

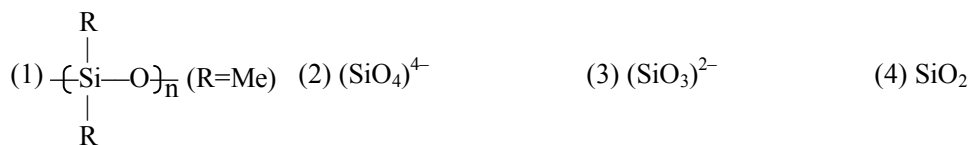
JEE Main Online Exam 2019

Questions & Solutions

12th April 2019 | Shift - I

CHEMISTRY

Q.1 The basic structural unit of feldspar, zeolites, mica, and asbestos is:



Ans. [2]

Sol. Feldspar, zeolites, mica and asbestos are silicates which contains SiO_4^{4-} basic unit

Q.2 Which of the following is a thermosetting polymer?

- (1) Bakelite (2) Nylon6 (3) PVC (4) Buna-N

Ans. [1]

Sol. Bakelite is a thermosetting polymer, thermosetting polymers are also called as 3D-polymer or cross link polymer.

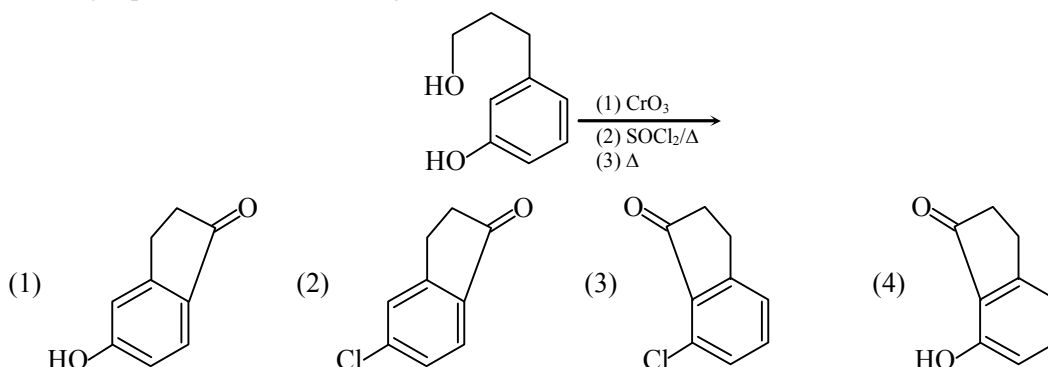
Q.3 The correct set of species responsible for the photochemical smog is:

- (1) NO, NO₂, O₃ and hydrocarbons (2) N₂, NO₂ and hydrocarbons
 (3) CO₂, NO₂, SO₂ and hydrocarbons (4) N₂, O₂, O₃ and hydrocarbons

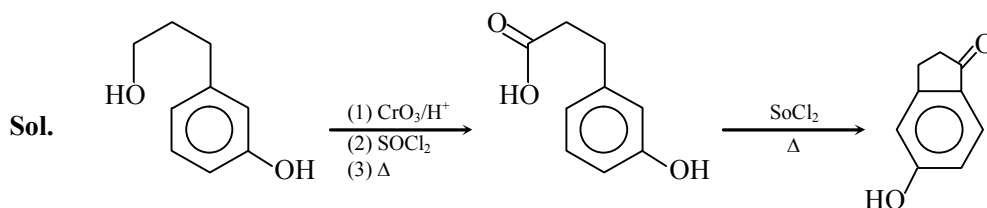
Ans. [1]

Sol. NO, NO₂, O₃, hydrocarbon are the factors which causes smog.

