

SR CHEMISTRY

1. VA GROUP ELEMENTS

1. Which pair of oxyacids of phosphorous contain 'P-H' bonds ? (E-2009)
 1) H_3PO_4, H_3PO_3 2) $H_3PO_5, H_4P_2O_7$ 3) H_3PO_3, H_3PO_2 4) H_3PO_2, HPO_3
2. Which of the following reactions yield elementary gases like N_2, H_2, O_2 as the byproducts ? (M-2009)
 I) $CuO + NH_3 \rightarrow$ II) $2NH_3 + 2Na \xrightarrow[300-400^\circ C]{Fe}$
 III) $8NH_3 + 3Cl_2 \rightarrow$ IV) $2Pb(NO_3)_2 \xrightarrow{\Delta}$
 1) I & II only 2) II, III & IV only 3) I, II & III only 4) All of these
3. The correct order of reducing abilities of hydrides of V group elements is (E-2008)
 1) $NH_3 < PH_3 < AsH_3 < SbH_3 < BiH_3$ 2) $NH_3 > PH_3 > AsH_3 > SbH_3 > BiH_3$
 3) $NH_3 < PH_3 > AsH_3 > SbH_3 > BiH_3$ 4) $SbH_3 > BiH_3 > AsH_3 > NH_3 > PH_3$
4. The number of P-O bonds and lone pairs of electrons present in P_4O_6 molecule, respectively. (M-2008)
 1) 12,16 2) 12,12 3) 8,8 4) 12,4
5. Which is in the decreasing order of boiling points of V group hydrides? (M-2007)
 1) $NH_3 > PH_3 > AsH_3 > SbH_3$ 2) $SbH_3 > AsH_3 > PH_3 > NH_3$
 3) $PH_3 > NH_3 > AsH_3 > SbH_3$ 4) $SbH_3 > NH_3 > AsH_3 > PH_3$
6. The following are some statements related to VA group hydrides. (2007-E)
 I. Reducing property increases from NH_3 to BiH_3
 II. Tendency to donate lone pair decreases from NH_3 to BiH_3
 III. Thermal stability of hydrides decreases from NH_3 to BiH_3
 IV. Bond angle of hydrides decreases from NH_3 to BiH_3
 The correct statements are of
 1) I, II, III and IV 2) I, III and IV 3) I, II and IV 4) I and IV
7. Hydrolysis of NCl_3 gives NH_3 and X. Which of the following is X ? (2006-E)
 1) $HClO_4$ 2) $HClO_2$ 3) $HOCl$ 4) $HClO_2$
8. Which of the following is not correct? (E- 2005)
 (1) Ammonia is used as refrigerant.
 (2) A mixture of $Ca(CN)_2$ and C is known as nitrolim.
 (3) A mixture of $Ca(H_2PO_4)_2$ and $CaSO_4 \cdot 2H_2O$ is known as super phosphate of lime.
 (4) Hydrolysis of NCl_3 gives NH_3 and $HOCl$
9. Which of the following is not correct? (M-2005)
 (1) Hydrolysis of NCl_3 gives NH_3 and $HOCl$ (2) NH_3 is less stable than PH_3
 (3) NH_3 is a weak reducing reagent compared to PH_3
 (4) Nitric oxide in solid state exhibits diamagnetic properties.

2. VIA GROUP ELEMENTS

10. The type of bonds present in sulphuric anhydride : (E-2009)
 1) $3s$ and three $pp-dp$ 2) $3s$, one $pp-pp$ and two $pp-dp$
 3) $2s$ and three $pp-dp$ 4) $2s$ and two $pp-dp$

23. **Assertion (A) :** The bond dissociation energy of fluorine is less than bromine (**M-2009**)
Reason (R): In fluorine molecule, large lone pair electronic repulsions and appreciable internuclear repulsions are present
 1) Both A and R are true and R is the correct explanation of A
 2) Both A and R are true but R is not the correct explanation of A
 3) A is true but R is not true
 4) A is not true but R is true
24. Which one of the following reactions does not occur ? (**E-2008**)
 1) $F_2 + 2Cl^- \rightarrow 2F^- + Cl_2$
 2) $Cl_2 + 2F^- \rightarrow 2Cl^- + F_2$
 3) $Br_2 + 2I^- \rightarrow 2Br^- + I_2$
 4) $Cl_2 + 2Br^- \rightarrow 2Cl^- + Br_2$
25. The compound in which the number of $dp - pp$ bonds are equal to those present in ClO_4^-
 1) XeF_4
 2) XeO_3
 3) XeO_4
 4) XeF_6
26. $\xrightarrow[\text{(dry)}]{Ca(OH)_2} \xrightarrow[-H_2O]{Cl_2} A \xrightarrow{\text{auto-oxidation}} CaCl_2 + B$ (**M-2008**)
 Identify B in the above reaction
 1) $CaOCl_2$
 2) $Ca(ClO_3)_2$
 3) $Ca(OH)_2$
 4) $Ca(ClO_2)_2$
27. One gas bleaches the colour of flowers by reduction and another gas by oxidation, The gases respectively are (**M-2007**)
 1) SO_2 and Cl_2
 2) CO and Cl_2
 3) NH_3 and SO_2
 4) H_2S and Br_2
28. Which one of the following pairs of reactants does not form oxygen when they react with each other. (**2005 E**)
 (1) $F_2, NaOH$ solution (hot, conc.)
 (2) F_2, H_2O
 (3) $Cl_2, NaOH$ solution (cold, dil.)
 (4) $CaOCl_2, H_2SO_4$ (dil., small amount)
29. Which of the following is used during the preparation of fluorine by Whyflaw Gray Method. (**2005**)
 (1) aqueous KF
 (2) aq. HF
 (3) Molten KHF_2
 (4) NH_4F

4. TRANSITION ELEMENTS

30. Which one of the following sets correctly represent the increase in the paramagnetic property of the ions ? (**E-2009**)
 1) $Cu^{2+} < V^{2+} < Cr^{2+} < Mn^{2+}$
 2) $Cu^{2+} < Cr^{2+} < V^{2+} < Mn^{2+}$
 3) $Cu^{2+} < V^{2+} < Cr^{2+} < Mn^{2+}$
 4) $V^{2+} < Cu^{2+} < Cr^{2+} < Mn^{2+}$
31. Which one of the following statements is correct ? (**M-2009**)
 1) Ionic radius of Fe^{3+} is greater than Fe^{2+}
 2) Atomic radius of chlorine atom is greater than the ionic radius of chloride ion.
 3) Electron affinity of phosphorus is greater than nitrogen
 4) Cs_2O is strongly acidic in nature
32. $[Co(NH_3)_5SO_4]Br$ and $[Co(NH_3)_5Br]SO_4$ are pair of ____ isomers. (**E-2008**)
 1) Ionization
 2) Ligand
 3) Co-ordination
 4) Hydrate
33. Which one of the following pairs of complexes has the effective atomic number equal to 36 for the transition element ? (**M-2008**)
 1) $[Co(NH_3)_6]Cl_3; K_3[Fe(CN)_6]$
 2) $[Co(NH_3)_6]Cl_3; [Cr(H_2O)_6]Cl_3$
 3) $[Fe(CO)_5]; K_4[Fe(CN)_6]$
 4) $[Fe(CO)_5]; K_3[Fe(CN)_6]$
34. When $AgNO_3$ solution is added in excess to 1M solution of $CoCl_3 \cdot xNH_3$, one mole of $AgCl$ is formed. What is the value of 'x'? (**M-2007**)
 1) 1
 2) 2
 3) 3
 4) 4

35. Which of the following pair of Transition metal ions, have the same calculated values of spin only magnetic moment ? **(2007-E)**
 1) Ti^{+2} and V^{+2} 2) Fe^{+2} and Cu^{+2} 3) Cr^{+2} and Fe^{+2} 4) Co^{+2} and Ti^{+2}
36. What is the correct order of spin only magnetic moment (in BM) of Mn^{2+} , Cr^{2+} and V^{2+} ? **(2006-E)**
 1) $Mn^{2+} > V^{2+} > Cr^{2+}$ 2) $V^{2+} > Cr^{2+} > Mn^{2+}$ 3) $Mn^{2+} > Cr^{2+} > V^{2+}$ 4) $Cr^{2+} > V^{2+} > Mn^{2+}$
37. A complex compound of CO^{+3} with molecular formula $CoClX$, YNH_3 gives a total of 3 ions when dissolved in water. How many Cl^- ions satisfy both primary and secondary valencies in this complex? **(2005 Engg.)**
 (1) 3 (2) 1 (3) 4 (4) Zero
38. **Assertion (A)** : The spin only magnetic moment of Sc^{+3} is 1.73 BM.

