

Q4) What is the correct order of ionic radii

Mg^{+2} , Na^+ , F^- , Al^{+3} , O^{2-} , N^{3-}

- 1) $N^{3-} > O^{2-} > F^- > Na^+ > Mg^{+2} > Al^{+3}$
- 2) $Na^+ > Mg^{+2} > Al^{+3} > F^- > O^{2-} > N^{3-}$
- 3) $Al^{+3} > Mg^{+2} > Na^+ > F^- > O^{2-} > N^{3-}$
- 4) $F^- > O^{2-} > N^{3-} > Na^+ > Mg^{+2} > Al^{+3}$

Ans. (1)

Solution: There are isoelectronic species.

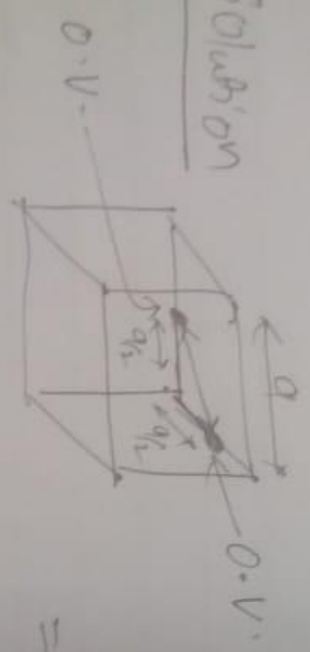
where ionic size $\propto \frac{1}{\text{atomic no.}}$

Q4) If the edge length of a FCC unit cell is a . Then what will be the distance (minimum) between two octahedral voids.

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

Ans. $\frac{a}{\sqrt{2}}$

Solution



Distance between two octahedral voids

$$= \sqrt{\left(\frac{a}{2}\right)^2 + \left(\frac{a}{2}\right)^2} = \frac{a}{\sqrt{2}}$$

Ques what is the use of Bupropionine?

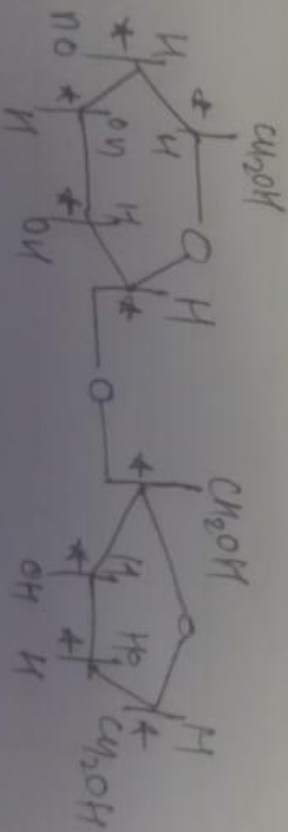
- 1) Analgesic
- 2) Antihistamine
- 3) Antiseptic
- 4) Antidepressant

Ans (2)

Ques How many chiral carbons are present in sucrose?

Ans. 9

Solution - Sucrose has α -D-glucosidic linkage between C₁ of α -D-glucose & C₂ of β -D-fructose



Ques: which of the following statement is correct regarding Probability density (except infinity)

- (1) For 1s can be zero
- (2) For 2p cannot be zero
- (3) For 3p can be zero
- (4) For 2s never be zero

Ans: (3)

Probability density = ψ^2 , if $\psi^2 = 0$ means

Solution

it means it will have nodes

- (1) no node in 1s so ψ^2 cannot be zero
- (3) 3p has two nodes
- (2) 1 angular node in 2p so, can have $\psi^2 = 0$
- (4) 2s has one node

Q. Find activation energy from this graph (lnk vs 1/T)



- (1) 2R (2) R (3) 3R (4) R/2

Ans: (1)