Q.4 The major product of the following reaction is :



Ans. [1]



Q.5 The mole fraction of a solvent in aqueous solution of a solute is 0.8. The molality (in mol kg⁻¹) of the aqueous solution is :

- (1) 13.88×10^{-1} (2) 13.88×10^{-3} (3) 13.88 (4) 13.88×10^{-2}

Ans. [3]

Sol. $x_A = 0.8, x_B = 0.2$

$$x_B = \frac{mM_A}{1000 + mM_A} \quad \text{or} \quad m = \frac{1000}{M_A} \times \frac{x_B}{1 - x_B}$$

$$m = \frac{1000}{16} \times \frac{0.2}{0.8}$$

$$m = 13.88$$

Q.6 Glucose and Galactose are having identical configuration in all the positions except position.

- (1) C-5 (2) C-3 (3) C-2 (4) C-4

Ans. [4]

Sol. Glucose and galactose differs in configuration on C₄.

Q.7 The correct sequence of thermal stability of the following carbonates is :

- (1) $\text{BaCO}_3 < \text{SrCO}_3 < \text{CaCO}_3 < \text{MgCO}_3$ (2) $\text{MgCO}_3 < \text{CaCO}_3 < \text{SrCO}_3 < \text{BaCO}_3$
 (3) $\text{BaCO}_3 < \text{CaCO}_3 < \text{SrCO}_3 < \text{MgCO}_3$ (4) $\text{MgCO}_3 < \text{SrCO}_3 < \text{CaCO}_3 < \text{BaCO}_3$

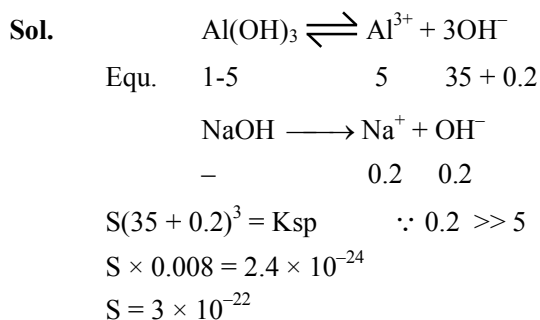
Ans. [2]

Sol. In 2nd group carbonates thermal stability increases down the group due to increase in lattice energy.

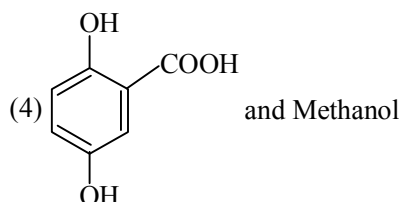
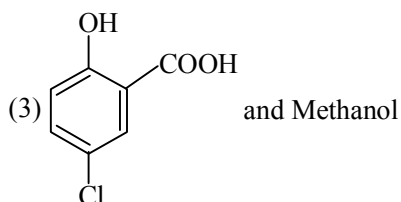
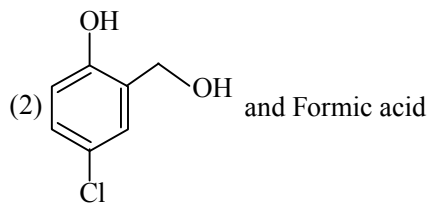
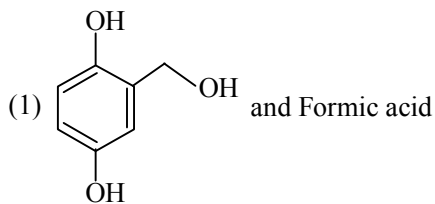
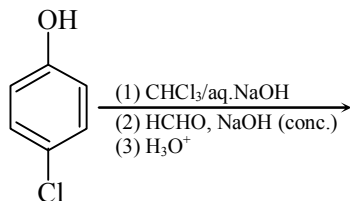
Q.8 What is the molar solubility of $\text{Al}(\text{OH})_3$ in 0.2 M NaOH solution ? Given that, solubility product of $\text{Al}(\text{OH})_3 = 2.4 \times 10^{-24}$:

