



# NEET Exam. 2019 (5<sup>th</sup> May 2019)

## (Paper & Solution)

Code – S2

**Q.136** In which case change in entropy is negative ?

- (1) Sublimation of solid to gas  
(2)  $2\text{H(g)} \rightarrow \text{H}_2\text{(g)}$   
(3) Evaporation of water  
(4) Expansion of a gas at temperature

**Ans.** [4]

- Sol.** (1) Evaporation of water  $\Delta S = \oplus$   
(2) Expansion of gas at constant temperature =  $\oplus$   
(3)  $\text{S} \rightarrow \text{g} \oplus$   
(4)  $2\text{H}_{(\text{g})} \longrightarrow \text{H}_{2(\text{g})} \ominus$

**Q.137** For the chemical reaction  $\text{N}_2\text{(g)} + 3\text{H}_2\text{(g)} \rightleftharpoons 2\text{NH}_3\text{(g)}$

- (1)  $-\frac{d[\text{N}_2]}{dt} = \frac{1}{2} \frac{d[\text{NH}_3]}{dt}$   
(2)  $3 \frac{d[\text{H}_2]}{dt} = 2 \frac{d[\text{NH}_3]}{dt}$   
(3)  $-\frac{1}{3} \frac{d[\text{H}_2]}{dt} = -\frac{1}{2} \frac{d[\text{NH}_3]}{dt}$   
(4)  $-\frac{d[\text{N}_2]}{dt} = 2 \frac{d[\text{NH}_3]}{dt}$

**Ans.** [1]

- Sol.**  $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$   
 $-\frac{d\text{N}_2}{dt} = -\frac{1}{3} \frac{d\text{H}_2}{dt} = +\frac{1}{2} \frac{d\text{NH}_3}{dt}$   
 $-\frac{d\text{N}_2}{dt} = +\frac{1}{2} \frac{d[\text{NH}_3]}{dt}$

**Q.138** Which of the following diatomic molecular species has only  $\pi$  bonds according to Molecular Orbital Theory?

- (1)  $\text{C}_2$  (2)  $\text{Be}_2$  (3)  $\text{O}_2$  (4)  $\text{N}_2$

**Ans.** [1]

- Sol.**  $\text{C}_2 = \sigma 1s^2 \sigma^* 1s^2 \sigma 2s^2 \sigma^* 2s^2 \pi 2p_x^2 \pi 2p_y^2$   
12  $e^-$  has only  $\pi$  bonds according to M.O.T.  
In  $\text{C}_2$  molecule, only  $\pi$  electron occupied the bonding molecular orbital.

**Q.139** Which of the following is **incorrect** statement ?

- (1)  $\text{GeX}_4$  (X = F, Cl, Br, I) is more stable than  $\text{GeX}_2$   
(2)  $\text{SnF}_4$  is ionic in nature  
(3)  $\text{PbF}_4$  is covalent in nature  
(4)  $\text{SiCl}_4$  is easily hydrolysed

**Ans.** [3]

- Sol.**  $\text{PbF}_4$  is an ionic compound.

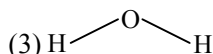
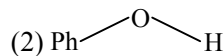
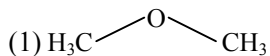
- Q.140** Under isothermal condition, a gas at 300 K expands from 0.1 L to 0.25 L against a constant external pressure of 2 bar. The work done by the gas is [Given that 1 L bar = 100 J]  
 (1) 25 J (2) 30 J (3) -30 J (4) 5 kJ

**Ans.** [3]

**Sol.** Thermodynamics

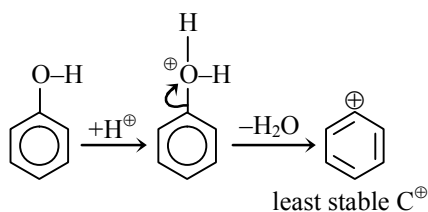
$$\begin{aligned} W &= -P_{\text{ext}}\Delta V \\ &= -2(\text{bar})(0.15 \text{ L}) \\ &= -0.3 \text{ bar} : \\ &= -0.3 \times 100 \text{ J} \\ &= -30 \text{ J} \end{aligned}$$