Solution

$$\ln k = \ln A - \frac{E_a}{RT}$$

$$\text{Slope} = -\frac{E_a}{10^3 R}$$

$$\ln k = \ln A - \frac{E_a \times 10^3}{10^3 R}$$

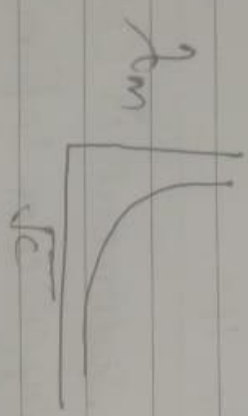
$$\frac{-E_a}{10^3 R} = \frac{-10}{5}$$

$$E_a = 2 \times 10^3 R \text{ J}$$

$$E_a = 2R \text{ kJ}$$

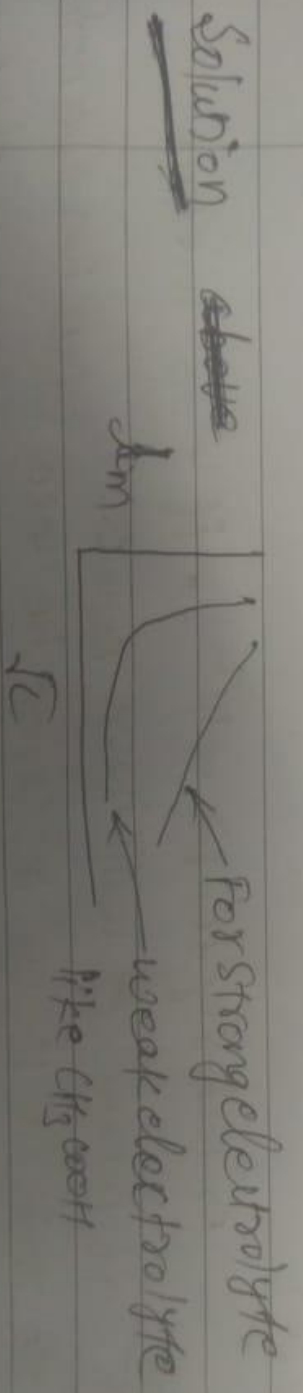
$$y = \ln A - \frac{E_a}{10^3 R} x$$

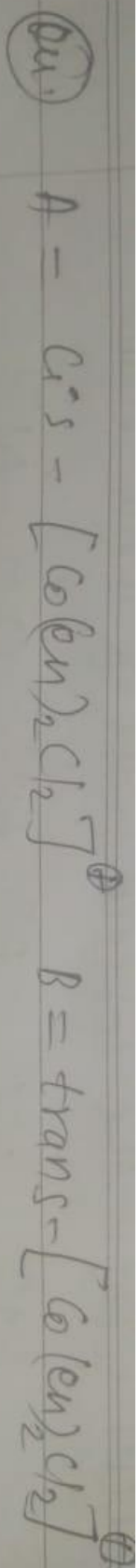
Ques ~~For~~ which electrolyte will have this graph.



- (1) HCl (2) KNO_3 (3) CH_3COOH (4) NaCl

Ans- (3)



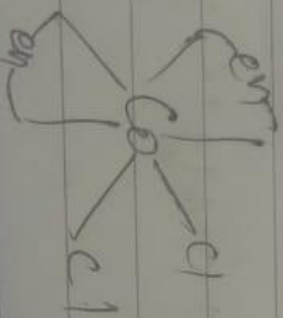


to which of the above complexes will be optically active?

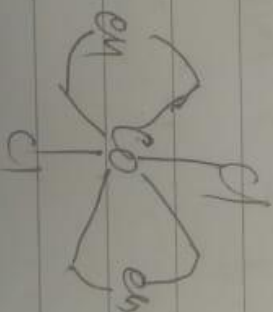
- (1) only A (2) only B (3) both (4) none

Ans - (1)

