## **AIPMT Sample Paper 2013**

## Chemistry

Q. 1. With which of the following configuration an atom has the lowest ionization enthalpy?

a.  $Is^{2} 2s^{2} 2p^{6}$ b.  $Is^{2} 2s^{2} 2p^{5}$ c.  $Is^{2} 2s^{2} 2p^{3}$ d.  $Is^{2} 2s^{2} 2p^{5} 3s^{1}$ 

Sol.  $ls^2 2s^2 2p^5 3s^1$  represents the excited state of a Neon atom. The energy needed to knock off an electron from the excited state of neon must be least. Correct choice is: (4)

**Q. 2.** An element, X has the following isotopic composition;  $^{200}X.90\%$ ;  $^{199}X.8.0\%$ ;  $^{202}X.2.0\%$ The weighted average atomic mass of the naturally occurring element X is closest to :

- a. 199 amu
- b. 200 amu
- c. 201 amu
- d. 202 amu

Sol. The weighted average atomic mass of element (X) =  $0.9(200) + 0.08(199) + 0.02(202) = 180 + 15.92 + 4.04 = 199.96 \approx 200$  Correct choice is: (2)

**Q. 3.** Concentrated aqueous sulpharic acid is 98% H 2SO 4 by mass and has a density of 1.80 g.  $mL^{-1}$ . Volume of acid required to make one litre of 0.1 M H<sub>2</sub>SO<sub>4</sub> is,

- a. 5.55 mL
- b. 11.10 mL
- c. 16.65 mL
- d. 22.20 mL

Sol. Density = 1.80 g/ml  $\Rightarrow$  1 litre has 1800g  $H_2SO_4$  (impure)  $\Rightarrow$  1 litre has 0.98 (1800)g  $H_2SO_4$  (pure)  $\Rightarrow$  1 litre has  $\frac{1764}{98}$  moles  $H_2SO_4$  = 18 M  $\Rightarrow$  Now, 18 ×  $V_1$  = 0.1 × 1 or,  $V_1 = \frac{0.1}{18} \times 1000 = 5.55$  ml Correct choice: (1)

Q.4. Consider the following sets of quantum numbers:

	n	Ι	Μ
(a)	3	0	0
(b)	2	2	1
(c)	4	3	-2
(d)	1	0	-1
(e)	3	2	3

Which of the following sets of quantum number is not possible

- a. a and c
- b. b, c and d
- c. a, b, c and d
- d. b, d and e

**Sol.** Choice (b), (d) and (e) are incorrect. Remember that value of  ${}^{\circ}l'$  ranges from (0) to (n - 1) and values of  ${}^{\circ}m'$  range from (-l) to (+l). Correct choice: (4)

S

 $+ \frac{1}{2}$ 

 $+ \frac{1}{2}$ 

- 1/2

- 1/2

 $\pm 1$ 

**Q. 5.** The number of moles of  $KMnO_4$  that will be needed to react with one mole of sulphite ion in acidic solution is:

C



Sol.

Correct choice : (4

2.693

**Q. 6.** In a first-order reaction  $A \rightarrow B$ , if k is rate constant and initial concentration of the reactant A is 0.5 M then the half-life is :

c. 
$$\frac{\log 2}{K}$$
d. 
$$\frac{\log 2}{K\sqrt{0.5}}$$

t 1/2 for a first order reaction =  $\frac{0.693}{K} = \frac{2.303 \log_{10} 2}{K} = \frac{\ln 2}{K}$ Sol.

Correct choice: (1)

Q. 7. The reaction of hydrogen and iodine monochloride is given as:

$$H_{2(g)} + 2ICL_{(g)} \rightarrow 2HCl_{(g)} + l_{2(g)}$$

This reaction is of first order with respect to  $H_{2(g)}$  and  $lCl_{(g)}$  following mechanisms were proposed :

Mechanism A :  $H_{2(g)} + 2ICL_{(g)} \rightarrow 2HCl_{(g)} + l_{2(g)}$ 

 $\text{Mechanism B}: \xrightarrow{H_{2(g)} + ICI_{(g)} \to HCL_{(g)} + HI_{(g)} \text{ slow } HI_{(g)} + ICI_{(g)} \to HCI_{(g)} + I_{2(g)}, \text{ fast } ICI_{(g)} \to HCI_{(g)} + I_{2(g)}, \text{ fast } ICI_{(g)} \to HCI_{(g)} \to HCI_{(g)} + I_{2(g)}, \text{ fast } ICI_{(g)} \to HCI_{(g)} \to HCI_$ 