- (1) 3×10^{-22} (2) 3×10^{-19} (3) 12×10^{-21} (4) 12×10^{-22}

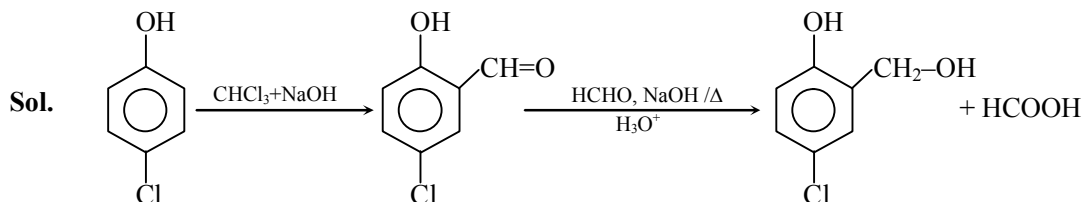
Ans. [1]



Q.9 The major products of the following reaction are:



Ans. [2]



Q.10 Which of the following statements is not true about RNA?

- (1) It controls the synthesis of protein (2) IL is present in the nucleus of the cell
 (3) It usually does not replicate (4) It has always double stranded α -helix structure

Ans. [4]

Sol. RNA is single stranded helix structure

Q.11 Peptization is a:

- (1) process of converting soluble particles to form colloidal solution
 (2) process of converting precipitate into colloidal solution
 (3) process of bringing colloidal molecule into solution
 (4) process of converting a colloidal solution into precipitate

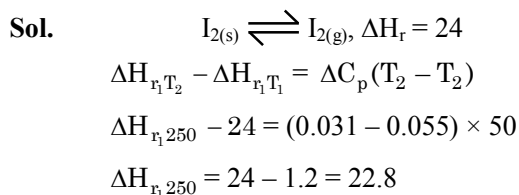
Ans. [2]

Sol. fact peptization is a process of converting precipitate into colloidal solution.

Q.12 Enthalpy of sublimation of iodine is 24 cal g^{-1} at 200°C . If specific heat of $\text{I}_2(\text{s})$ and $\text{I}_2(\text{vap})$ are 0.055 and $0.031 \text{ cal g}^{-1}\text{K}^{-1}$ respectively, then enthalpy of sublimation of iodine at 250°C in cal g^{-1} is :

- (1) 2.85 (2) 22.8 (3) 11.4 (4) 5.7

Ans. [2]



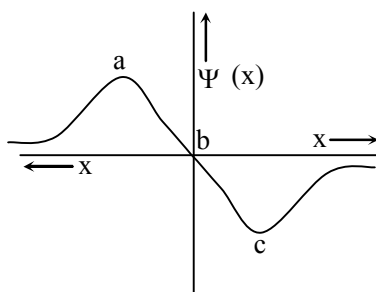
Q.13 The idea of froth floatation method came from a person X and this method is related to the process Y of ores. X and Y, respectively. Are :

- (1) washer woman and concentration (2) fisher woman and concentration
 (3) wisher man and reduction (4) fisher man and reduction

Ans. [1]

Sol. froth floatation is used for concentration for sulphide ore

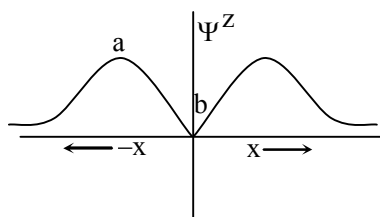
Q.14 The electrons are more likely to be found :



- (1) in the region a and c (2) only in the region c
 (3) in the region a and b (4) only in the region a

Ans. [1]

Sol.



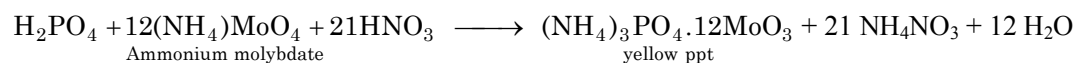
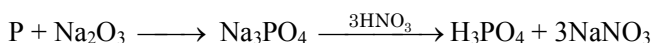
At a & c, probability of finding electron is maximum

Q.15 An organic compound 'A' is oxidized with Na_2O_2 followed by boiling with HNO_3 . The resultant solution is then treated with ammonium molybdate to yield a yellow precipitate. Based on above observation, the element present in the given compound is:

