperatures
 (B) nonspontaneous at all temperatures
 (C) spontaneous only at high temperatures
 (D) spontaneous only at low temperatures

Ans. [A]

Sol. $\Delta G = \Delta H - T\Delta S$

or

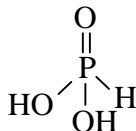
$$\Delta G = \Delta H + (-T\Delta S)$$

$$\begin{array}{ccc} \downarrow & \downarrow & \downarrow \\ -ve & -ve & -ve \end{array}$$

65. Which of the following salt/s of H_3PO_3 exists ?
 (i) NaH_2PO_3
 (ii) Na_2HPO_3
 (iii) Na_3PO_3
 (A) I and II only (B) I, II and III (C) II and III only (D) III only

Ans. [A]

Sol. H_3PO_3 is diprotic acid so form two type of salt NaH_2PO_3 , Na_2HPO_3



66. Which of the following molecules is most volatile ?

- (A) Salicylaldehyde (B) p-nitrophenol
(C) p-hydroxybenzoic acid (D) m-hydroxybenzoic acid

Ans. [A]

Sol. Among the following salicylaldehyde is most volatile. It is steam volatile due to intramolecular H-bonding.

67. The isoelectric point of an amino acid is -

- (A) The pH at which it exists in the acidic form
(B) The pH at which exists in the basic form
(C) The pH at which it exists in the Zwitter ion form
(D) The pH which is equal to its pK_a value

Ans. [C]

Sol. Isoelectric point : Isoelectric point of an amino acid is the pH at which it exists in the Zwitter ion form.

68. A gas shows positive Joule-Thomson Effect below its -

- (A) Boyle temperature
(B) Critical temperature
(C) Inversion temperature
(D) Transition temperature

Ans. [C]

Sol. By Definition

69 The following data was recorded for the reaction :



Set No.	[A]	[B]	Rate of the reaction
I	0.1 M	0.2M	0.001
II	0.2M	0.2M	0.004
III	0.2M	0.8M	0.008

The order of the reaction is -

- (A) 1 (B) 2 (C) 2.5 (D) 3

Ans. [C]

Sol. $0.001 = K(0.1)^n (0.2)^m \dots(i)$
 $0.004 = K (0.2)^n (0.2)^m \dots(ii)$
 $0.008 = K (0.2)^n (0.8)^m \dots(iii)$

from (iii) \div (i)

$$\frac{0.008}{0.004} = \left(\frac{0.8}{0.2}\right)^m$$

$$2 = 4^m$$

$$m = 0.5$$

from (ii) \div (i)

$$\frac{0.004}{0.001} = \left(\frac{0.2}{0.1}\right)^n \Rightarrow n = 2 ;$$

$$\text{order of reaction} = 2 + 0.5 = 2.5$$

from (ii) \div (i)

$$\frac{0.004}{0.001} = \left(\frac{0.2}{0.1}\right)^n$$

$$n = 2$$

$$\therefore \text{order of reaction} = n + m = 2 + 0.5 = 2.5$$

70. Which solution has the highest pH ?

- (A) 0.01M CaCl₂ (B) 0.01M KNO₂ (C) 0.01M CH₃COOH (D) 0.01M CH₃COCH₃

Ans. [B]

Sol. 0.01 M KNO₂ because it is salt of weak acid (HNO₂) & strong base KOH.

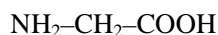
71. The minimum number of H⁺ ions that can be released by an amino acid is-

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

Ans. [A]

Sol. Amino acid is organic compound which contain one NH₂ group and one -COOH group (At least) so minimum number of proton that can be released by an amino acid is 1.

Smallest amino acid glycine



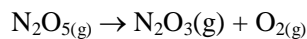
72. Which of the following molecular structures is NOT possible ?

- (A) OF₂ (B) SF₂ (C) OF₄ (D) SF₄

Ans. [C]

Sol. OF₄ \rightarrow Octet of 2nd period element do not expand.

73. K_p for the reaction given below is 1.36 at 499 K. Which of the following equations can be used to calculate K_c for this reaction ?



(A) $K_c = \frac{[(0.0821) \times (499)]}{[1.36]}$

(B) $K_c = \frac{[(1.36)(0.0821)]}{[499]}$

(C) $K_c = \frac{[1.36]}{[(0.0821) \times (499)]}$

(D) $K_c = \frac{[(1.36) \times (499)]}{[0.0821]}$

Ans. [C]

Sol. $K_p = K_c (RT)^{\Delta n_g}$

$$K_c = \frac{1.36}{(0.0821 \times 499)^1}$$

74. A 55-KDa protein was acid hydrolysed to obtain a mixture of amino acids. How many amino acids could be present in the solution ?