Solution



opt. active

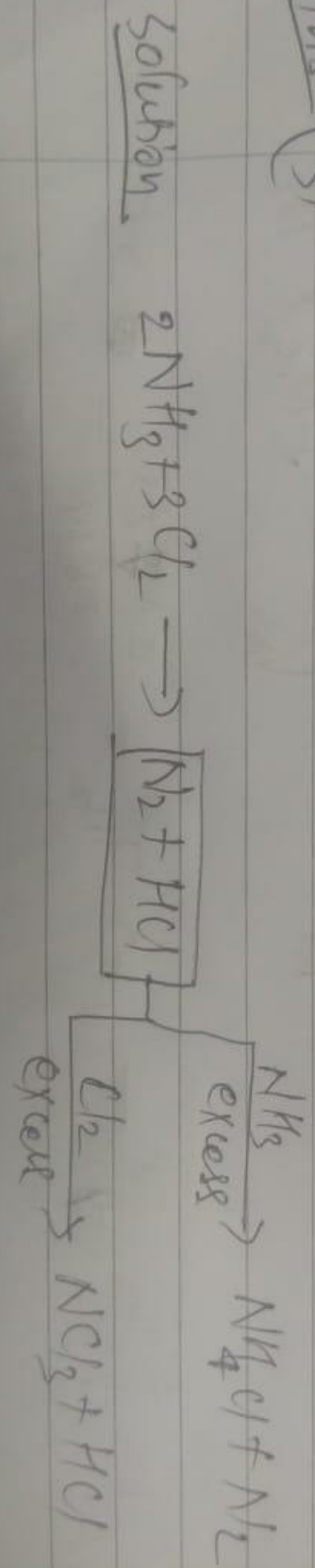


opt. inactive

Q. The products formed by N_2 with excess of Cl_2 are:-

- (1) $NH_4Cl + HCl$ (2) $NCl_3 + N_2$ (3) $NCl_2 + HCl$ (4) $NH_4Cl + N_2$

Ans. (3)



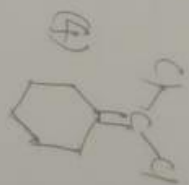
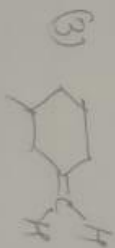
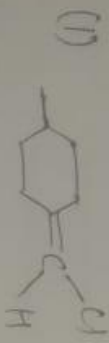
Ques Boron & Silicon are refined by

- (1) Zone refining (2) Mond's process
(3) Vapour phase refining (4) electrolytic refining

Ans. (1)

Solution To obtain ultrapure, B, Si, Ge (used in semiconductors) & these are refined by 'Zone refining method'.

Q. which of the following compound can show Geometrical isomerism



Ans. ~~(1)~~ (2)

Solution Two show G.I., compound must have two different groups at each ends of restricted rotation



Q.4. If $A_0 > P$ for $[Ru(H_2O)_6]^{+2}$

what is the magnetic moment of this complex.

- P 0 2) $\sqrt{3}$ 3) $\sqrt{8}$ 4) $\sqrt{15}$

Ans. (2)

Solution



if $A_0 > P \Rightarrow t_{2g}^{2,2,1}$ eg d_{xy} $\Rightarrow n=0$

~~$\mu = \sqrt{n(n+2)}$~~ $= \sqrt{1(1+2)} = \sqrt{3}$

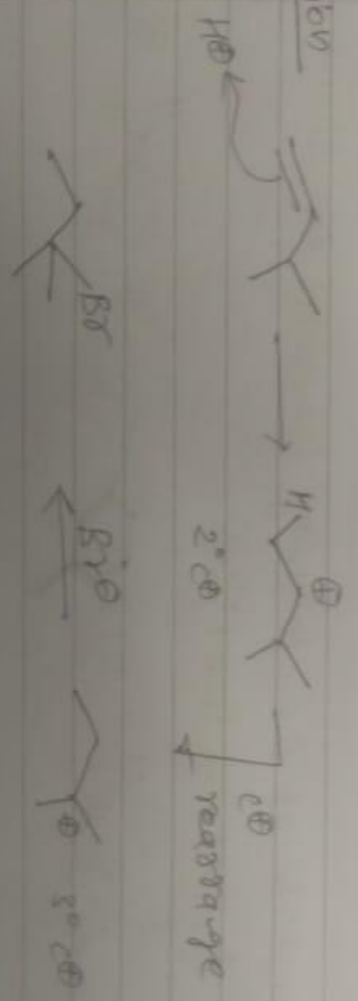
(a) Find major product of the following reaction



