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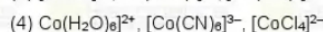
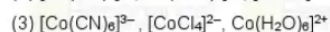
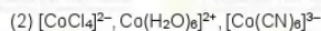
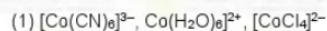
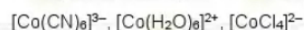
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1. Arrange the following complex in increasing order of intensity of colour.



Sol. (1)

	Complex	Colour
1.	$[\text{Co}(\text{CN})_6]^{3-}$	Yellow
2.	$[\text{Co}(\text{H}_2\text{O})_6]^{2+}$	Pink
3.	$[\text{CoCl}_4]^{2-}$	Blue

2. Which of the following does not disproportionate



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Sol. In  $\text{BrO}_4^-$ , Br is in maximum oxidation state. So it can only reduce

3. A metal M on reaction with excess oxygen give  $\text{MO}_2$  type oxide (as main product) then possible metal is.



Ans. (3)

**Sol.**  $K + O_2 \text{ (excess)} \longrightarrow KO_2$   
Potassium on reaction with excess oxygen give superoxide

4. Identify the correct increasing order of 1st ionisation energy of following  
Al, Mg, Si, S, P

(1) Mg, Al, Si, P, S      (2) Al, Mg, Si, S, P      (3) Mg, Al, Si, S, P      (4) Al, Mg, Si, P, S

**Ans. (2)**

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Al  $3s^2 3p^1$

Si  $3s^2 3p^2$

P  $3s^2 3p^3$

S  $3s^2 3p^4$

So correct order :- Al < Mg < Si < S < P

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5. Four moles of a diatomic gas is heated from 0°C to 50°C, find the heat supplied to the gas if work done by it is zero.

(1) 780 R      (2) 500 R      (3) 100 R      (4) 650 R

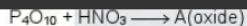
**Ans. (2)**

**Sol.**  $w = 0$

$$\Delta E = q_v = nC_v\Delta T$$

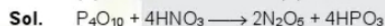
$$4 \times \frac{5R}{2} \times 50 = 500 R$$

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Nature of oxide A is

(1) acidic      (2) Basic      (3) Neutral      (4) Amphoteric



'A'

Nature of oxide 'A' is "acidic".

7. An equimolar mixture of benzene ( $P^{\circ}_{\text{Benzene}} = 70$  torr and methyl benzene ( $P^{\circ}_{\text{Methyl Benzene}} = 20$  torr) is prepared, then find mole fraction of benzene in vapour phase.

**Ans.** 0.7

**Sol.**  $P_{\text{Total}} = P^{\circ}_{\text{Benzene}} X_{\text{Benzene}} + P^{\circ}_{\text{Toluene}} X_{\text{Toluene}}$

$$= (70) \frac{1}{2} + (20) \frac{1}{2}$$

$$= 35 + 10$$

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$$P_{\text{Total}} = P^{\circ}_{\text{Benzene}} X_{\text{Benzene}} + P^{\circ}_{\text{Toluene}} X_{\text{Toluene}}$$

$$\frac{1}{45} = \frac{Y_{\text{Benzene}}}{70} + \frac{1 - Y_{\text{Benzene}}}{20}$$

$$\frac{1}{45} = \frac{2Y_{\text{Benzene}} + 7(1 - Y_{\text{Benzene}})}{140}$$

$$\frac{1}{45} = \frac{2Y_{\text{Benzene}} + 7 - 7Y_{\text{Benzene}}}{140}$$

$$\frac{1}{45} = \frac{7 - 5Y_{\text{Benzene}}}{140}$$

$$\frac{1}{9} = \frac{7 - 5Y_{\text{Benzene}}}{28}$$

$$28 = 63 - 45 Y_{\text{Benzene}}$$

$$Y_{\text{Benzene}} = \frac{35}{45} = \frac{7}{9}$$

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Total lone pair on central atom = 3.

9. Which of the following have positive electrode potential for reaction  $M^{2+}(aq) + 2e^- \rightarrow M$ .

(1) Co (2) Ni (3) Cu (4) Zn

Ans. (3)

Sol.  $Cu^{2+}(aq) + 2e^- \rightarrow Cu$   $E_{Cu^{2+}/Cu}^0 = 0.34V$

10. Which of the following is most easily economically refined by Fractional distillation.

(1) Zn (2) Ni (3) Cu (4) Fe

Ans. (1)

Using this process, crude zinc containing Cd, Fe and Pb as impurities can be refined.

11. Among the following pairs which is incorrect regarding similarity in properties.

(1)  $Be(OH)_2, Al(OH)_3$  (2)  $NaOH, Ca(OH)_2$  (3)  $B(OH)_3, H_3PO_4$  (4)  $B(OH)_3, Mg(OH)_2$

Ans. (4)

Sol.  $B(OH)_3$  is  $H_3BO_3$  is acidic in nature.

$Mg(OH)_2$  is basic in nature.

12. **Statement-1** : Dihedral angle of  $H_2O_2$  in gas is around  $90^\circ$ .

**Statement-2** : Dihedral angle of  $H_2O_2$  in solid is around  $111.5^\circ$ .

are the statements ture of false.