Reason (R) : The spin only magnetic moment (in BM) of an ion is equal to $\sqrt{n(n+2)}$. **(M-2005)**

- (1) Both A and R are true and R is the correct explanation of A.
 (2) Both A and R are true and R is not the correct explanation of A.
 (3) A is true but R is not true. (4) A is not true but R is true.

5. SOLUTIONS

39. During the depression of freezing point experiment an equilibrium is established between the molecules of : **(E-2009)**
 1) liquid solvent and solid solvent 2) liquid solute and solid solvent
 3) liquid solute and solid solute 4) liquid solvent and solid solute
40. After removing the hard shell of an egg by dissolving in dil HCl, a semiper meable membrane is visible. If such an egg is kept in a saturated solution of common salt the size of the egg will : **(M-2009)**
 1) shrink 2) grow
 3) remain the same 4) first shrink and then grow larger
41. Molality of an aqueous solution that produces an elevation of boiling point of 1.00 K at 1 atm pressure (K_b for water = $0.512 \text{ K.kg.mol}^{-1}$) **(M-2009)**
 1) 0.512 M 2) 0.195m 3) 1.95m 4) 5.12M
42. When 25 grams of a non-volatile solute is dissolved in 100 grams of water, the vapour pressure is lowered by 2.25×10^{-1} mm. If the vapour pressure of water at 20°C is 17.5 mm, what is the molecular weight of the solute ? **(E-2008)**
 1) 206 2) 302 3) 350 4) 276
43. The volumes of two HCl solutions A(0.5N) and B(0.1N) to be mixed for preparing 2L of 0.2N HCl solution **(M-2008)**
 1) 0.5 L of A+1.5 L of B 2) 1.5 L of A+0.5 L of B
 3) 1 L of A +1 L of B 4) 0.75 L of A +1.25 L of B
44. In the redox reaction, $2 \text{KMnO}_4 + 3\text{H}_2\text{SO}_4 + 5\text{H}_2\text{C}_2\text{O}_4 \longrightarrow \text{K}_2\text{SO}_4 + 2\text{MnSO}_4 + 8\text{H}_2\text{O} + 10\text{CO}_2$ the volume of 0.1 M. KMnO_4 required to oxidizes 25mL of 0.25M $\text{H}_2\text{C}_2\text{O}_4$ solution **(M-2007)**
 1) 25 L 2) 125 mL 3) 25 mL 4) 1.25 L
45. The vapour pressure of water at 23°C is 19.8 mm. 0.1 mole of glucose is dissolved in 178.2 gms of water. What is the vapour pressure (in mm) of the resultant solution? **(E-2005)**
 (1) 19.0 (2) 19.602 (3) 19.402 (4) 19.202
46. In an oxidation reduction reaction, MnO_4^- ion is converted to Mn^{2+} . What is number of equivalents of KMnO_4 (molecular wt. = 158) present in 250 ml of 0.04 M KMnO_4 ? **(M-2005)**
 (1) 0.02 (2) 0.05 (3) 0.04 (4) 0.07

6. ACIDS AND BASES

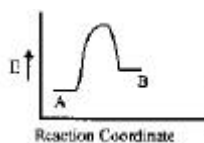
47. pH of a buffer solution decreases by 0.02 units when 0.12 g of acetic acid is added to 250ml of a buffer solution of acetic acid and Potassium acetate at 27°C. The buffer capacity of the solution is : **(E-2009)**
 1) 0.1 2) 10 3) 1 4) 0.4
48. 20 ml of 0.1 M acetic acid is mixed with 50ml of Potassium acetate. K_a of acetic acid = 1.8×10^{-5} at 27°C . The concentration of Potassium acetate if pH of the mixture is 4.8: **(E-2009)**
 1) 0.1 M 2) 0.04M 3) 0.4M 4) 0.02M
49. The correct order of pH of solutions of CuSO_4 , NaCN, NaCl and water : **(M-2009)**
 1) $\text{CuSO}_4 < \text{NaCN} < \text{NaCl} = \text{H}_2\text{O}$ 2) $\text{CuSO}_4 > \text{NaCN} = \text{H}_2\text{O} > \text{NaCl}$
 3) $\text{CuSO}_4 = \text{H}_2\text{O} > \text{NaCN} < \text{NaCl}$ 4) $\text{CuSO}_4 < \text{NaCl} = \text{H}_2\text{O} < \text{NaCN}$
50. 50 ml of H_2O is added to 50ml of 1×10^{-3} M barium hydroxide solution. What is the pH of the resulting solution ? **(E-2008)**
 1) 3 2) 3.3 3) 11.0 4) 11.7
51. **Assertion (A):** The aqueous solution of CH_3COONa is alkaline in nature.
Reason(R): Acetate ion undergoes anionic hydrolysis. **(E-2008)**
 1) Both A and R are true and R is the correct explanation of A
 2) Both A and R are true but R is not the correct explanation of A
 3) A is true but R is not true 4) A is not true but R is true
52. Boron halides behaves as Lewis acids because of their _____ nature **(E-2008)**
 1) Proton donor 2) Covalent 3) Electron deficient 4) Ionizing
53. When 0.1 moles of an acid is added to 2 litres of a buffer solution, the pH of the buffer decreases by 0.5. The buffer capacity of the solution is **(M-2008)**
 1) 0.6 2) 0.4 3) 0.2 4) 0.1
54. Identify Bronsted - Lowry acids in the reaction given

$$[\text{Al}(\text{H}_2\text{O})_6]^{3+} + \text{HCO}_3^- \rightleftharpoons [\text{Al}(\text{H}_2\text{O})_5(\text{OH})]^{2+} + \text{H}_2\text{CO}_3$$
 (A) (B) (C) (D) **(M-2008)** the correct answer is
 1) (A),(C) 2) (B),(D) 3) (A),(D) 4) (B),(C)
55. 100 mL of 0.1 M H_2SO_4 is added to 200 mL of 0.1M NaOH. What is the pH of the resulting mixture?**(M-2007)**
 1) 2 2) 7 3) 10 4) 12
56. Which of the following is not a conjugate acid-base pair ? **(2007-E)**
 1) $\text{HPO}_3^{2-}, \text{PO}_3^{3-}$ 2) $\text{H}_2\text{PO}_4^-, \text{HPO}_4^{2-}$ 3) $\text{H}_2\text{PO}_4^-, \text{H}_3\text{PO}_4$ 4) $\text{H}_2\text{PO}_4^-, \text{PO}_3^{3-}$
57. Which of the following salts give an acidic solution in water ? **(2007-E)**
 1) CH_3COONa 2) NH_4Cl 3) NaCl 4) $\text{CH}_3\text{COONH}_4$
58. The concentration of oxalic acid is 'x' mol L^{-1} . 40 mL of this solution reacts with 16 mL of 0.05 M acidified KMnO_4 . What is the pH of 'x' M oxalic acid solution? (Assume that oxalic acid dissociates completely) **(2006-E)**
 1) 1.3 2) 1.699 3) 1 4) 2
59. **Assertion (A) :** The pH of a buffer solution containing equal moles of acetic acid and sodium acetate is 4.8 (pKa of acetic acid is 4.8)
Reason (R) : The ionic product of water at 25°C is $10^{-14} \text{ mol}^2.\text{lit}^{-2}$. **(2005 Engg.)**
 The correct answer is
 (1) Both (A) and (R) are true and (R) is the correct explanation of (A).
 (2) Both (A) and (R) are true and (R) is not the correct explanation of (A).
 (3) (A) is true but (R) is not true. (4) (A) is not true but (R) is true.

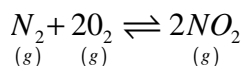
60. The pH of a solution of H_2O_2 is 6.0. Some Cl_2 gas is bubbled in to this solution. Which of the following is correct? **(2005 Engg.)**
- (1) The pH of resultant solution becomes 8.0.
 - (2) H_2 gas is liberated from resultant solution.
 - (3) The pH of resultant solution becomes less than 6.0 and O_2 gas is liberated.
 - (4) Cl_2O is formed in the resultant solution.
61. Which of the following is correct? **(2005 Medical)**
- (1) The pH of 1 lit. solution containin g 0.49 gms of H_2SO_4 is 2.0.
 - (2) The conjugate base of H_2S is $S^{2(-)}$
 - (3) BF_3 is Lewis base.
 - (4) Phenolphthalein is colourless in basic medium.