Which of the above mechanism (s) can be consistent with the given information about the reaction

- a. A only
- b. B only
- c. 1 and 2 both
- d. Neither 1 nor 2

**Sol.** The rate law is invariably determined from the slowest step of the mechanism. Therefore mechanism (B) is consistent with the data given for order of reaction. Correct choice: (2)

**Q. 8.** If 60% of a first order reaction was completed in 60 minutes, 50% of the same reaction would be completed in approximately :

a. 40 minutes
b. 50 minutes
c. 45 minutes
d. 60 minutes
(log 4 = 0.60, log 5 = 0.69)

$$k = \frac{2.303}{60} \log \frac{1}{0.4} = \frac{2.303}{60} \log \frac{10}{4} = \frac{2.303}{60} \log \frac{5}{2} = \frac{2.303}{60} (\log 5 - \log 2) = \frac{2.303}{60} (0.69 - 0.3) = \frac{2.303}{60} \times 0.39$$
  
$$t \ \frac{1}{2} = \frac{2.303 \times 0.3 \times 60}{2.303 \times 0.39} = 46.15 \approx 45 \text{ min } utes.$$

Correct choice: (3)

Q. 9. The equilibrium constant of the reaction :

 $Cu(s) + 2Ag^{+}(aq) \rightarrow Cu^{2+}(aq) + 2Ag(s); E^{0} = 0.46 V \text{ at } 298K \text{ is }$ :

a.  $4.0 \times 10^{15}$ b.  $2.4 \times 10^{10}$ c.  $2.0 \times 10^{10}$ d.  $4.0 \times 10^{10}$   $\Delta G^0 = -2 \times 96500 \times 0.46 = -88780 j$   $? G^0 = 2.303 RT \log K_c \text{ or } -88780 = -2.303 \times 8.514 \times 298 \log K_c$ Sol.  $or - 88780 = -5705.84 \log k_c \text{ or } \log k_c = 15.55 \quad [K_c = 4 \times 10^{15}]$ 

Correct choice: (1)

**Q. 10.** 0.5 molal aqueous solution of a weak acid (HX) is 20% ionized. If Kf for water is 1.86 K kg mol sup-1, the lowering in freezing point of the solution is

a. -0.56 K b. -1.12 K c. 0.56 K

a.

d. 1.12 K

$$\Delta T_f = i K_f m = 1.2 \times 1.86 \times 0.5 = 1.12 K$$
 Correct choice: (4)

Q. 11. The efficiency of a fuel cell is given by

d. 
$$\frac{\Delta g}{\Delta H}$$

**Sol.** Efficiency of a fuel cell 
$$\binom{n}{\Delta H}$$
 Correct choice: (4)

Q. 12. Consider the following reactions:

a. 
$$\begin{aligned} H_{(aq)}^{+} + OH_{aq}^{-} &= H_2O_{(1)}, \ \Delta \ H = -X_1Kj \ mol^{-1} \\ H_{2(g)} + \frac{1}{2}O_{2(g)} &= H_2O_{(1)}, \ \Delta H = -X_2Kj \ mol^{-1} \\ \text{b.} \\ \text{c.} \quad CO_{2(g)} + H_{2(g)} &= CO_{(g)} + H_2O_{(1)} - X_3Kj \ mol^{-1} \\ C_2H_{2(g)} + \frac{5}{2}O_{2(g)} &= 2CO_{(g)} + H_2O_{(1)} + X_4Kj \ mol \\ \text{d.} \end{aligned}$$

Enthalpy of formation of H<sub>2</sub>O(l) is

a.  $+ X_1 KJ mol^{-1}$ b.  $+ X_2 KJ mol^{-1}$ c.  $+ X_3 KJ mol^{-1}$ d.  $+ X_4 KJ mol^{-1}$ 

**Sol.** Heat of formation of  $H_2O(1) = -X_2 k I / mol$ . Correct choice: (2)

Q. 13. Given that bond energies of

H – and CI – CI are 430 KJmol – respectively and  $\Delta_f H$  fo HCI is – 90 KJ mol <sup>-1</sup>, Bond enthalpy of HCI is

a.  $245 \text{ KJ mol}^{-1}$ b.  $2909 \text{ KJ mol}^{-1}$ c.  $380 \text{ KJ mol}^{-1}$ d.  $425 \text{ KJ mol}^{-1}$   $H_2 = CI_2 \rightarrow 2HCI; [B_{.}E_{H_{-}H} + B_{.}E_{CI_{-}CI}] - [2BE_{H_{-}CI}] = \Delta H_R$ Sol.  $[430 + 240] - [2_{.}BE_{H_{-}CI}] = 180 \text{ or } 670 - 2(BE)_{H_{-}CI} = 850 \text{ or } BE_{H_{-}CI} = 425 \text{ KJ mol}^{-1}$ Correct choice: (4) Q. 14. The Langmuir adsorption isotherm is deduced using the assumption