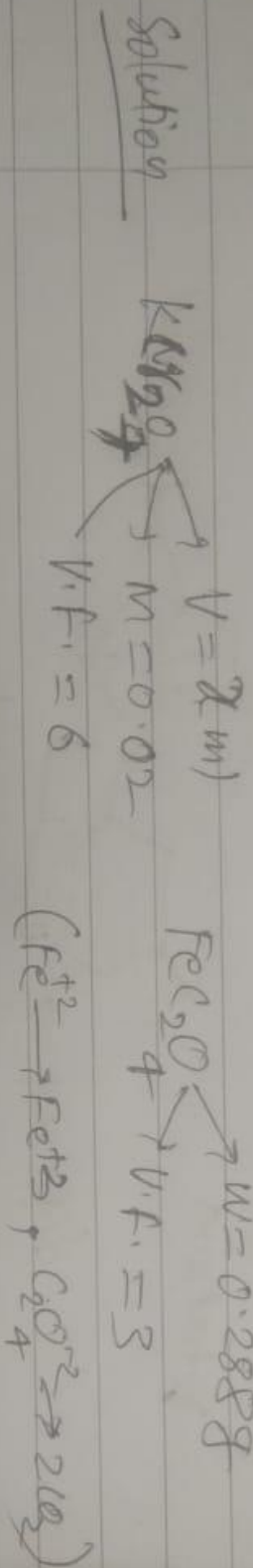
- (1) CC(C)C(Br)C (2) CC(C)C(Br)C (3) CC(C)C(Br)C (4) CC(C)C(Br)C

Ans. (2)

Solution



Q11) How much volume (in ml) of 0.02 M $K_2Cr_2O_7$ is required to completely oxidise 0.288 g ferrous oxalate.



$$2 \times 10^{-3} \times 0.02 \times 6 = \frac{0.288}{144} \times 3$$

$$x = \frac{2 \times 288 \times 10^{-3} \times 3}{144 \times 10^3 \times 2 \times 10^{-2} \times 6} = 10^2 = \boxed{100 \text{ ml}}$$

Ans.

Q1: Pure form of H_2O_2 is

(1) Linear, Blue coloured

(2) non-planar, blue

(3) Planar, colourless

(3) Linear, colourless.

Ans. (2)

Solution



It has open-book like
Structure
(non-planar)

Q18) Which of the following has maximum bond angle.

- (1) H_2O (2) H_2S (3) NH_3 (4) CH_4

Ans. ~~H_2O~~ (4)

Solution H_2O - ~~104.5°~~ 104.5° (sp³ with two l.p. orbitals)

NH_3 - 107° (sp³ with 1 l.p. at N)

CH_4 - 109.5° (sp³)

H_2S $\approx 92^\circ$

Q: Calculate ΔG for (in kJ)