7. CHEMICAL KINETICS, CHEMICAL EQUILIBRIUM AND ENERGITICS

62. For a first order reaction at $27^\circ C$, the ratio of time required for 75% completion to 25% completion of reaction is : **(E-2009)**
- 1) 3.0
 - 2) 2.303
 - 3) 4.8
 - 4) 0.477
63. Rate of a reaction can be expressed by Arrhenius equation $k = A.e^{-E_a/RT}$. In this equation, E_a represents: **(M-2009)**
- 1) The energy above which not all the colliding molecules will react
 - 2) The energy below which colliding molecules will not reacts.
 - 3) The total energy of the reacting molecules at temperature T
 - 4) The fraction of molecules with energy greater than the activation energy of the reaction
64. For a reversible reaction $A \rightleftharpoons B$, which one of the following statements is wrong from the given energy profile diagram ? **(E-2008)**



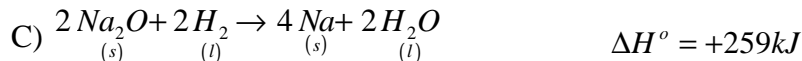
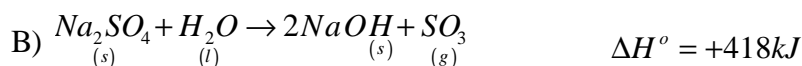
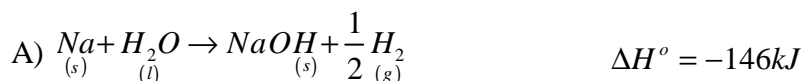
- 1) Activation energy of forward reaction is greater than backward reaction
 - 2) The forward reaction is endothermic
 - 3) The threshold energy is less than that of activation energy.
 - 4) The energy of activation of forward reaction is equal to the sum of heat of reaction and the energy of activation of backward reaction
65. The rate constant of a first order reaction is 0.0693 min^{-1} . What is the time (in minutes) required for reducing an initial concentration of 20 mol l^{-1} to 2.5 mol l^{-1} ? **(M-2008)**
- 1) 40
 - 2) 30
 - 3) 20
 - 4) 10
66. $A_{(g)} \rightarrow B_{(g)}$ is a first order reaction. The initial concentration of A is 0.2 mol l^{-1} . After 10 minutes the concentration of B is found to be 0.18 mol l^{-1} . The rate constant (in min^{-1}) for the reaction is **(M-2008)**
- 1) 0.2303
 - 2) 2.303
 - 3) 0.693
 - 4) 0.01
67. The fraction of element disintegrated after 4 half lifes in percentage is **(M-2007)**
- 1) 75%
 - 2) 87.5%
 - 3) 93.75%
 - 4) 92.5%
68. The equilibrium constant for the given reaction is 100



What is the equilibrium constant for the reaction given below: **(E-2009)**

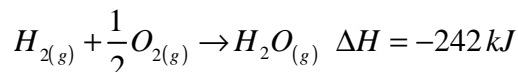
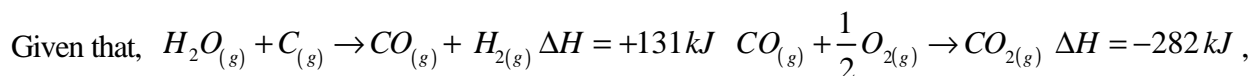
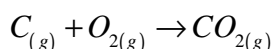
- 1) 10
- 2) 1
- 3) 0.1
- 4) 0.01

69. In a reversible reaction at equilibrium the net heat change of the reaction is : **(M-2009)**
 1) Positive 2) Negative
 3) Zero 4) Cannot be predicted
70. In a 500 ml flask, the degree of dissociation of PCl_5 at equilibrium is 40% and the initial amount is 5 moles. The value of equilibrium constant in mol.lit^{-1} for the decomposition of PCl_5 is **(E-2008)**
 1) 2.33 2) 2.66 3) 5.32 4) 4.66
71. In the reaction $2\text{SO}_3(\text{g}) \rightleftharpoons 2\text{SO}_2(\text{g}) + \text{O}_2(\text{g})$, $\text{SO}_3(\text{g})$ is 50% dissociated at 27°C . When the equilibrium pressure is 0.5 atm. Hence partial pressure of $\text{SO}_3(\text{g})$ at equilibrium is **(M-2007)**
 1) 0.5 atm 2) 0.3 atm 3) 0.2 atm 4) 0.1 atm
72. $\text{N}_2(\text{g}) + 3\text{H}_2(\text{g}) \rightleftharpoons 2\text{NH}_3(\text{g}) + 22 \text{ k.cal}$. The activation energy for the forward reaction is 50 k.cal. What is the activation energy for the backward reaction? **(M-2007)**
 1) -72 k.cal 2) -28 k.cal 3) +28 k.cal 4) +72 k.cal
73. Given that $\Delta H_f(H) = 218 \text{ kJ/mol}$. express the H - H bond energy in kcal/mol : **(E-2009)**
 1) 52.15 2) 911 3) 104 4) 52153
74. Calculate ΔH° for the reaction :



- 1) + 823 kJ 2) - 581 kJ 3) - 435 kJ 4) +531 kJ

75. A chemical reaction cannot occur at all if its : **(M-2009)**
 1) ΔH is (+) ve and ΔS is (-) ve 2) ΔH is (-) ve and ΔS is (+) ve
 3) ΔH and ΔS are (+) ve but $\Delta H > T\Delta S$ 4) ΔH and ΔS are (-) ve but $\Delta H > T\Delta S$
76. Calculate ΔH in kJ for the following reaction **(E-2008)**



- 1) - 393 2) +393 3) +655 4) -655

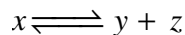
77. 100 cm^3 of 0.1 M HCl and 100 cm^3 of 0.1 M NaOH solutions are mixed in a calorimeter. If the heat liberated is "Q" kcal, the heat of neutralization (ΔH) (in kcal) of $\text{HCl}_{(aq)}$ and $\text{NaOH}_{(aq)}$ is **(M-2008)**
 1) -10Q 2) -100Q 3) -1000Q 4) -Q
78. Calculate the difference between ΔE and ΔH for the following reaction at 27°C . (in K.Cal)
 $\text{C}_{(\text{graphite})} + \text{H}_2(\text{g}) \rightarrow \text{CH}_4(\text{g})$ **(M-2007)**
 1) -0.6 2) -1.2 3) +0.6 4) +1.2

79. Calculate enthalpy for formation of ethylene from the following data (2007-E)
- A) $C_{(graphite)} + O_2(g) \rightarrow CO_2(g); \Delta H = -393.5 KJ$
- B) $H_2(g) + \frac{1}{2} O_2(g) \rightarrow H_2O(l); \Delta H = -286.2 kJ$
- C) $C_2H_4(g) + 3O_2(g) \rightarrow 2CO(g) + 2H_2O(l); \Delta H = -1410.8 kJ$
- 1) 54.1 kJ 2) 44.8 kJ 3) 51.4 kJ 4) 48.4 kJ
80. **Assertion (A)** : A catalyst increases the rate of a reaction
Reason (R) : In presence of catalyst, the activation energy of the reaction increases.
 The correct answer is (2007-E)
- 1) Both A and R are true and R is the correct explanation of A
 2) Both A and R are true but R is not the correct explanation of A
 3) A is true, But R is not true 4) A is not true but R is true
81. The equilibrium constant for the reaction $SO_2(g) + \frac{1}{2} O_2(g) \rightleftharpoons SO_3(g)$ is 50×10^{-2} atm. The equilibrium constant of the reaction $2SO_3(g) \rightleftharpoons 2SO_2(g) + O_2(g)$ would be (2007-E)
- 1) 100 atm 2) 200 atm 3) 4×10^4 atm 4) 6.25×10^4 atm
82. Which of the following is not a characteristic property of chemical equilibrium ? (2006-E)
- 1) Rate of forward reaction is equal to rate of backward reaction at equilibrium
 2) After reaching the chemical equilibrium, the concentrations of reactants and products remain unchanged with time
 3) For $A(g) \rightleftharpoons B(g)$, K_c is 10^{-2} . If this reaction is carried out in the presence of catalyst, the value of K_c decrease
 4) After reaching the equilibrium, both forward and backward reactions continue to take place
83. The rate constant of a first order reaction at $27^\circ C$ is 10^{-3} min^{-1} . The temperature coefficient of this reaction is 2. What is the rate constant (in min^{-1}) at $17^\circ C$ for this reaction ? (2006-E)
- 1) 10^{-3} 2) 5×10^{-4} 3) 2×10^{-3} 4) 10^{-2}
84. Identify the reaction for which $\Delta H \neq \Delta E$ (2006-E)
- 1) $S(\text{rhombic}) + O_2(g) \rightarrow SO_2(g)$ 2) $N_2(g) + O_2(g) \rightarrow 2NO(g)$
 3) $H_2(g) + Cl_2(g) \rightarrow 2HCl(g)$ 4) $CO(g) + \frac{1}{2} O_2(g) \rightarrow CO_2(g)$
85. Observe the following reaction : $2A + B \rightarrow C$.
 The rate of formation of C is $2.2 \times 10^{-3} \text{ mol.lit}^{-1}.\text{min}^{-1}$.
 What is the value of $\frac{d[A]}{dt}$ (in $\text{mol.lit}^{-1}.\text{min}^{-1}$)? (2005 Engg.)
- (1) 2.2×10^{-3} (2) 1.1×10^{-3} (3) 4.4×10^{-3} (4) 5.5×10^{-3}
86. At 550 K, the K_c for the following reaction is $10^4 \text{ mol}^1.\text{lit}$.
 $x + y \rightleftharpoons z$
 (g) (g) (g)
- At equilibrium, it was observed that, $[x] = \frac{1}{2}[y] = \frac{1}{2}[z]$
- What is the value of $[z]$ in mol.lit^{-1} at equilibrium. (2005 Engg.)
- (1) 2×10^{-4} (2) 10^{-4} (3) 2×10^4 (4) 10^4