- a. The adsorbed molecules interact with each other
- b. The adsorption takes place in multilayers
- c. The adsorption sites are equivalent in their ability to adsorb the particles
- d. The heat of adsorption varies with coverage

Sol. angmuir adsorption has the following postulates

a. The isotherm is devised for adsorption equilibrium i.e., when rate of adsorption = rate of desorption

 $\rightarrow H_2O; K_3$ 

- b. Adsorption at all sites is equivalent
- c. Adsorption at a site is unaffected by adsorption at neighboring sites.

Correct choice: (3)

Q. 15. The following equilibrium constants are given

 $N_2 + 3H_2 \leftrightarrow 2NH_3; K_1 \qquad N2 + O_2 \leftrightarrow 2NO; k_2$ 

The equilibrium constant for the oxidation of  $NH_3$  by oxygen to give NO is

a.  $K_1K_2 / K_3$ b.  $K_2K_3^3 / K_1$ c.  $K_{21}K_3^2 / K_1$ d.  $K_2^2K_3 / K_1$ Sol.  $2NH_3 \rightarrow N_2 + 3H_2$   $3H_2 + \frac{3}{2}O_2 \rightarrow 3H_2O$   $N_2 + O_2 \rightarrow 2NO$   $2NH_3 + \frac{5}{2}O_3 \rightarrow 2NO + 3H_2O$   $K_2$   $K^* = K_2K_3^3 / K_1$ Correct choice: (2) Q. 16. Caulate the pOH of a solution at 25<sup>o</sup>C that contains  $1 \times 10^{-10}$  M of hydronium ions, i.e.  $H_{3}O^{+}$ :

- a. 1.000
- b. 7.000
- c. 4.000
- d. 9.000

**Sol.**  $[OH^{-}] = 10^{-4} \mod 1$ ;  $P^{OH} = 4$  Correct choice : (3)

**Q. 17.** Aweak acid, *HA has a*  $K_a$  of  $1.00 \times 10^{-5}$ . If 0.100 mol of this acid is dissolved in one litre of water, the percentage of acid dissociated at equilibrium is closest to

- a. 0.100%
- b. 99.0%
- c. 1.00%
- d. 99.9%

Sol. We know that,

$$K_a = C \alpha^2 \text{ or } \alpha = \sqrt{\frac{K_a}{C}} = \sqrt{\frac{10^{-5}}{10^{-1}}} \text{ Correct choice: (3)}$$

Q. 18. The fraction of total volume occupied by the atoms present in a simple cube is



Q. 19. Identify the correct order of the size of the following:

a)  $Ca^{2+} < Ar < K^+ < CI^- < S^{2-}$ b)  $Ca^{2+} + K^+ < Ar < S^{2-} < CI^$ c.  $Ca^{2+} + < K^+ < Ar < CI^- < S^{2-}$  d.  $Ar < Ca^{2+} < K^+ < CI^- < S^{2-}$ 

**Sol.** Anions have the largest sizes followed by neutral atoms and then cations for a respective period. So, the correct order should be  $Ca^{2+} + < K^+ < Ar < CI^- < S^{2-}$  Correct choice: (3)

Q.20. In which of the following pairs, the two species are iso-structural?

- a.  $BrO_3^-$  and  $XeO_3$ b.  $SF_4$  and  $XeF_4$ c.  $SO_3^{2-}$  and  $NO_3^-$
- d.  $BF_3$  and  $NF_3$

**Sol.** Both -  $BrO_3^-$  and  $XeO_3$  have the central atom in  $SP^3$ , both these species are pyramidal.



- a. Benzene
- b. Toluene
- c. Chlorobenzene
- d. Phenol would be
- a. d > b > a > c
- b. a > b > c > d
- c. b > d > a > c
- $d. \quad d > c > b > a$

**Sol.** The correct order is a > c. Correct choice: (1)

**Q. 22.** Predict the product  $\tilde{C}$  obtained in the following reaction of



## Sol.

Correct choice: (1)