Given $\Delta U = -220 \text{ kJ}$, $\Delta S = -30 \text{ J}$

Solution

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

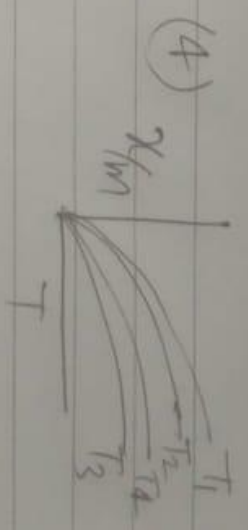
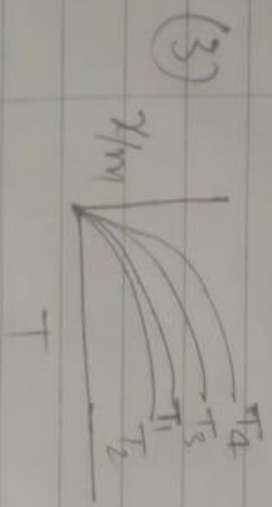
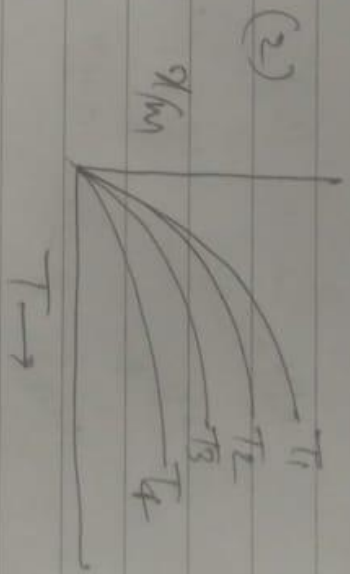
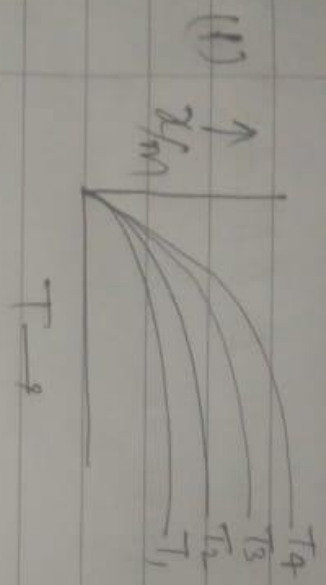
$$\Delta n_g = 1 - 2 = -1$$

$$= (\Delta U + \Delta n_g RT) - T\Delta S$$

$$= (-220) + (-1) \times 8.314 \times 10^3 \times 298 - 298 \times -30 \times 10^3$$

$$\boxed{\Delta G = -13.5 \text{ kJ}} \text{ Ans.}$$

Ques which is the correct graphical representation of x_m variation with Temperature ($T_4 > T_3 > T_2 > T_1$)



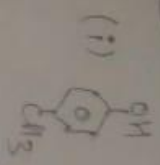
Ans: (2)

Solution

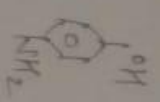
As adsorption is exothermic process

Hence, x_m ↓ as T ↑

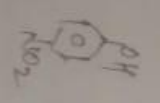
Q11) Which is the correct order of boiling points



(ii)



(iii)



(iv)



~~Ans~~ (1) (i) > (ii) > (iii) > (iv)

(2) (iv) > (iii) > (ii) > (i)

(3) (i) > (ii) > (iv) > (iii)

(4) (i) > (iii) > (ii) > (iv)

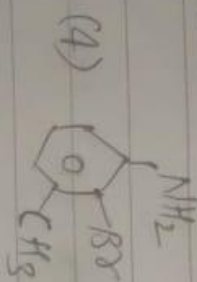
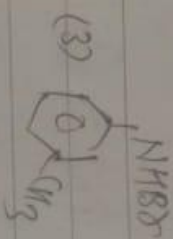
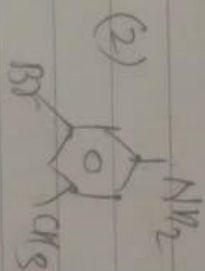
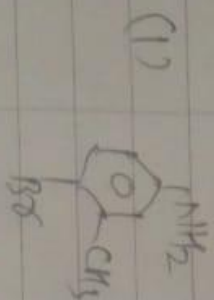
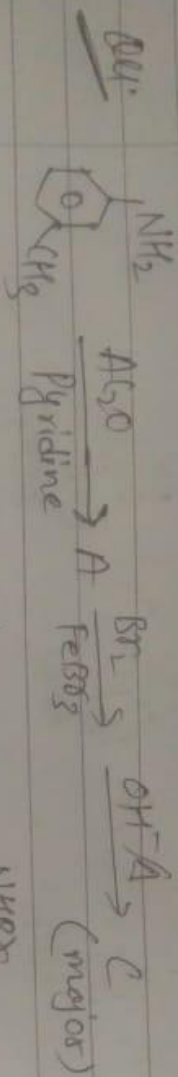
Ans (3)

Q12 Solution

In O=C(N)O, both -OH & -NH₂

can form H-bond

And out of (i) (iii) & (iv) ⇒ (iii) is more polar



Ans: (1)