87. Which of the following is not correct? (2002 Engg.)

- (1) Dissolution of NH_4Cl in excess of water is an endothermic process.
- (2) Neutralization process is always exothermic.
- (3) The absolute value of enthalpy (H) can be determined experimentally.
- (4) The heat of reaction at constant volume is denoted by ΔE .

88. At 600°C, K_p for the following reaction is 1 atm.



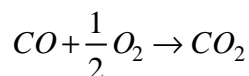
(g) (g) (g)

At equilibrium, 50% of 'x' is dissociated. The total pressure of the equilibrium system is P atm. What is the partial pressure (in atm) of x (g) at equilibrium? (2005 Medical)

- (1) 1
- (2) 4
- (3) 2
- (4) 0.5

89. The heat of formation of CO(g) and CO₂(g) are $\Delta H = -110$ and $\Delta H = -393$ K.J. mol respectively.

What is the heat of reaction (ΔH) (in K.J mol⁻¹) for the following reaction.



(g) (g) (g)

(2005 Medical)

- (1) -504
- (2) -142.5
- (3) -283
- (4) 504

8. ELECTRO CHEMISTRY

90. For the following cell reaction (E-2009)



$$\Delta G_f^\circ (AgCl) = -109 kJ / mol$$

$$\Delta G_f^\circ (Cl^-) = -129 kJ / mol$$

$$\Delta G_f^\circ (Ag^+) = 78 kJ / mol$$

E° of the cell is :

- 1) - 0.60 V
- 2) 0.60 V
- 3) 6.0V
- 4) None

91. At 25°C the molar conductances at infinite dilution for the strong electrolytes NaOH, NaCl and BaCl₂ are 248×10^{-4} , 126×10^{-4} and 280×10^{-4} S.m².mol⁻¹ respectively. I_m° Ba(OH)₂ in S.m² mol⁻¹. (E-2009)

- 1) 52.4×10^{-4}
- 2) 524×10^{-4}
- 3) 402×10^{-4}
- 4) 262×10^{-4}

92. During the charging of a lead - acid storage battery, the cathode reaction is : (M-2009)

- 1) Formation of PbSO₄
- 2) Reduction of Pb²⁺ to Pb
- 3) Formation of PbO₂
- 4) Oxidation of Pb to Pb²⁺

93. The standard potentials at 25°C for the half reactions are given against them below : (M-2009)



When Zn dust is added to a solution of MgCl₂:

- 1) Magnesium is precipitated
- 2) Zinc dissolves in the solution
- 3) Zinc chloride is formed
- 4) No reaction takes place

94. When same quantity of electricity is passed through aqueous AgNO₃ and H₂SO₄ solutions connected in series 5.04×10^{-2} g of H₂ is liberated. What is the mass of silver (in grams) deposited ?

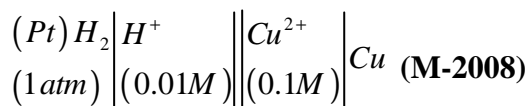
(Eq wts of Hydrogen = 1.008, silver = 108) (E-2008)

- 1) 54
- 2) 0.54
- 3) 5.4
- 4) 10.8

95. When electric current is passed through acidified water for 1930 seconds, 1120 ml of H₂ gas is collected (at STP) at the cathode. What is the current passed in amperes ? (M-2008)

- 1) 0.05
- 2) 0.50
- 3) 5.0
- 4) 50

96. The cell potential of the following cell at 25°C (in volts) is



- 1) 0.308 2) 0.427 3) 0.308 4) 0.337

97. Which one of the following reactions occur at the cathode ? (M-2008)

- 1) $2OH^- \rightarrow H_2O + 1/2O_2 + 2e^-$ 2) $Ag \rightarrow Ag^+ + e^-$
 3) $Fe^{2+} \rightarrow Fe^3 + e^-$ 4) $Cu^{2+} + 2e^- \rightarrow Cu$

98. When 3.86 amperes current is passed through an electrolyte for 50 minutes, 2.4 grams of a divalent metal is deposited. The gram atomic weight of the metal (in grams) is (M-2007)

- 1) 24 2) 12 3) 64 4) 40

99. Calculate the emf of the cell $Cu(s) | Cu^{2+}(aq) | Ag^+(aq) | Ag(s)$

Given $E_{Cu^{2+}/Cu}^0 = +0.34V, E_{Ag^+/Ag}^0 = 0.80V$ (2007-E)

- 1) + 0.46 V 2) + 1.14 V 3) + 0.57 V 4) - 0.46 V

100. The standard reduction potential of $Zn^{2+} | Zn, Cu^{2+} | Cu$ and $Ag^+ | Cu$ and $Ag^+ | Ag$ are respectively - 0.76, 0.34 and 0.8 V The following cells were constructed

- 1) $Zn | Zn^{2+} || Cu^{2+} | Cu$ 2) $Zn | Zn^{2+} || Ag^+ | Ag$ 3) $Cu | Cu^{2+} || Ag^+ | Ag$

What is the correct order of E_{cell}^0 of these cells ? (2006-E)

- 1) $2 > 3 > 1$ 2) $2 > 1 > 3$ 3) $1 > 2 > 3$ 4) $3 > 1 > 2$

101. What is the time (in sec) required for depositing all the silver present in 125mL of 1 M $AgNO_3$ solution by passing a current of 241.25 A ? (1F = 96500 coulombs) (2006-E)

- 1) 10 2) 50 3) 1000 4) 100

102. Assertion (A) : A current of 96.5 A is passed into aqueous $AgNO_3$ solution for 100s. The weight of silver deposited is 10.8 g (At. wt. of Ag = 108)

Reason (R) : The mass of a substance deposited during the electrolysis of an electrolyte is inversely proportional to the quantity of electricity passing through the electrolyte (2006-E)

The correct answer is

- 1) Both A and R are true and R is correct explanation of A
 2) Both A and R are true but R is not the correct explanation of A
 3) A is true but R is false 4) A is false but R is true

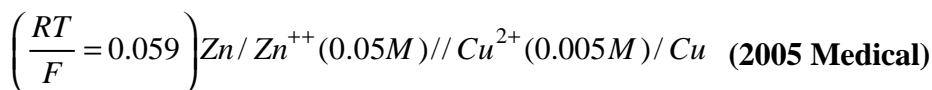
103. What is the quantity of electricity (in coulombs) required to deposit all the silver from 250 ml of 1M $AgNO_3$ solution? (Ag = 108) (2005 Engg.)

- (1) 2412.5 (2) 24125 (3) 4825.0 (4) 48250

104. Which of the following is not correct? (2005 Engg.)

- (1) Aq. solution of NaCl is an electrolyte. (2) The units of electro-chemical equivalent are of coulomb.
 (3) In the Nernst equation, 'n' represents the ne of electrons transferred in the electrode reaction.
 (4) Standard reduction potential of hydrogen electrode is zero.

105. The standard reduction potentials of Zn^{2+} / Zn and Cu^{2+} / Cu are -0.76 and +0.34 V respectively. What is the cell emf (in V) of the following cell?