Q. 23. Which of the compounds with molecular formulaC5H10 yields acetone on ozonolysis?

- a. 2 Methyl 1 butene
- b. 2 Methyl 2 butane
- c. 3 Methyl 1 butane
- d. Cyclopentane

$$(CH_3)_2 C \Rightarrow CH - CH_3 \rightarrow (CH_3)_2 C = O + CH_3 CHO$$

Sol. 2 - meinn + 2

Correct choice: (2)

**Q. 24.** If there is no rotation of plane polarized light by a compound in a specific solvent, thought to be chural, it may mean that

- a. the compound may be a racemic mixture
- b. the compound is certainly a chiral

- c. the compound is certainly meso
- d. there is no compound in the solvent

**Sol.** The given compound was thought to be chiral because of a chiral carbon/s. If there is no optical activity, it means the compound must certainly be meso. Correct choice: (3)

Q. 25. For the following

- a. l–
- b. Cl-
- c. Br-

the increasing order of nucleophilicity would be:

a. 
$$Br^{-} < Cl^{-} < l^{-}$$
  
b.  $l^{-} < Br^{-} < Cl^{-}$   
c.  $Cl^{-} < Br^{-} < l^{-}$   
d.  $l^{-} < Cl^{-} < Br^{-}$ 

Sol. The order of nucleophilicities of halides ions in water (default solvent) will be

 $Cl^- < Br^- < l^-$  Correct choice: (3)

**Q. 26.**  $CH_3 - CHCl - CH_2 - CH_3$  has a chiral centre. Which one of the following represents its R configuration?



$$C_{3}H_{5}$$

$$H - C - CH_{3}$$

$$C_{3}H_{5}$$

$$H - C - CH_{3}$$

$$H - C - CH_{3}$$

$$H - C - CH_{3}$$

$$H$$

$$CH_{3}$$

$$CH_{3}$$

$$CH_{3} - CH - CH_{2} - CH_{3} + HI \rightarrow \dots$$

$$Q. 27. In the reaction
Which of the following compounds will be formed?
$$CH_{3}$$

$$CH_{3$$$$

$$\begin{array}{c} CH_3 \ -CH - CH_3 \ + CH_3 CH_2 OH \\ \\ | \\ CH_3 \end{array}$$

c.

$$\begin{array}{c} CH_3 \ -CH - CH_2OH \ +CH_3CH_3 \\ \\ | \\ CH_3 \end{array}$$

d.

Sol.  $CH_3 = CH_2 = CH_1$ 



Q. 28. Which one of the following vitamins is water-soluble?

- a. Vitamin A
- b. Vitamin B
- c. Vitamin E
- d. Vitam in K

**Sol.** Vitamin (B) and vitamin (C) are water soluble, while Vitamin (A), (D), (E) and (K) are fat soluble. Correct choice: (2)

H-CH, -OH

Q. 29. RNA and DNA are chiral molecules, their chirality is due to

- a. D sugar component
- b. L sugar component
- c. Chiral bases
- d. Chiral phosphate ester units

Sol. Deoxyribose and ribose sugars are D -chiral sugars in DNA and RNA. Correct choice: (1)

Q. 30. Which one of the following polymers is prepared by condensation polymerization?

- a. Styrene
- b. Nylon -66
- c. Teflon
- d. Rubber

**Sol.** Nylon-66 is a condensation polymer of hexamethylene diamine and adipic acid. \Correct choice: (2)

**Q. 31.** The correct order of (C - O) bond length among  $CO, CO_3^{-2}, CO_2$  is:

 $\begin{array}{ll} & CO < CO_2 < CO_3^{2-} \\ {\rm b.} & CO_2 < CO_3^{2-} < CO \\ {\rm c.} & CO < CO_3^{2-} < CO_2 \\ {\rm d.} & < CO_3^{2-} < CO_2 < CO \\ \end{array}$ 

**Sol.** The correct order of C = O bond length will be  $CO < CO_2 < CO_3^2$ 

Correct choice: (1)

**Q. 32.** Which one of the following ionic species has the greatest proton affinity to form stable compound?

- a. I-
- b. HS-
- c.  $NH_2^-$
- d. E-

**Sol.** Strongest base would have the highest proton affinity i.e,  $NH_2^-$  Correct choice: (3)

Q. 33. In which of the following the hydration energy is higher than the lattice energy?

- a. SrSO<sub>4</sub>
- b. BaSO<sub>4</sub>
- c. MgSO<sub>4</sub>
- d. RaSO<sub>4</sub>

Sol. MgSO<sub>4</sub> is the most soluble out of the given alkaline earth metal sulphates. Correct choice: (3)

**Q. 34.** Which of the following statements, about the advantage of roasting sulphide ore before reduction is not true?

- a. Roasting of the sulphide to the oxide is thermodynamically feasible.
- b. Carbon and hydrogen are suitable reducing agents for metal sulphides.