- (1) Fluorine (2) Phosphorus (3) Nitrogen (4) Sulphur

Ans. [2]

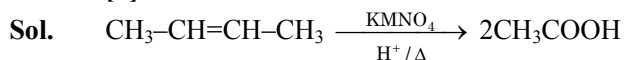
Sol. This is qualitative test for phosphorous



Q.16 But-2-ene on reaction with alkaline KMnO_4 at elevated temperature followed by acidification will give:

- (1) one molecule of CH_3CHO and one molecule of CH_3COOH
 (2) 2 molecules of CH_3COOH
 (3) $\text{CH}_3-\underset{\text{OH}}{\text{CH}}-\underset{\text{OH}}{\text{CH}}-\text{CH}_3$
 (4) 2 molecules of CH_3CHO

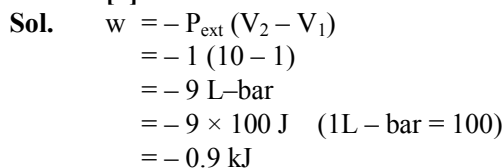
Ans. [2]



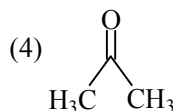
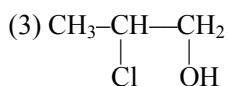
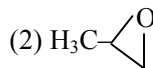
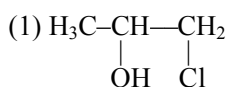
Q.17 An ideal gas is allowed to expand from 1 L to 10 L against a constant external pressure of 1 bar. The work done in kJ is:

- (1) +10.0 (2) -9.0 (3) -2.0 (4) -0.9

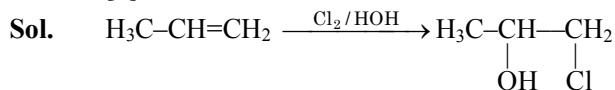
Ans. [4]



Q.18 The major product of the following addition reaction is -



Ans. [1]

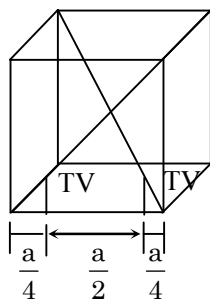


Q.19 An element has a face-centred cubic (fcc) structure with a cell edge of a . The distance between the centres of two nearest tetrahedral voids in the lattice is:

- (1) a (2) $\frac{3}{2}a$ (3) $\frac{a}{2}$ (4) $\sqrt{2}a$

Ans. [3]

Sol.



Minimum distance between two tetrahedral voids is $\frac{3a}{4}$

Q.20 In the following reaction; $x\text{A} \rightarrow y\text{B}$

$$\text{Log}_{10} \left[-\frac{d[\text{A}]}{dt} \right] = \log_{10} \left[\frac{d[\text{B}]}{dt} \right] + 0.3010$$

'A' and 'B' respectively can be :

- (1) n-Butane and Iso-butane (2) C_2H_4 and C_4H_8
 (3) C_2H_4 and C_6H_6 (4) N_2O_4 and NO_2

Ans. [2]

Sol. $x\text{A} \longrightarrow y\text{B}$

$$-\frac{1}{x} \frac{\Delta\text{A}}{dt} = +\frac{1}{y} \frac{\Delta\text{B}}{dt}$$

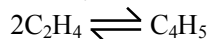
$$-\frac{\Delta\text{A}}{dt} = +\frac{x}{y} \frac{\Delta\text{B}}{dt} \quad \text{---(1)}$$

$$\therefore \log \left[-\frac{d\text{A}}{dt} \right] = \log \left[+\frac{d\text{B}}{dt} \right] + \log 2$$

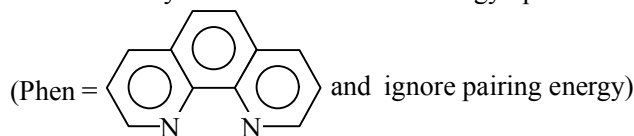
$$-\frac{d\text{A}}{dt} = +\frac{2}{1} \frac{d\text{B}}{dt} \quad \text{---(2)}$$