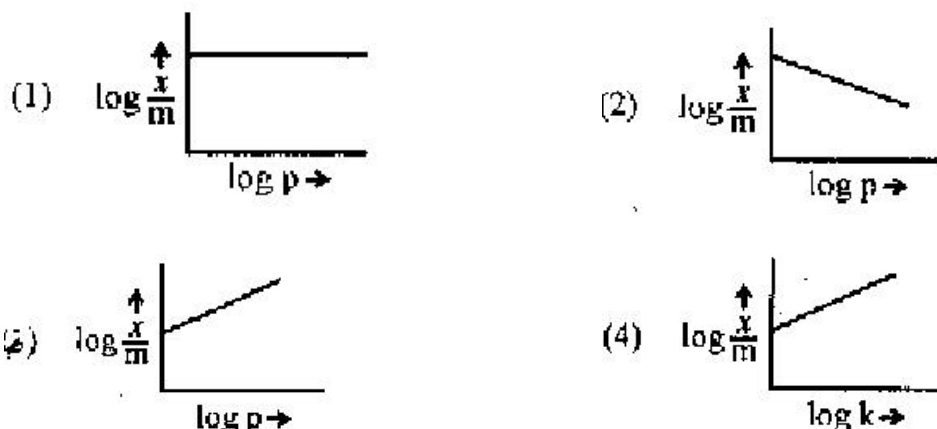
- (1) 1.295 (2) 1.0705 (3) 1.1 (4) 1.041

106. What is the electro-chemical equivalent (in g. eq. wt.) of silver? ($A_g = 108$; $F = \text{Faraday}$) (M-2005)

- (1) $108 F$ (2) $\frac{108}{F}$ (3) $\frac{F}{108}$ (4) $\frac{1}{108 F}$

10. SURFACE CHEMISTRY

107. The extent of Physisorption of an adsorbate increases with: (M-2009)
 1) increase in temperature 2) decrease in surface area of the adsorbent
 3) decrease in pressure of adsorbate 4) decrease in temperature
108. Which one of the following is most effective in causing the coagulation of an As_2S_3 sol? (E-2009)
 1) KCl 2) $AlCl_3$ 3) $MgSO_4$ 4) $K_3Fe(CN)_6$
109. Which one of the following graphs represent Freundlich adsorption isotherm? (E-2008)



110. Which one of the following reactions is an example of auto-catalysis? (M-2008)

- 1) $2AsH_3(g) \rightarrow 2As(g) + 3H_2(g)$ 2) $N_2(g) + 3H_2(g) \xrightarrow{Fe(s)} 2NH_3(g)$
- 3) $2SO_2(g) + O_2(g) \xrightarrow{NO(g)} 2SO_3(g)$
- 4) $C_{12}H_{22}O_{11(l)} + H_2O(l) \xrightarrow{H^{(+)}} C_6H_{12}O_6(l) + C_6H_{12}O_6(l)$

111. Disperse phase and Dispersion medium in blood are respectively (M-2007)

- 1) Solid and liquid 2) Liquid and solid 3) Liquid and liquid 4) Solid and solid

112. Which of the following is not correct? (2007-E)

- 1) Milk is a naturally occurring emulsion
 2) Gold sol is a Lyophilic sol.
 3) Physical adsorption decreases with rise in temperature
 4) Chemical adsorption is unilayered

113. The disperse phase, dispersion medium and nature of colloidal solution (lyophilic or lyophobic) of 'gold sol' respectively are (2006-E)

- 1) solid, solid, lyophobic 2) liquid, liquid, lyophobic
 3) solid, liquid, lyophobic 4) solid liquid, lyophilic

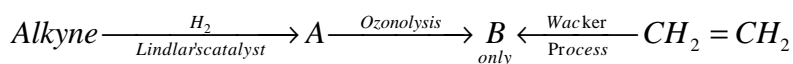
114. Which of the following is an example for heterogenous catalysis reaction? (2005 Engg.)

- (1) $2SO_2(g) + O_2(g) \xrightarrow{NO(g)} 2SO_3(g)$
- (2) Hydrolysis of aqueous sucrose solution in the presence of aq. mineral acid.
- (3) $2H_2O_2(l) \xrightarrow{Pt(s)} 2H_2O(l) + O_2(g)$
- (4) Hydrolysis of liquid ester in the presence of aq. mineral acid

- 115 Which of the following is correct? **(2005 Medical)**
- (1) Catalyst undergoes permanent chemical change.
 - (2) Particle size of solute in true solutions is 10^{-3} m.
 - (3) Starch solution is a hydrosol.
 - (4) Hydrolysis of liquid ester in the presence of mineral - acid, is an example of heterogeneous catalysis reaction.

ORGANIC CHEMISTRY

116. Identify the alkyne in the following sequence of reactions: **(E-2009)**

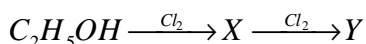


- 1) $H_3C - C \equiv C - CH_3$
 - 2) $H_3C - CH_2 - C \equiv CH$
 - 3) $H_2C = CH - C \equiv CH$
 - 4) $HC \equiv C - CH_2 - C \equiv CH$
- 117 In Gattermann reaction, a diazonium group is replaced by \underline{X} using \underline{Y} . X, Y are : **(E-2009)**

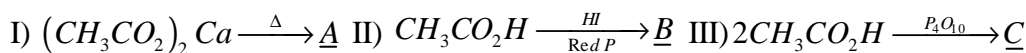
X

Y

- 1) Cl^-
 - 2) Cl^+
 - 3) Cl^-
 - 4) Cl_2
- 1) Cu/HCl
 - 2) $CuCl_2/HCl$
 - 3) $CuCl_2/HCl$
 - 4) Cu_2O/HCl
- 118 What are \underline{X} and \underline{Y} in the following reaction sequence : **(E-2009)**



- 1) C_2H_5Cl, CH_3CHO
 - 2) CH_3CHO, CH_3CO_2H
 - 3) CH_3CHO, CCl_3CHO
 - 4) C_2H_5Cl, CCl_3CHO
119. What are \underline{A} , \underline{B} , \underline{C} in the following reactions ? **(E-2009)**

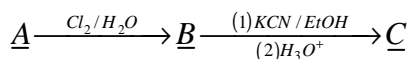


A

B

C

- 1) C_2H_6
 - 2) $(CH_3CO)_2O$
 - 3) CH_3COCH_3
 - 4) CH_3COCH_3
- 1) CH_3COCH_3
 - 2) C_2H_6
 - 3) C_2H_6
 - 4) $(CH_3CO)_2O$
- 1) $(CH_3CO)_2O$
 - 2) CH_3COCH_3
 - 3) $(CH_3CO)_2O$
 - 4) C_2H_6
- 120 One per cent composition of an organic compound A is carbon : 85.71% and hydrogen 14.29%. Its vapour density is 14. Consider the following reaction sequence: **(E-2009)**



Identify \underline{C}



- 1) $\begin{array}{c} | \\ OH \end{array}$
- 2) $HO - CH_2 - CH_2 - CO_2H$
- 3) $HO - CH_2 - CO_2H$
- 4) $CH_3 - CH_2 - CO_2H$

130 Identify A and B in the following reaction : (E-2008)



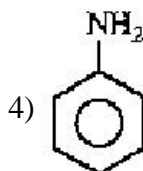
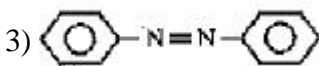
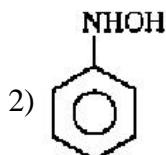
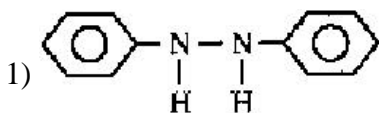
A

- 1) HI+RedP
- 2) Ni/Δ
- 3) LiAlH₄
- 4) Pd BaSO₄

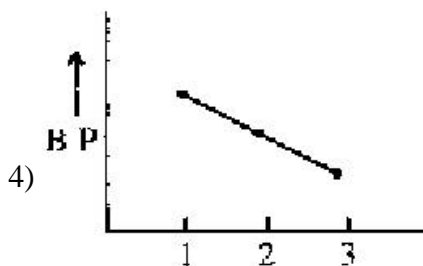
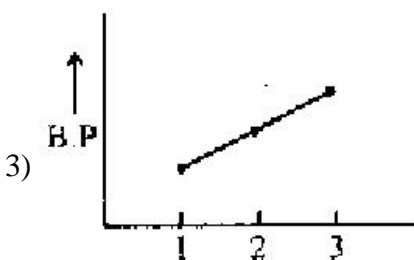
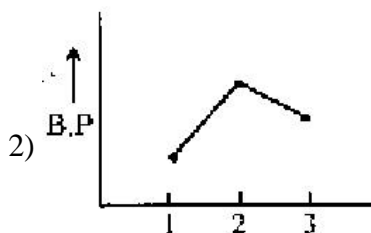
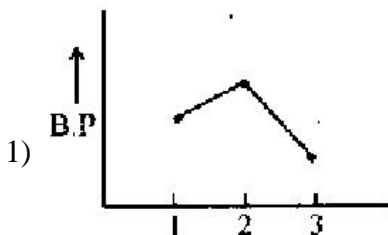
B