- Q.141** The compound that is most difficult to protonate is :

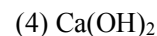
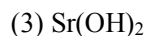
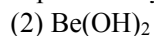
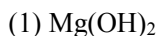


**Ans.** [2]

**Sol.**



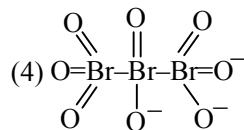
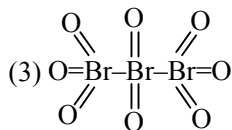
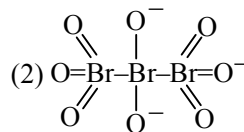
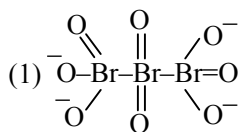
- Q.142** Which of the following is an amphoteric hydroxide ?



**Ans.** [2]

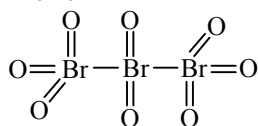
**Sol.** Be(OH)<sub>2</sub> is amphoteric in nature.

- Q.143** The correct structure of tribromooctaoxide is -

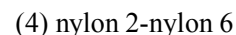
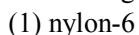


**Ans.** [3]

**Sol.** Br<sub>3</sub>O<sub>8</sub>



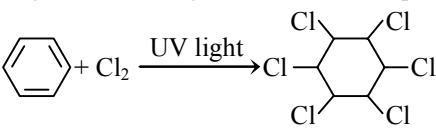
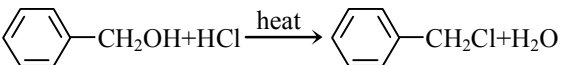
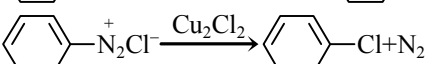
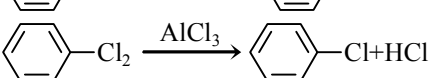
- Q.144** The biodegradable polymer is -



**Ans.** [4]

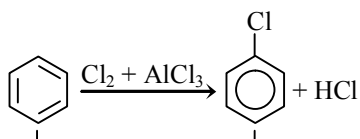
**Sol.** Biodegradable polymer → Nylon-2-Nylon-6.

**Q.145** Among the following, the reaction that proceeds through an electrophilic substitution, is -

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

**Ans.** [4]

**Sol.**



Electrophilic substitution reaction

**Q.146** Match the following :

(a)	Pure nitrogen	(i)	Chlorine
(b)	Haber process	(ii)	Sulphuric acid
(c)	Contact process	(iii)	Ammonia
(d)	Deacon's process	(iv)	Sodium azide or Barium azide

Which of the following is the correct option ?

- |     | (a)   | (b)   | (c)   | (d)   |
|-----|-------|-------|-------|-------|
| (1) | (iii) | (iv)  | (ii)  | (i)   |
| (2) | (iv)  | (iii) | (ii)  | (i)   |
| (3) | (i)   | (ii)  | (iii) | (iv)  |
| (4) | (ii)  | (iv)  | (i)   | (iii) |

**Ans.** [2]

**Sol.** Pure  $N_2$   $BaN_3 \rightarrow Ba + N_2$

Haber process  $N_2 + 3H_2 + 2NH_3$

Contact process  $2SO_2 + O_2 + 2SO_3$

Deacon's process  $HCl + O_2 \xrightarrow{CuCl_2} H_2O + Cl_2$

**Q.147** The number of sigma ( $\sigma$ ) and pi ( $\pi$ ) bonds in pent-2-en-4-yne is -

- (1) 11  $\sigma$  bonds and 2  $\pi$  bonds (2) 13  $\sigma$  bonds and no  $\pi$  bond  
 (3) 10  $\sigma$  bonds and 3  $\pi$  bonds (4) 8  $\sigma$  bonds and 5  $\pi$  bonds