Compare (1) & (2)

$$x = 2, y = 1$$



Q.21 The complex ion that will lose its crystal field stabilization energy upon oxidation of its metal to +3 state is :

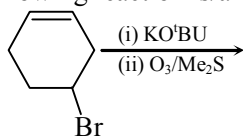


- (1) $[\text{Fe}(\text{phen})_3]^{2+}$ (2) $[\text{Zn}(\text{phen})_3]^{2+}$ (3) $[\text{Co}(\text{phen})_3]^{2+}$ (4) $[\text{Ni}(\text{phen})_3]^{2+}$

Ans. [1]

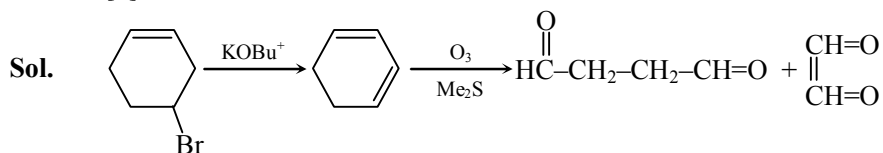
Sol. In the complexes of Fe^{2+} , Co^{2+} , Ni^{2+} upon oxidation, complexes of Fe^{3+} , Co^{3+} & Ni^{3+} stabilizes whereas in case of removing 3rd electron from Zn becomes difficult.

Q.22 The major product(s) obtained in the following reaction is/are :



- (1)  (2) 
 (3)  (4)  and $\text{OHC}-\text{CHO}$

Ans. [4]



Q.23 The group number, number of valence electrons, and valency of an element with atomic number 15, respectively, are:

- (1) 16, 6 and 3 (2) 15, 6 and 12 (3) 16, 5 and 2 (4) 15, 5 and 3

Ans. [4]

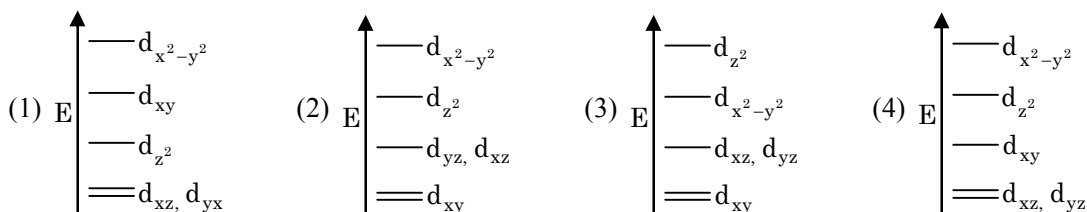
Sol. $z = 15 (3s^2 3p^2)$

hv. No. = 15

Valence e^- s = 5

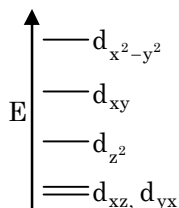
Valence = 3

Q.24 Complete removal of both the axial ligands (along the z-axis) from an octahedral complex leads to which of the following splitting patterns? (relative orbital energies not on scale).



Ans. [1]

Sol. In this case, this leads to square planar complex



Q.25 5 moles of AB_2 weigh 125×10^{-3} kg and 10 moles of A_2B_2 weigh 300×10^{-3} kg. The molar mass of A (M_A) and molar mass of B (M_B) in kg mol are:

- (1) $M_A = 10 \times 10^{-3}$ and $M_B = 5 \times 10^{-3}$ (2) $M_A = 25 \times 10^{-3}$ and $M_B = 50 \times 10^{-3}$
 (3) $M_A = 5 \times 10^{-3}$ and $M_B = 10 \times 10^{-3}$ (4) $M_A = 50 \times 10^{-3}$ and $M_B = 25 \times 10^{-3}$

Ans. [3]