(A) 550 (B) 500 (C) 1000 (D) 1100

Ans. [B]

Sol. 3 sequence = 1 amino acid = 110 Da

So in 55 KDa = $55 \times 1000 = 55000$ Da

$$\text{So no. of amino acid in 55 KDa} = \frac{55000}{110} = 500$$

75. Which of the following phenols is most soluble in aqueous sodium bicarbonate ?

(A) 2, 4-dihydroxyacetophenon

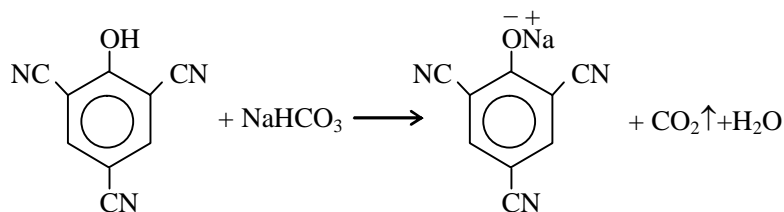
(B) p-cyanophenol

(C) 3,4-dicyanophenol

(D) 2,4,6-tricyanophenol

Ans. [D]

Sol.



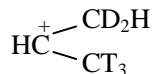
2,4,6-Tricyanophenol most soluble in given molecule.

76. 6.24 g of ethanol are vaporized by supplying 5.89 kJ of heat energy. What is the enthalpy of vapourisation of ethanol ?
 (A) 43.42 kJ (B) 47.0 kJ (C) 21.75 kJ (D) 435.0 kJ

Ans. [A]

Sol. Enthalpy of vapourisation = $\frac{5.89 \times 46}{6.24} = 43.42$ kJ.

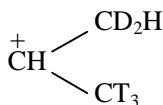
77. How many hyperconjugative structures are possible in the following carbocation ?



- (A) 1 (B) 3 (C) 5 (D) 6

Ans. [D]

Sol.



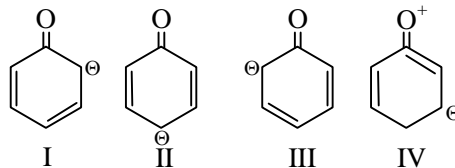
$\alpha\text{H} = 6$ So no. of hyper conjugative Str = 6.

78. The ions which give black precipitates on passing H_2S gas in acidic medium are -
 (A) Al^{3+} and Ni^{2+} (B) Ni^{2+} and Co^{2+} (C) Cu^{2+} and Bi^{3+} (D) Zn^{2+} and Mn^{2+}

Ans. [C]

Sol. $\text{Cu}^{2+} + \text{H}_2\text{S} \rightarrow \text{CuS}$ black ppt
 $\text{Bi}^{3+} + \text{H}_2\text{S} \rightarrow \text{Bi}_2\text{S}_3$ black ppt

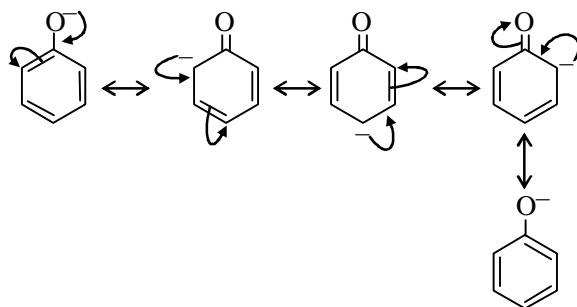
79. Which of the following is not a resonating structure for the phenoxide ion ?



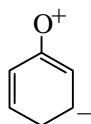
- (A) I (B) II (C) III (D) IV

Ans. [D]

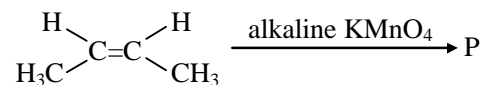
Sol.



Not possible structure is



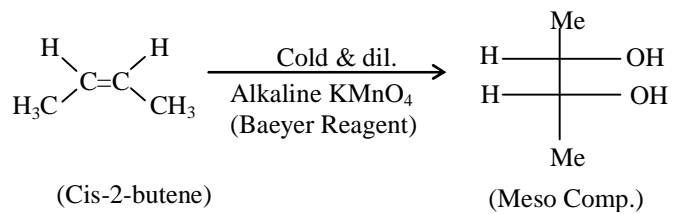
80. Which of the following statements is true for the reaction given below ?



- (A) P is a meso compound 2,3-butanediol formed by syn addition
 (B) P is a meso compound 2,3-butanediol formed by anti addition
 (C) P is a racemic mixture of d-and l-2,3-butanediol formed by anti addition
 (D) P is a racemic mixture of d-and l-2,3-butanediol formed by syn addition

Ans. [A]

Sol.



(Cis Alkene → Syn. addition → Meso) Meso-2,3-butane-di-ol

* Baeyer reagent formed vicinal diols by syn additions.