**Ans.** [3]

**Sol.**  $H-C\equiv C-CH=CH-CH_3$

$10\sigma + 3\pi$ -Bonds

**Q.148** Enzymes that utilize ATP is phosphate transfer require an alkaline earth metal (M) as the cofactor. M is -

- (1) Ca (2) Sr (3) Be (4) Mg

**Ans.** [4]

**Sol.**  $Mg \rightarrow$  In ATP Phosphate transfer

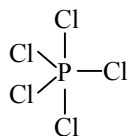


**Q.149** Identify the incorrect statement related to  $\text{PCl}_5$  from the following -

- (1) Axial P–Cl bonds are longer than equatorial P–Cl bonds
- (2)  $\text{PCl}_5$  molecule is non-reactive
- (3) Three equatorial P–Cl bonds make an angle of  $120^\circ$  with each other
- (4) Two axial P–Cl bonds make an angle of  $180^\circ$  with each other

**Ans.** [2]

**Sol.**



Three equatorial bonds and two axial bonds.

Due to unsymmetry  $\text{PCl}_5$  is reactive.

**Q.150** If the rate constant for a first order reaction is  $k$ , the time ( $t$ ) required for the completion of 99 % of the reaction is given by -

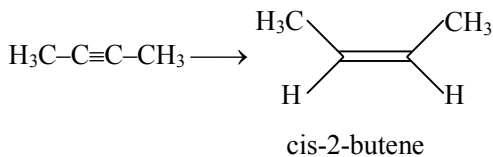
- (1)  $t = 4.606/k$                       (2)  $t = 2.303/k$                       (3)  $t = 0.693/k$                       (4)  $t = 6.909/k$

**Ans.** [1]

**Sol.** Chemical kinetics

$$\begin{aligned} t &= \frac{2.3}{K} \log \frac{a}{a-x} \\ &= \frac{2.3}{k} \log \frac{1.0}{1} \\ &= \frac{2.303 \times 2}{k} \\ t_{99\%} &= \frac{6.606}{k} \end{aligned}$$

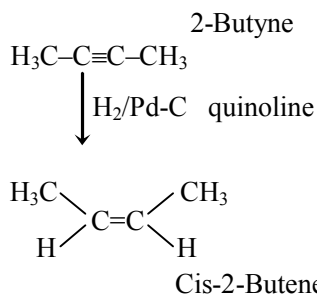
**Q.151** The most suitable reagent for the following conversion, is :



- (1) Zn / HCl                              (2)  $\text{Hg}^{2+} / \text{H}^+, \text{H}_2\text{O}$   
(3) Na / liquid  $\text{NH}_3$                   (4)  $\text{H}_2, \text{Pd/C},$  quinoline

**Ans.** [4]

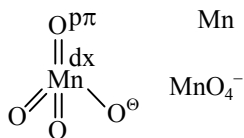
**Sol.**



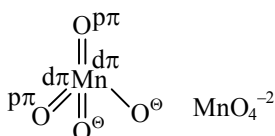
- Q.152** The manganate and permanganate ions are tetrahedral due to -
- (1) The  $\pi$ -bonding involves overlap of p-orbitals of oxygen with p-orbitals of manganese
  - (2) The  $\pi$ -bonding involves overlap of d-orbitals of oxygen with d-orbitals of manganese
  - (3) The  $\pi$ -bonding involves overlap of p-orbitals of oxygen with d-orbitals of manganese
  - (4) There is no  $\pi$ -bonding

**Ans.** [3]

**Sol.** Structure of permanganate ion



and manganate ion



- Q.153** For a cell involving one electron  $E_{\text{cell}}^\ominus = 0.59$  V at 298 K, the equilibrium constant for the cell reaction is :