- 1) LiAlH₄
- 2) LiAlH₄
- 3) HI+Red P
- 4) Zn+HCl

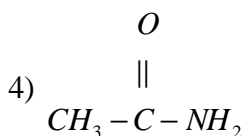
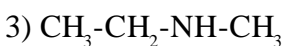
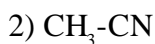
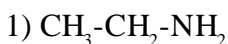
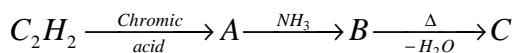
131. The structure of the compound formed, when nitrobenzene is reduced by lithium aluminium hydride (LiAlH₄) is (E-2008)



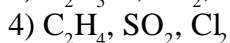
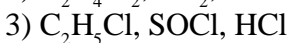
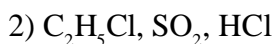
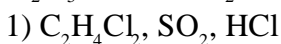
132. Which one of the following graphs represent the correct order of boiling points (B.P) of ethane (1), ethyl alcohol (2) and acetic acid (3) ? (M-2008)



133. Identify C in the following reaction : (M-2008)

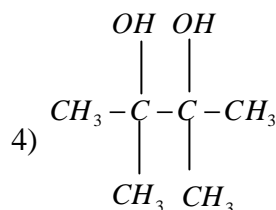
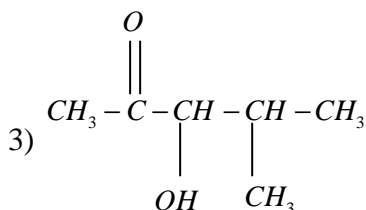
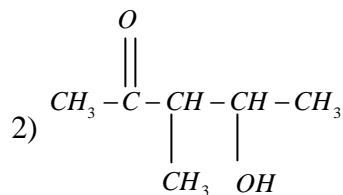
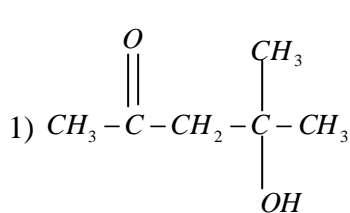


134. C₂H₅OH + SOCl₂ $\xrightarrow{\text{Pyridine}}$ X + Y + Z in this reaction X, Y and Z respectively, are (M-2008)



135. The compound that reacts with CH_3MgBr to yield methane as one of the products is
 1) CH_3CHO 2) CH_3COCH_3 3) $\text{CH}_3\text{COOCH}_3$ 4) $\text{CH}_3\text{CH}_2\text{OH}$ (M-2008)
136. The organic compound which gives peroxy compound on exposure to atmospheric air in the presence of sunlight is (M-2008)
 1) $\text{C}_2\text{H}_5\text{OC}_2\text{H}_5$ 2) CHCl_3 3) $\text{CH}_3\text{CH}_2\text{OH}$ 4) CH_3CHO
137. When 1,1-dichloro propane and 2,2, dichloro propane are reacted separately with aqueous potassium hydroxide solution, compounds 'A' and 'B' are formed. Both 'A' and 'B' gave the same product 'C' on reduction using amalgamated zinc and HCl. Identify C. (M-2008)
 1) Propyl alcohol 2) Isopropyl alcohol 3) Propyl chloride 4) Propane
138. $\text{CH}_3\text{CN} + \text{H}_2\text{O} \xrightarrow{\text{H}^+} \text{A} \xrightarrow[\text{Red P}]{\text{excess Cl}_2} \text{B}$ (M-2008)
 In the above reaction, A and B are respectively
 1) CH_3COOH , CCl_3COOH 2) $\text{CH}_3\text{CH}_2\text{OH}$, $\text{CH}_3\text{CH}_2\text{Cl}$
 3) CH_3CHO , CCl_3CHO 4) CH_3COCH , CCl_3COCH
139. Nitrobenzene undergoes reduction with Zn/alcoholic KOH to form a compound A. The number of Sigma and Pi bonds in A, respectively are (M-2008)
 1) 17,6 2) 27,6 3) 27,8 4) 17,8
140. Nitrobenzene is reduced by Zn and alcoholic potash mixture to get (M-2007)
 1) $\text{C}_6\text{H}_5 - \text{NH}_2$ 2) $\text{C}_6\text{H}_5 - \text{NH} - \text{NH} - \text{C}_6\text{H}_5$
 3) $\text{C}_6\text{H}_5 - \text{N}=\text{N} - \text{C}_6\text{H}_5$ 4) $\text{C}_6\text{H}_5 - \text{NH} - \text{CO} - \text{C}_6\text{H}_5$
141. $\text{C}_2\text{H}_5\text{Cl} \xrightarrow[\text{Ag}_2\text{O}]{\text{dry}} \text{A} \xrightarrow[\text{360}^\circ\text{C}]{\text{Al}_2\text{O}_3} \text{B} \xrightarrow{\text{SCl}_2} \text{C}$ (M-2007)
 In the above sequence of reactions, identify 'C'
 1) Chloroethane 2) chloropicrin 3) Mustard gas 4) Lewisite gas
142. 'A' reacts with $\text{C}_2\text{H}_5\text{I}$ giving 'B' and NaI. Here 'A' and 'B' respectively are (M-2007)
 1) CH_3COONa , CH_3OCH_3 2) $\text{C}_2\text{H}_5\text{OC}_2\text{H}_5$, $\text{C}_2\text{H}_5\text{COOC}_2\text{H}_5$
 3) $\text{C}_2\text{H}_5\text{ONa}$, $\text{C}_2\text{H}_5\text{OC}_2\text{H}_5$ 4) $\text{C}_2\text{H}_5\text{OH}$, $\text{C}_2\text{H}_5\text{OC}_2\text{H}_5$
143. Which one of the following reactions is called Rosenmued reaction ? (M-2007)
 1. Aldehydes are reduced to alcohols 2. Acids are converted to acid chlorides
 3. Alcohols are reduced to hydrocarbons 4. Acid chlorides are reduced to aldehydes
144. Ethyl chloride on reduction with gives compound 'X' as important, 'X' on chlorination with one mole of in the presence of light at ordinary temperature gives 'Y'. What is Y ? (M-2007)
 1) C_2H_6 2) C_2H_4 3) $\text{C}_2\text{H}_5\text{Cl}$ 4) $\text{C}_2\text{H}_5\text{OH}$
145. Methyl alcohol when reacted with carbon monoxide using cobalt or Rhodium as catalyst compound 'A' is formed, 'A' on heating with Al in the presence of red phosphorus as catalyst 'B' is formed Identify 'B' (M-2007)
 1) CH_3COOH 2) CH_3CHO 3) $\text{CH}_3\text{CH}_2\text{I}$ 4) CH_3CH_3
146. Which of the following reactions can produce aniline as main product ? (2006-E)
 1) $\text{C}_6\text{H}_5\text{NO}_2 + \text{Zn} / \text{KOH}$ 2) $\text{C}_6\text{H}_5\text{NO}_2 + \text{Zn} / \text{NH}_4\text{Cl}$
 3) $\text{C}_6\text{H}_5\text{NO}_2 + \text{LiAlH}_4$ 4) $\text{C}_6\text{H}_5\text{NO}_2 + \text{Zn} / \text{HCl}$
147. Which of the following is added to chloroform to slow down its aerial oxidation in presence of light ? (2006-E)
 1) Carbonyl chloride 2) Ethyl alcohol 3) Sodium hydroxide 4) Nitric acid

148 Which of the products is formed when acetone is reacted with barium hydroxide solution ? (2006-E)



149 When acetaldehyde is heated with Fehling solution, a red precipitate is formed. Which of the following is that ? (2006-E)

- 1) Cu_2O 2) Cu 3) CuO 4) CuSO_4

150 Match the following lists

List-I

- A) Grignard reagent
B) Clemmensen reduction
C) Rosenmund reduction
D) Wolff-Kishner reduction

List-II

- 1) $\text{H}_2 / \text{Pd} - \text{BaSO}_4$
2) $\text{N}_2\text{H}_4 \mid \text{KOH} \mid \underset{\text{CH}_2 - \text{OH}}{\text{CH}_2 - \text{OH}}$
3) CH_3MgX
4) $\text{Zn} - \text{Hg} \mid \text{concHCl}$
5) $\text{H}_2 \mid \text{Ni}$

	A	B	C	D
1)	3	4	2	1
3)	2	1	4	5

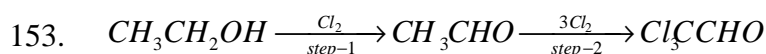
	A	B	C	D
2)	3	4	1	2
4)	5	3	2	1

151 When compound X is oxidised by acidified potassium dichromate, compound Y is formed. Compound Y on reduction with LiAlH_4 gives X, X and Y respectively are (2006-E)