The  $\int f^{G^{\theta}}$  of the sulphide is greater than those for CS<sub>2</sub> and H<sub>2</sub>S

The  $^{\Delta} f^{G^{\theta}}$  is negative for roasting of sulphide ore to oxide

Sol. Carbon and hydrogen are not suitable for reduction of sulphides directly. Correct choice: (2)

Q. 35. The correct order of increasing thermal stability of

 $K_2CO_3$ ,  $MgCO_3$ ,  $CaCO_3$  and  $BeCO_3$  is :

 $\begin{array}{ll} a. & K_2CO_3 < MgCO_3 & < CaCO_3 < BeCO_3 \\ b. & BeCO_3 < MgCO_3 & < K_2CO_3 & < CaCO_3 \\ c. & BeCO_3 < MgCO_3 & < CaCO_3 & < K_2CO_3 \\ d. & MgCO_3 & < BeCO_3 & < CaCO_3 & < K_2CO_3 \\ \end{array}$ 

**Sol.** The correct order is  $BeCO_3 < MgCO_3 < CaCO_3 < K_2CO_3$ 

Correct choice: (3)

**Q. 36.** Sulphides ores of metals are usually concentrated by Froth Flotation process. Which one of the following sulphides oresoffers an exception and is concentrated by chemical leaching?

- a. Sphalerite
- b. Argentite
- c. Galena
- d. Copper pyrite

**Sol.** Argentite ore is leached with NaCN during extraction of silver in the Mc Arthur Forrest Cyanide process. Correct choice: (2)

Q. 37. Which one of the following anions is present in the chain structure of silicates?

- a.  $SiO_4^{4-}$
- b.  $\lambda_2 O_1$
- c.  $(SiO_3^{2^-})$
- d.  $(S_2^{2-})$

Sol. Chain silicates have the general formula  $(SiO_3^{2-})_*$  Correct choice: (4)

**Q. 38.** Which one of the following orders correctly represents the increasing acid strengths of the given acids?

a.  $HOCIO_3 < HOCIO_2 < HOCIO < HOCI$ a.  $HOCIO_3 < HOCIO < HOCIO_2 < HOCIO_3$   $HOCIO_3 < HOCI < HOCIO_3 < HOCIO_2$   $HOCIO_2 < HOCIO_3 < HOCIO < HOCI$ d. **Sol.** The correct order is HOCIO<sub>3</sub> < HOCIO < HOCIO<sub>2</sub> < HOCIO<sub>3</sub> Correct choice: (2)

**Q. 39.** Which of the following oxidation states are the most characteristic for lead and tin respectively?

a. +2, +2b. +4, +2c. +2, +4 d. +4, +4

Sol. Among common characteristic states for Pb and Sn, we find +2 and 44 respectively. Correct choice: (3)

**Q. 40.** Identify the incorrect statement among the following:

- a. Shielding power of 4f electrons is quite weak
- b. There is a decrease in the radii of the atoms or ions as one proceeds from La to Lu
- c. Lanthanoid contraction is the accumulation of successive shrinkages
- d. As a result of lanthanoid contraction, the properties of 4d series of the transition elements have no similarities with the 5d series of elements

Sol. The atomic radii of 4d and 5d elements down the group become quite similar due to lanthanidecontraction. Correct choice: (4)

Q. 41. Which one of the following ions is the most stable in aqueous solution?

- Mn<sup>3.</sup> a.
- $Cr^3$ b.
- $v^{3+}$
- c. *Ti*<sup>3+</sup>
- d.

(Atomic number. Ti = 22, V23, Cr = 24, Mn = 25)

**Sol**.  $Cr^{3+}$  is the most stable ion in aqueous medium. Correct choice: (2)

Q. 42. The d electron configurations of Cr. Which one of the following aqua complexes will exhibit the minimum paramagnetic behaviour?