[Given that  $\frac{2.303 kT}{F} = 0.059$  V at  $T = 298$  K]

- (1)  $1.0 \times 10^{10}$                       (2)  $1.0 \times 10^{30}$                       (3)  $1.0 \times 10^2$                       (4)  $1.0 \times 10^5$

**Ans.** [1]

**Sol.**  $E_{\text{cell}}^\ominus = \frac{0.06}{n} \log_{10} k$

$$0.6 = \frac{0.06}{1} \log_{10} k$$

$$\log_{10} k = 10$$

$$k = 10^{10}$$

- Q.154** pH of a saturated solution of  $\text{Ca(OH)}_2$  is 9. The solubility product ( $K_{\text{sp}}$ ) of  $\text{Ca(OH)}_2$  is -

- (1)  $0.125 \times 10^{-15}$                       (2)  $0.5 \times 10^{-10}$                       (3)  $0.5 \times 10^{-15}$                       (4)  $0.25 \times 10^{-10}$

**Ans.** [3]

**Sol.**  $\text{Ca(OH)}_2 \rightleftharpoons \text{Ca}^{+2} + 2\text{OH}^-$

$$\text{pH} = 9 \quad \text{pOH} = 5$$

$$[\text{OH}^-] = 10^{-5} = 2s$$

$$s = \frac{10^{-5}}{2}$$

$$K_{\text{sp}} = (s) (\text{OH}^-)^2$$

$$= \frac{10^{-5}}{2} \times (10^{-5})^2$$

$$= \frac{1}{2} \times 10^{-15}$$

$$= 0.5 \times 10^{-15}$$

**Q.155** For an ideal solution, the correct option is -

- (1)  $\Delta_{\text{mix}} H = 0$  at constant T and P  
 (2)  $\Delta_{\text{min}} G = 0$  at constant T and P  
 (3)  $\Delta_{\text{mix}} S = 0$  at constant T and P  
 (4)  $\Delta_{\text{mix}} V \neq 0$  at constant T and P

**Ans.** [1]

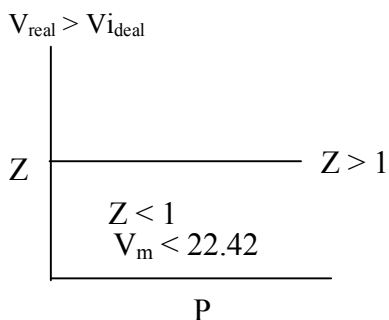
**Sol.** Liquid solution  
 For ideal solution  
 $\Delta H_{\text{mix}} = 0$   
 $\Delta S_{\text{mix}} = \oplus$   
 $\Delta G_{\text{mix}} = \ominus$

**Q.156** A gas at 350 K and 15 bar has molar volume 20 percent smaller than that for an ideal gas under the same conditions. The correct option about the gas and its compressibility factor (Z) is -

- (1)  $Z < 1$  and attractive forces are dominant  
 (2)  $Z < 1$  and repulsive forces are dominant  
 (3)  $Z > 1$  and attractive forces are dominant  
 (4)  $Z > 1$  and repulsive forces are dominant

**Ans.** [1]

**Sol.**  $Z = \frac{pV}{\eta R_t}$        $Z = \frac{V_{\text{real}}}{V_{\text{ideal}}}$



$Z < 1$  then intermolecular forces are dominant  
 $Z > 1$  then repulsive forces dominate

**Q.157** The correct order of the basic strength of methyl substituted amines in aqueous solution is -

- (1)  $(\text{CH}_3)_3\text{N} > (\text{CH}_3)_2\text{NH} > \text{CH}_3\text{NH}_2$   
 (2)  $\text{CH}_3\text{NH}_2 > (\text{CH}_3)_2\text{NH} > (\text{CH}_3)_3\text{N}$   
 (3)  $(\text{CH}_3)_2\text{NH} > \text{CH}_3\text{NH}_2 > (\text{CH}_3)_3\text{N}$   
 (4)  $(\text{CH}_3)_3\text{N} > \text{CH}_3\text{NH}_2 > (\text{CH}_3)_2\text{NH}$