- 1) $\text{C}_2\text{H}_5\text{OH}, \text{CH}_3\text{COOH}$ 2) $\text{CH}_3\text{COCH}_3, \text{CH}_3\text{COOH}$
3) $\text{C}_2\text{H}_5\text{OH}, \text{CH}_3\text{COCH}_3$ 4) $\text{CH}_3\text{CHO}, \text{CH}_3\text{COCH}_3$

152 Ethyl chloride reacts with sodium ethoxide to form a compound A. Which of the following reactions also yields A ? (2006-E)

- 1) $\text{C}_2\text{H}_5\text{Cl}, \text{KOH} (\text{alc}), \Delta$ 2) $2\text{C}_2\text{H}_5\text{OH}, \text{conc. H}_2\text{SO}_4, 140^\circ\text{C}$
3) $\text{C}_2\text{H}_5\text{Cl}, \text{Mg}$ (dry ether) 4) C_2H_2 dil $\text{H}_2\text{SO}_4, \text{HgSO}_4$



In above reactions the role of Cl_2 in step - 1 and step-2 respectively is (2006-E)

- 1) oxidation, chlorination 2) reduction, chlorination
3) oxidation, addition 4) reduction, substitution

- 154 $CaOCl_2 + H_2O \rightarrow Ca(OH)_2 + X$
 $X + CH_3CHO \rightarrow Y$
 $Y + Ca(OH)_2 \rightarrow CHCl_3$
 What is 'Y' ? (2007-E)
 1) $CH_3CH(OH)_2$ 2) CH_2Cl_2 3) CCl_3CHO 4) CCl_3COCH_3
- 155 $CH_3COOH \xrightarrow{LiAlH_4} A$
 $A + CH_3COOH \xrightarrow{H_3O^+} B + H_2O$
 In the above reactions 'A' and 'B' respectively are (2007-E)
 1) $CH_3COOC_2H_5, C_2H_5OH$ 2) CH_3CHO, C_2H_5OH
 3) C_2H_5OH, CH_3CHO 4) $C_2H_5OH, CH_3COOC_2H_5$
156. Hybridisation of Oxygen in Diethylether is (2007-E)
 1) SP 2) SP^2 3) SP^3 4) SP^3d
157. Match the following (2007-E)
- | Reactants | Products |
|--|-------------------|
| A) C_2H_5Cl Moist Ag_2O | i. CH_3CH_2ONO |
| B) C_2H_5Cl aqueous Ethanolic AgCN | ii. C_2H_4 |
| C) C_2H_5Cl , aqueous Ethanolic $AgNO_2$ | iii. CH_3CH_2OH |
| D) C_2H_5Cl , Ethanolic KOH | iv. CH_3CH_2NC |
| | v. C_2H_6 |
- The correct match is
 1) A- v, B-iii, C-iv, D-i 2) A-i, B-ii, C-iii, D-iv
 3) A- iii, B-iv, C-i, D-ii 4) A-iv, B-i, C-ii, D- v
158. Nitrobenzene on reduction with Zinc and NH_4Cl gives (2007-E)
 1) Azobenzene 2) Aniline
 3) Hydrazobenzene 4) N-Phenyl hydroxylamine
159. An organic compound 'X' on treatment with Pyridinium chlorochromate in dichloromethane gives compound 'Y'. Compound 'Y', reacts with I_2 and alkali to form Triiodomethane. The compound X is (2007-E)
 1) C_2H_5OH 2) CH_3CHO 3) CH_3COCH_3 4) CH_3COOH
160. Identify A and B in the following reactions. (2005 Engg.)
 $A \xrightarrow{aqNaOH} C_2H_5OH \xleftarrow{AqOH} B$
 (1) $A = C_2H_2, B = C_2H_6$ (2) $A = C_2H_5, B = C_2H_5Cl$
 (3) $A = C_2H_5Cl, B = C_2H_5Cl$ (4) $A = C_2H_5Cl, B = C_2H_5Cl$
- 161 In which of the following reactions the product is an ether? (2005 Engg.)
 (1) $C_6H_6 - CH_3COCl / anhydrous AlCl_3$ (2) $C_2H_5Cl + aqKOH$
 (3) $C_6H_6 + C_6H_5COCl / anhydrous AlCl_3$ (4) $C_2H_5Cl + C_2H_5ONa$
- 162 Which of the following compounds is the reactant in Rosenmund's reaction?(2005 Engg.)
 (1) CH_3COOH (2) CH_3CHO (3) $CH_3CH_2 - Cl$ (4) CH_3COCl

163 3-Hydroxy butanal is formed when (x) reacts with (y) in dilute (z) solution. What are (x), (y) and (z) solutions? **(2005 Engg.)**

x	y	z
(1) CH_3CHO	$(CH_3)_2CO$	$NaOH$
(2) CH_3CHO	CH_3CHO	$NaCl$
(3) $(CH_3)_2CO$	$(CH_3)_2CO$	HCl
(4) CH_3CHO	CH_3CHO	$NaOH$

164 Natalite is used as : **(2005 Engg.)**
 (1) Anaesthetic (2) Substitute for petrol (3) Insecticide (4) Preservative

165 In the reaction $C_2H_5OH \xrightarrow[300^\circ C]{Cu} x$. The molecular formula of 'x' is **(2005 Engg.)**

(1) C_4H_6O	(2) $C_4H_{10}O$	(3) C_2H_4O	(4) C_2H_6
---------------	------------------	---------------	--------------

166 Which of the following compounds is soluble in benzene but almost insoluble in water? **(2005 Engg.)**

(1) C_2H_5OH	(2) CH_3COOH	(3) CH_3CHO	(4) $C_6H_5NO_2$
----------------	----------------	---------------	------------------

167 Match the following lists. **(2005 Engg.)**

List - I

- A) Benzene
 B) Ethylene
 C) Acetaldehyde
 D) Chloroform

List - II

- 1) Phosgene
 2) Silver mirror
 3) Mustard gas
 4) $(4n + 2)p$ electrons
 5) Carbyl amine

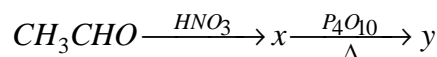
The correct answer is :

	(A)	(B)	(C)	(D)		(A)	(B)	(C)	(D)
(1)	4	3	2	1	(2)	3	2	1	4
(3)	2	4	5	3	(4)	5	1	4	3

168 Which of the following is obtained in carbylamine reactions? **(2005 Medical)**

(1) $C_2H_5NH_2$	(2) $COCl_2$	(3) C_6H_5CN	(4) C_6H_5NC
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169 Identify 'x' and 'y' in the following : **(2005 Medical)**



x	y	x	y
(1) C_2H_5OH	C_2H_4	(2) $CH_3 - COOH$	$(CH_3CO)_2O$
(3) CH_3CO_2H	$CH_3CO_2CH_3$	(4) C_2H_5OH	CH_3CO_2H

170 Match the following : **(2005 Medical)**

List - I

- A) Ethylene
 B) Acetylene
 C) Ethanol
 D) Diethyl ether

List - II

- 1) Natalite
 2) Preservative
 3) Hawker lamp
 4) Drug
 5) Polyethylene

The correct answer is :