 $\left[ Mn \ (H_2O_6) \right]^2 \ [Fe (H_2O_6)]^2 \$ 

(Atomic number. Cr + 24, Mn = 25, Fe = 26, Ni = 28)

Sol.  $AsH_2O$  is a weak field ligand,  $[M_1(H_2O_6)]^{+2}$  will have two unpaired electrons and will show least paramagnetic character. Correct choice: (4)

Q. 43. Which of the following will give a pair of enantiomorphs?

a.  $\begin{bmatrix} Pt (NH_3)_4 \end{bmatrix} \begin{bmatrix} PtCI_6 \end{bmatrix}$ b.  $\begin{bmatrix} Co (NH_3)_4 & CI_2 \end{bmatrix} NO_2$ c.  $\begin{bmatrix} Cr (NH_3)_6 \end{bmatrix} \begin{bmatrix} Co (CN)_6 \end{bmatrix}$ d.  $\begin{bmatrix} Co (en)_2 & CI_2 \end{bmatrix} Cl$ 

**Sol**. The complex ion  $\begin{bmatrix} Co & (en)_2 & CI_2 \end{bmatrix}^+$  can show optical isometrism in its cis-isomer, and will form a pair of enantiomorphs. Its trans-form will be optically inactive (meso). Correct choice: (4)

**Q. 44.** If NaCl is doped with  $10^{-4}$  mol % SrCl<sub>2</sub>, the concentration of cation vacancies will be  $(N_A = 6.02 \times 10^{23} \text{ mol}^{-1})$ 

- a.  $6.02 \times 10^{14} mol^{-1}$ b.  $6.02 \times 10^{15} mol^{-1}$ c.  $6.02 \times 10^{16} mol^{-1}$
- d  $6.02 \times 10^{17} mol^{-1}$

Sol. Number of moles of cationic vacancies

$$\frac{10^{-4}}{10^2} = 10^{-6} \text{ mole}$$

$$\Rightarrow \text{Number of cationic variancies} = 10^{-6} \times 6.02 \times 10^{23} = 6.02 \times 10^{17} \text{ Correct choice: (4)}$$

Q. 45. Which of the following presents the correct order of the acidity in the given compounds?

a.  

$$FCH_2COOH > CICH_2COOH > BrCH_2COOH > CH_3COOH$$
  
b.  
 $FCH_2COOH > BrCH_2COOH > CICH_2COOH > FCH_2COOH$   
c.  
 $FCH_2COOH > CH_3COOH > BrCH_2COOH > CICH_2COOH$   
d.  
 $FCH_2COOH > CICH_2COOH > FCH_2COOH > CH_3COOH$   
Correct choice: (1)  
2. 46. The product formed in Aldol condensation is

- a. an alpha, beta unsaturated ester
- b. a beta-hydroxy acid
- c. a beta-hydroxy aldehyde or a beta-hydroxy ketone
- d. an alpha-hydroxy aldehyde or ketone

**Sol.** Aldol condensation leads to formation of  $\beta$  – hydroxy aldehyde or a  $\beta$  – hydroxy Ketone.

Correct choice: (3)

**Q. 47.** Reduction of aldehydes and ketones into hydrocarbons using zinc amatgam and conc.HCl is called

- a. Wolf-Kishner Reduction
- b. Clemmensen Reduction
- c. Cope Reduction
- d. Dow Reduction

Sol. This is Clemmensen's reduction. Correct choice: (2)

**Q. 48.** Consider the following compounds



The correct decreasing order of their reactivity towards hydrolysis is

- a. (b) > (d) > (a) > (c)
- b. (b) > (d) > (c) > (a)
- c. (a) > (b) > (c) > (d)
- d. (d) > (b) > (a) > (c)

**Sol.** The attack of the nucleophile onto the carbonyl carbon is the rate-determining step. So, order must be (b) > (d) > (a) > (c) Correct choice: (1)

Q. 49. Which one of the following on treatment with 50% aqueous sodium

b.  $C_6H_5CH_2CHO$ c.  $C_6H_5CHO$ d.  $CH_3CH_2CH_2CHO$ 

**Sol.** Benzaldehyde has no  $\alpha$  -hydrogen atom, so it can undergo Cannizaro reaction. Correct choice: (3)

**Q. 50.** Which one of the following on reduction with lithium aluminium hydride yields a secondary amine?

- a. Methyl Cyanide
- b. Nitroethane
- c. Methylisocyanide

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d. Acetamide

Sol. Methyl isocyanide on reduction with LiAlH 4 will give dimethylamine. Correct choice: (3)