**Ans.** [3]

**Sol.**  $(\text{CH}_3)_2\text{NH} > \text{CH}_3\text{NH}_2 > (\text{CH}_3)_3\text{N}$   
 In aqueous sol  
 Reason → (i) Hydrogen Bonding  
 (ii) Steric factor

**Q.158** For the second period elements the correct increasing order of first ionization enthalpy is -

- (1)  $\text{Li} < \text{B} < \text{Be} < \text{C} < \text{N} < \text{O} < \text{F} < \text{Ne}$   
 (2)  $\text{Li} < \text{Be} < \text{B} < \text{C} < \text{O} < \text{N} < \text{F} < \text{Ne}$   
 (3)  $\text{Li} < \text{Be} < \text{B} < \text{C} < \text{N} < \text{O} < \text{F} < \text{Ne}$   
 (4)  $\text{Li} < \text{B} < \text{Be} < \text{C} < \text{O} < \text{N} < \text{F} < \text{Ne}$

**Ans.** [4]

**Sol.** Order of IE  
 I.E of  $\text{Be} > \text{B}$   
 I.E of  $\text{N} > \text{O}$   
 $\therefore \text{Li} < \text{B} < \text{Be} < \text{C} < \text{O} < \text{N} < \text{F} < \text{Ne}$

- Q.159** Which mixture of the solution will lead to the formation of negatively charged colloidal  $[AgI]^-$
- (1) 50 mL of 2 M  $AgNO_3$  + 50 mL of 1.5 M KI                      (2) 50 mL of 0.1 M  $AgNO_3$  + 50 mL of 0.1 M KI  
(3) 50 mL of 1 M  $AgNO_3$  + 50 mL of 1.5 M KI                      (4) 50 mL of M  $AgNO_3$  + 50 mL of 2 M KI

**Ans.** [1,4]



for  $[AgI]^-$  colloidal

KI must be in excess

(1), (2) both correct

50 ml  $AgNO_3$  + 50 ml

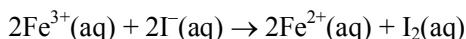
1.5 M

KI

50 ml  $AgNO_3$  + 50 ml

2 M KI

- Q.160** For the cell reaction

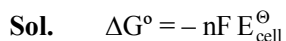


$E_{cell}^\ominus = 0.24$  V at 298 K. The standard Gibbs energy ( $\Delta_r G^\ominus$ ) of the cell reaction is :

[Given that Faraday constant  $F = 96500$  C mol $^{-1}$ ]

- (1) 46.32 kJ mol $^{-1}$                       (2) 23.16 kJ mol $^{-1}$                       (3) -46.32 kJ mol $^{-1}$                       (4) -23.16 kJ mol $^{-1}$

**Ans.** [3]



$$= -2(96500)(0.24)$$

$$= -46320 \text{ J/mole}$$

$$= -\frac{46320}{1000}$$

$$= -46.32 \text{ KJ/mole}$$

- Q.161** Which is the correct thermal stability order for  $H_2E$  (E = O, S, Se, Te and Po)?

- (1)  $H_2Po < H_2Te < H_2Se < H_2S < H_2O$                       (2)  $H_2Se < H_2Te < H_2Po < H_2O < H_2S$   
(3)  $H_2S < H_2O < H_2Se < H_2Te < H_2Po$                       (4)  $H_2O < H_2S < H_2Se < H_2Te < H_2Po$

**Ans.** [1]

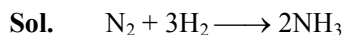
**Sol.** As we move downwards stability of Hydrides decreases



- Q.162** The number of moles of hydrogen molecules required to produce 20 moles of ammonia through Haber's process is :