	(A)	(B)	(C)	(D)		(A)	(B)	(C)	(D)
(1)	5	3	2	1	(2)	4	5	1	2
(3)	4	5	3	2	(4)	2	5	1	4

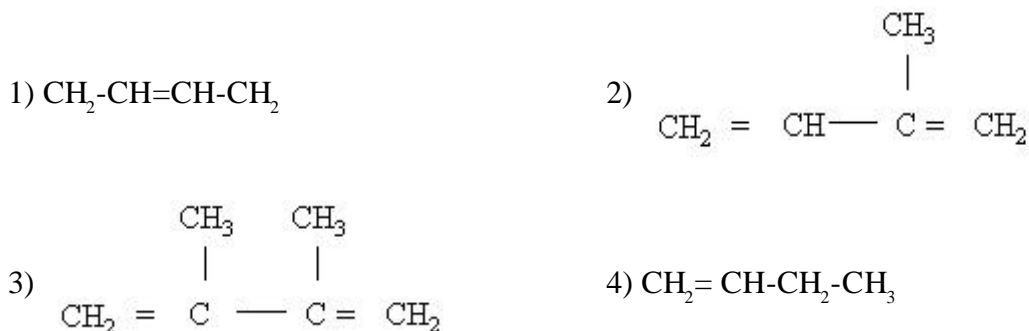
171. Hydrogen chloride and SO_2 are the side products in the reaction of ethanol with thionyl chloride. Which of the following is the main product in this reaction? **(2005 Medical)**
 (1) $\text{C}_2\text{H}_5-\text{O}-\text{C}_2\text{H}_5$ (2) C_2H_6 (3) CH_3Cl (4) $\text{C}_2\text{H}_5\text{Cl}$
172. A compound 'x' undergoes reduction with LiAlH_4 to yield 'y'. When vapours of 'y' are passed over freshly reduced copper at 300°C , 'x' is formed. What is 'y'? **(2005 Medical)**
 (1) CH_3COCH_3 (2) CH_3CHO (3) $\text{CH}_3\text{CH}_2\text{OH}$ (4) $\text{CH}_3-\text{O}-\text{CH}_3$
173. Consider the following reaction.
 $\text{C}_2\text{H}_5\text{OK} + \text{C}_2\text{H}_5\text{I} \xrightarrow{\Delta} x$ (pleasant smell liquid)
 Which of the following reagents converts ethyl bromide to 'x'? **(2005 Medical)**
 (1) Sodium (2) Dry Silver Oxide (3) Ethyl Chloride (4) Dry Silver Powder
174. What are the reagent and reaction conditions used for converting ethyl chloride to ethyl-nitrite (as the major product)? **(2005 Medical)**
 (1) $\text{KNO}_2, \text{C}_2\text{H}_5\text{OH}, \text{H}_2\text{O}, \Delta$ (2) $\text{NaNO}_2, \text{HCl}, 0^\circ\text{C}$
 (3) $\text{KCN}, \text{H}_2\text{O}, \Delta$ (4) $\text{AgNO}_2, \text{C}_2\text{H}_5\text{OH}, \text{H}_2\text{O}, \Delta$
175. Which of the following reagents converts both acetaldehyde and acetone to alkanes? **(2005 Medical)**
 (1) Ni / H_2 (2) LiAlH_4 (3) I_2 / NaOH (4) $\text{Zn} - \text{Mg} + \text{concHCl}$

POLYMERS

176. If \bar{M}_w is the weight - average molecular weight and \bar{M}_n is the number average molecular weight of a polymer, the poly dispersity index (PDI) of the polymer is given by **(E-2008)**

1) $\frac{\bar{M}_n}{\bar{M}_w}$ 2) $\frac{\bar{M}_w}{\bar{M}_n}$ 3) $\bar{M}_w \times \bar{M}_n$ 4) $\frac{1}{\bar{M}_w \times \bar{M}_n}$

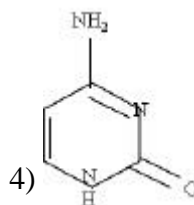
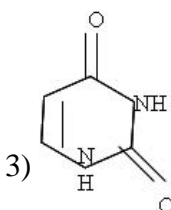
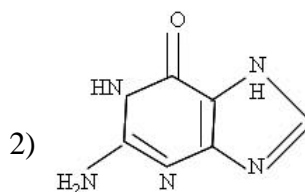
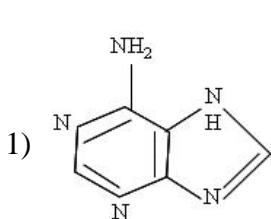
177. 'Natural rubber' is a polymer of **(M-2008)**



178. The raw material used in Nylon - 6 is] **(M-2007)**
 1. Adipic acid 2. Phthalic acid 3. Ethylene glycol 4. Caprolactum
179. Which of the following is a biodegradable polymer ? **(2007-E)**
 1) Polythene 2) Bakelite 3) PHBV 4) PVC

BIOMOLECULES

180. How many tripeptides can be prepared by linking the amino acids glycine, alanine and phenyl alanine ? (E-2009)
 1) One 2) Three 3) Six 4) Twelve
181. A codon has a sequence of A, and specifies a particular B that is to be incorporated into a C. What are A,B,C ? (E-2009)
- | | | | |
|----|---------|---------------|--------------|
| | A | B | C |
| 1) | 3 bases | amino acid | carbohydrate |
| 2) | 3 acids | carbohydrate | protein |
| 3) | 3 bases | protein amino | acid |
| 4) | 3 bases | amino acid | protein |
182. Which one of the following statements is not true for glucose ? (M-2009)
 1) $\alpha - D(+)$ - glucose undergoes mutarotation
 2) It has four asymmetric carbons in Fischer projection formula
 3) It gives saccharic acid with Tollen's reagent 4) It reacts with hydroxyl amine
183. The base present in Cytidine: (M-2009)



184. Hydrolysis of sucrose with dilute aqueous sulfuric acid yields (E-2008)
 1) 1 : 1 D(+)- glucose; D(-) fructose 2) 1 : 2 D-(+)- glucose; D(-)- fructose
 3) 1 : 1 D(-)- glucose; D(+) fructose 4) 1 : 2 D(-) glucose; D-(+)- fructose
185. Match the following : (M-2008)

List - I (Vitamins)

- A) B₁
 B) B₂
 C) B₃
 D) B₅

List - II

- (i) Riboflavin
 (ii) Pantothenic acid
 (iii) Niacin
 (iv) Thiamine

The correct match is

- | | | | | | | | | | |
|----|-----|----|-----|----|----|----|-----|----|-----|
| | A | B | C | D | | A | B | C | D |
| 1) | iv | i | iii | ii | 2) | iv | iii | i | ii |
| 3) | iii | iv | ii | i | 4) | iv | i | ii | iii |

186. A mixture of amylose and amylopectin is called (M-2007)
 1) Lactose 2) Starch 3) Cellulose 4) Crose
187. Which of the following biomolecules acts as specific catalysts in biological reactions ? (M-2007)
 1) Carbohydrates 2) Lipids 3) Vitamins 4) Enzymes

SOLID STATE

188. The Cubic unit cell of a metal (molar mass=63.55 g mol⁻¹) has an edge length of 362 pm. Its density is 8.92 g.cm⁻³. The type of unit cell is :
 1) Primate 2) Face centred 3) Body centred 4) End centred

189. Schotky defect is observed in the crystal of

- 1) NaCl 2) HCl 3) AgCl 4) MgCl₂

METALLURGY

190. Match the following (E-2009)

List - I

- A) Felspar
B) Asbestos
C) Pyrargyrite
D) Diaspore

List - II

- I) [Ag₃SbS₃]
II) Al₂O₃, H₂O
III) MgSO₄, H₂O
IV) KAlSi₃O₈
V) CaMg₃(SiO₃)₄

- | | | | | |
|----|----|---|-----|----|
| | A | B | C | D |
| 1) | IV | V | II | I |
| 3) | IV | I | III | II |

- | | | | | |
|----|----|---|----|----|
| | A | B | C | D |
| 2) | IV | V | I | II |
| 4) | II | V | IV | I |

191 Match the following : (M-2009)

List - I

- A) Nitration mixture
B) Thermit mixture
C) Silica
D) Alum

List - II

- I) Acid flux
II) Mordant
III) Fe₂O₃ (3 parts)+Al power (1 part)
IV) Conc. HNO₃+conc.H₂SO₄
V) Conc. HNO₃+conc.HCl

The correct match is :

- | | | | | |
|----|----|-----|---|-----|
| | A | B | C | D |
| 1) | IV | III | I | II |
| 3) | V | II | I | III |

- | | | | | |
|----|----|-----|----|----|
| | A | B | C | D |
| 2) | IV | III | II | I |
| 4) | V | III | I | II |

192 The formula of 'spinel' is AB₂O₄, where A is, and B is (M-2009)

A

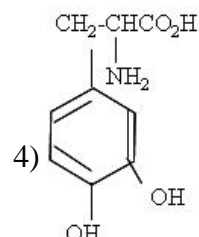
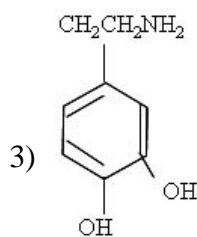
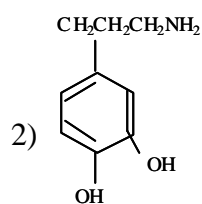
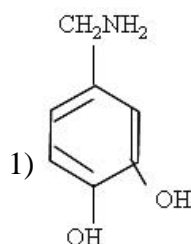
- 1) IIA element
2) IIIA metal
3) Transition metal in +3 state
4) IIA element

B

- 1) IIIA metal
2) IIA element
3) Transition metal in +2 state
4) Transition metal in +2 state

CHEMISTRY IN EVER DAY LIFE

193 Parkinson's disease is linked to abnormalities in the levels of dopamine in the body. The structure of dopamine is : (E-2009)



194. Barbituric acid is a condensation product of A and B. A,B are : (M-2009)

- 1) H₂NCONH₂, HO₂C - CO₂H 2) H₂NCONH₂, ClCOCH₃
3) H₂N - NH₂, ClCOCH₂COCl 4) H₂NCONH₂, ClOCC₂COCl

195 Which of the following gives paracetamol on acetylation?(2005 Medical)