Sol. $5 = \frac{125}{M_A + 2M_B}$

$$M_A + 2M_B = 25 \quad \dots(i)$$

$$10 = \frac{300}{2M_A + 2M_B}$$

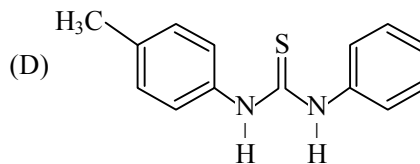
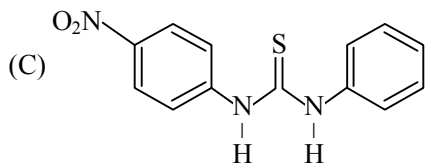
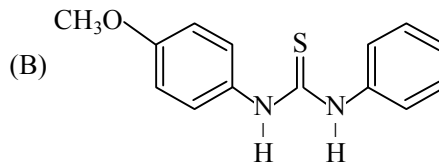
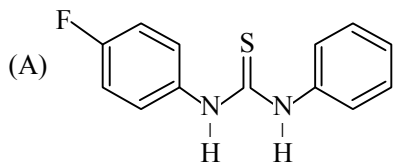
$$2M_A + 2M_B = 30 \quad \dots(2)$$

Solving (1) & (2) ;

$$M_A = 5 \text{ g/mol} = 5 \times 10^{-3} \text{ kg/mol}$$

$$M_B = 10 \text{ g/mol} = 10 \times 10^{-3} \text{ kg/mol}$$

Q.26 The increasing order of the pK_b of the following compound is:



(1) (C) < (A) < (D) < (B)

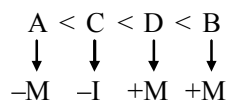
(2) (B) < (D) < (C) < (A)

(3) (B) < (D) < (A) < (C)

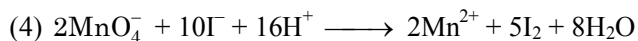
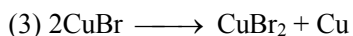
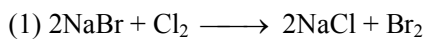
(4) (A) < (C) < (D) < (B)

Ans. [3]

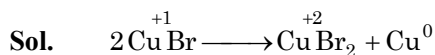
Sol.



Q.27 An example of a disproportionation reaction is :



Ans. [3]



Q.28 The correct statement among the following is :

(1) $(\text{SiH}_3)_3\text{N}$ is planar and more basic than $(\text{CH}_3)_3\text{N}$

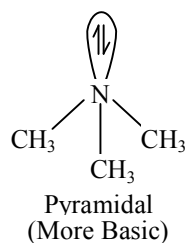
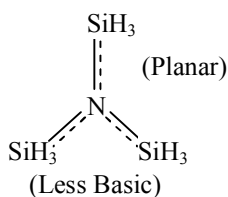
(2) $(\text{SiH}_3)_3\text{N}$ is pyramidal and more basic than $(\text{CH}_3)_3\text{N}$

(3) $(\text{SiH}_3)_3\text{N}$ is pyramidal and less basic than $(\text{CH}_3)_3\text{N}$

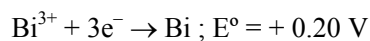
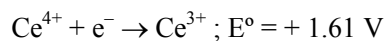
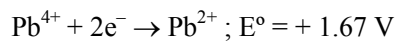
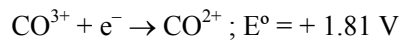
(4) $(\text{SiH}_3)_3\text{N}$ is planar and less basic than $(\text{CH}_3)_3\text{N}$

Ans. [4]

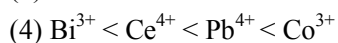
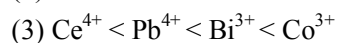
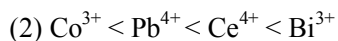
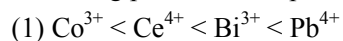
Sol.



Q.29 Given

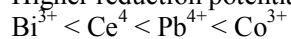


Oxidizing power of the species will increase in the order:



Ans. [4]

Sol. Higher reduction potential, higher oxidizing power.



Q.30 The metal that gives hydrogen gas upon treatment with both acid as well as base is:

(1) mercury

(2) zinc

(3) iron

(4) magnesium

Ans. [2]