- (1) 30                      (2) 40                      (3) 10                      (4) 20

**Ans.** [1]



moles = ?                      20 moles

$$2 \times \text{moles } H_2 = 3 \times \text{moles } NH_3$$

$$2 \times x = 3 \times 20$$

$$x = 30 \text{ moles}$$

- Q.163** Which of the following series of transitions in the spectrum of hydrogen atom falls in visible region?  
 (1) Paschen series                      (2) Brackett series                      (3) Lyman series                      (4) Balmer series

**Ans.** [2]

**Sol.** Visible region  
Balmer series

- Q.164** A compound is formed by cation C and anion A. The anions form hexagonal close packed (hcp) lattice and the cations occupy 75% of octahedral voids. The formula of the compound is :

- (1) C<sub>3</sub>A<sub>4</sub>                      (2) C<sub>4</sub>A<sub>3</sub>                      (3) C<sub>2</sub>A<sub>3</sub>                      (4) C<sub>3</sub>A<sub>2</sub>

**Ans.** [1]

**Sol.** Solid state

C	:	A
75% O.V.	:	(HCP)
$6 \times \frac{75}{100}$	:	6
$\frac{3}{4}$	:	1
3	:	4
C <sub>3</sub> A <sub>4</sub>		

- Q.165** The non-essential amino acid among the following is :

- (1) alanine                      (2) lysine                      (3) valine                      (4) leucine

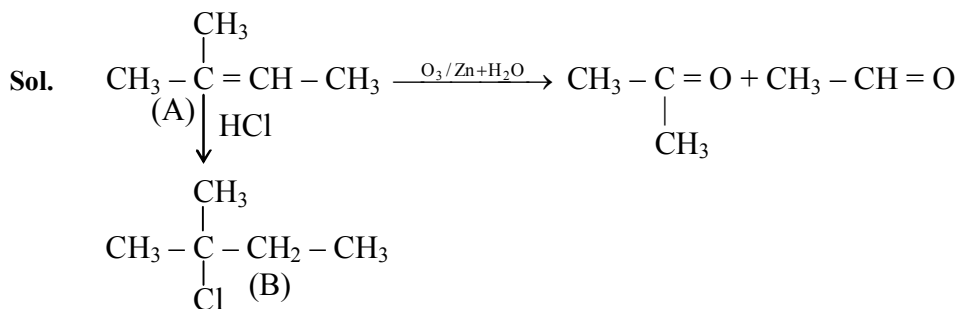
**Ans.** [1]

**Sol.** Non Essential amino acid → Alanine

- Q.166** An alkene “A” on reaction with O<sub>3</sub> and Zn + H<sub>2</sub>O gives propanone and ethanal in equimolar ratio. Addition of HCl to alkene “A” gives “B” as the major product. The structure of product “B” is :



**Ans.** [1]





**Q.167** Which of the following species is not stable?

- (1)  $[\text{Sn}(\text{OH})_6]^{2-}$                       (2)  $[\text{SiCl}_6]^{2-}$                       (3)  $[\text{SiF}_6]^{2-}$                       (4)  $[\text{GeCl}_6]^{2-}$

**Ans.** [2]

**Sol.**  $\text{SiCl}_6^{2-}$  does not exist due to small size of Si and steric linderance of 6 Cl atoms

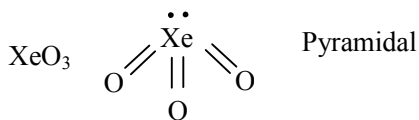
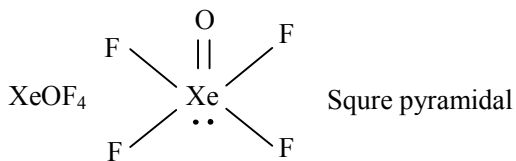
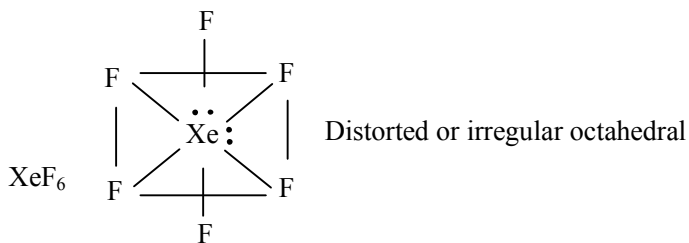
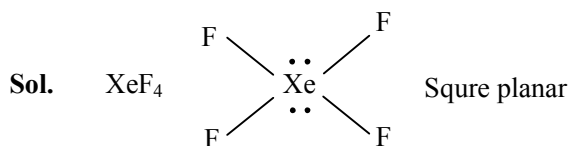
**Q.168** Match the Xenon compounds in Column-I with its structure in column-II and assign the correct code :

Column-I	Column-II
(a) $\text{XeF}_4$	(i) pyramidal
(b) $\text{XeF}_6$	(ii) square planar
(c) $\text{XeOF}_4$	(iii) distorted octahedral
(d) $\text{XeO}_3$	(iv) square pyramidal

**Code :**

- |     | (a)   | (b)   | (c)   | (d)  |
|-----|-------|-------|-------|------|
| (1) | (ii)  | (iii) | (i)   | (iv) |
| (2) | (iii) | (iv)  | (i)   | (ii) |
| (3) | (i)   | (ii)  | (iii) | (iv) |
| (4) | (ii)  | (iii) | (iv)  | (i)  |

**Ans.** [4]



**Q.169** Among the following, the one that is not a green house gas is :

- (1) ozone                      (2) sulphur dioxide                      (3) nitrous oxide                      (4) methane

**Ans.** [2]

**Sol.** Sulphurdioxide  $\text{SO}_2$

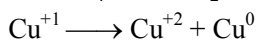
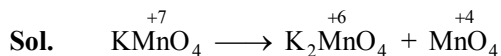
**Q.170** Which of the following reactions are disproportionation reaction?

- (a)  $2\text{Cu}^+ \rightarrow \text{Cu}^{2+} + \text{Cu}^0$   
 (b)  $3\text{MnO}_4^{2-} + 4\text{H}^+ \rightarrow 2\text{MnO}_4^- + \text{MnO}_2 + 2\text{H}_2\text{O}$   
 (c)  $2\text{KMnO}_4 \xrightarrow{\Delta} \text{K}_2\text{MnO}_4 + \text{MnO}_2 + \text{O}_2$   
 (d)  $2\text{MnO}_4^- + 3\text{Mn}^{2+} + 2\text{H}_2\text{O} \rightarrow 5\text{MnO}_2 + 4\text{H}^+$

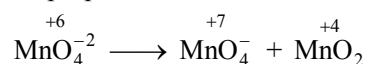
Select the correct option from the following :

- (1) (a), (c) and (d)                      (2) (a) and (d) only                      (3) (a) and (b) only                      (4) (a), (b) and (c)

**Ans.** [3]

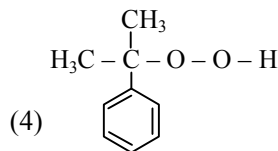
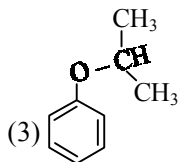
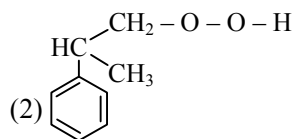
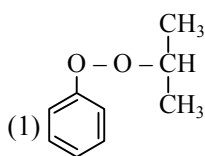
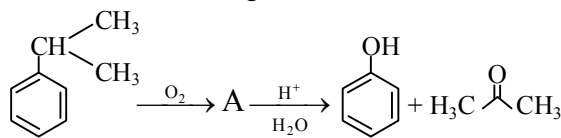


Disproportionate Rx<sup>n</sup>

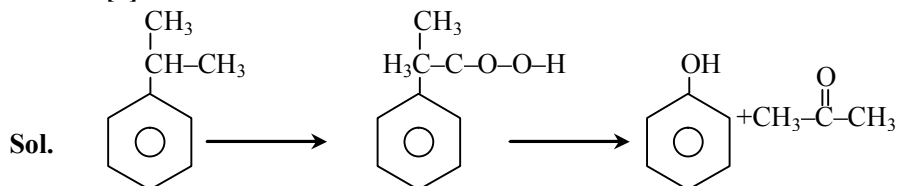


(a), (b) only

**Q.171** The structure of intermediate A in the following reaction, is :



**Ans.** [4]



**Q.172** The mixture that forms maximum boiling azeotrope is :

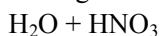
- (1) Acetone + Carbon disulphide  
 (2) Heptane + Octane  
 (3) Water + Nitric acid  
 (4) Ethanol + Water

**Ans.** [3]

**Sol.** Liquid solution

⇒ Max. bpt. Azeotrope

⇒ Negative deviation





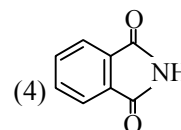
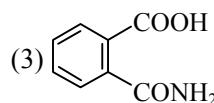
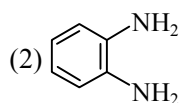
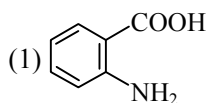
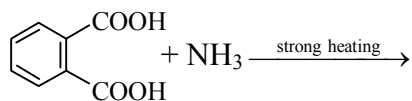
Q.177 Among the following, the narrow spectrum antibiotic is :

- (1) amoxicillin (2) chloramphenicol  
(3) penicillin G (4) ampicillin

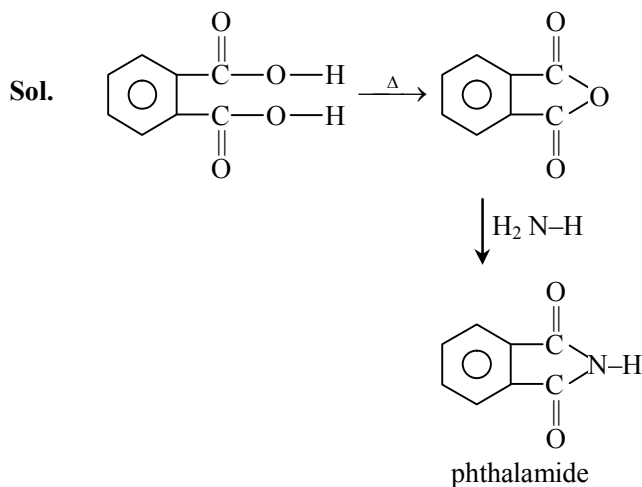
Ans. [3]

Sol. Penicillin – G  
Narrow Spectrum antibiotics

Q.178 The major product of the following reaction is :



Ans. [4]



Q.179 The method used to remove temporary hardness of water is :

- (1) Ion-exchange method (2) Synthetic resins method  
(3) Calgon's method (4) Clark's method

Ans. [4]

Sol. Clark's method is used to remove temporary hardness  
 $\text{Ca}(\text{HCO}_3)_2 + \text{Ca}^{+2} \text{ or } \text{Mg}^{+2} \longrightarrow \text{CaCO}_3 \text{ or } \text{MgCO}_3 + \text{H}_2\text{O}$

Q.180 Which one is malachite from the following?

- (1)  $\text{Fe}_3\text{O}_4$  (2)  $\text{CuCO}_3 \cdot \text{Cu}(\text{OH})_2$  (3)  $\text{CuFeS}_2$  (4)  $\text{Cu}(\text{OH})_2$

Ans. [2]

Sol. Malachite =  $\text{CuCO}_3 \cdot \text{Cu}(\text{OH})_2$