(1) True, True (2) True, False (3) False, True (4) False, False

Ans. (4)



(a) Gas phase

(b) Solid phase

(a)  $H_2O_2$  structure in gas phase, dihedral angle is  $111.5^\circ$ . (b)  $H_2O_2$  structure in solid phase at 110 K, dihedral angle is  $90.2^\circ$ .

The dihedral angle of  $H_2O_2$  in gaseous phase is approximate  $111.5^\circ$ . While dihydral angle in solid  $H_2O_2$  is affected by hydrogen bonding and it is  $90.2^\circ$  in solid state.

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13. 4.5 gram mass of a substance [molar mass = 90 g/mol] is dissolved in 250 ml solution, then molarity of solution is -

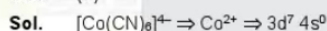
Ans. 0.2

Sol. Molarity (M) =  $\frac{W_{\text{solute}} \times 1000}{\text{GMM}_{\text{solute}} \times V_{\text{sol}}}$

$$M = \frac{4.5 \times 1000}{90 \times 250} = \frac{4.5 \times 4}{90} = 0.2 \text{ M.}$$

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Ans. (2)



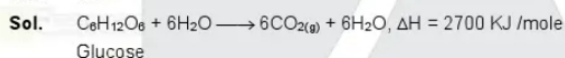
So number of unpaired electrons = 1.

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

$$\mu = 1.73 \text{ BM} \approx 2 \text{ BM.}$$

15. 10000 KJ energy is needed per day, if heat of combustion of glucose is 2700 KJ/Mole. Then how many gram of glucose is needed per day for this : [Report your answer to nearest integer].

Ans. 667

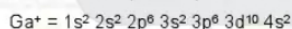
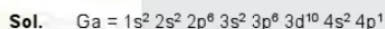


No. of mole of glucose require for production of 10,000 KJ heat is =  $\frac{10,000}{2700}$  mole.

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16. The value of  $\ell$  (azimuthal quantum number) for valence shell electron of  $\text{Ga}^+$  ion is \_\_\_\_\_.

Ans. 0



Azimuthal Quantum number ( $\ell$ ) for valence shell electron is 0.

17. What is the difference in energy between 2<sup>nd</sup> and 3<sup>rd</sup> orbit of  $\text{He}^+$  ion (in eV) is -

[Report your answer to nearest integer]

Ans. 8

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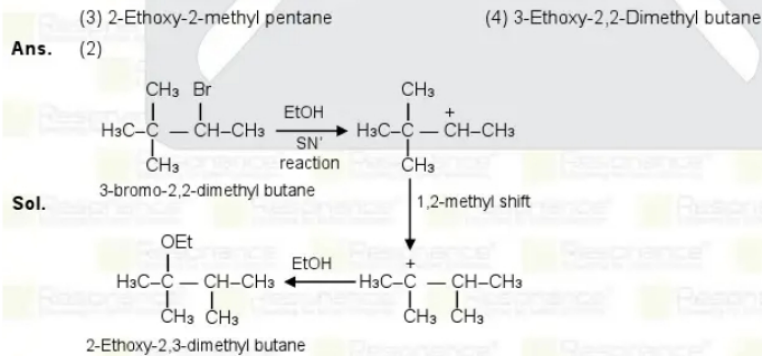
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$$(E_{\text{He}^+})_{n=3} = -13.6 \times \frac{(2)^2}{(3)^2} = -13.6 \times \frac{4}{9}$$

$$(E_{\text{He}^+})_{n=3} - (E_{\text{He}^+})_{n=2} = 13.6 \left[ 1 - \frac{4}{9} \right]$$

$$= 13.6 \left[ \frac{5}{9} \right] = 7.55 \text{ eV}$$





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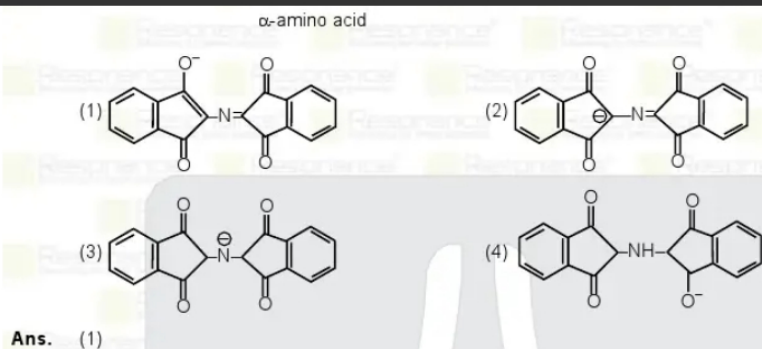
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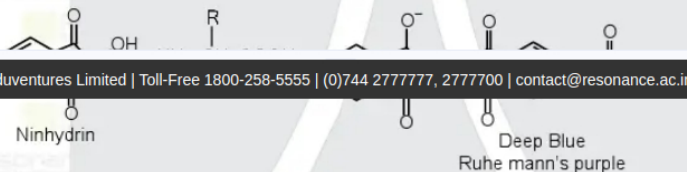
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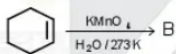
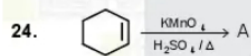
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**Ans.** (1)

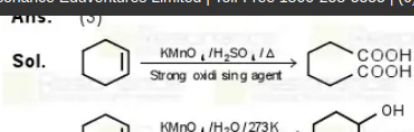


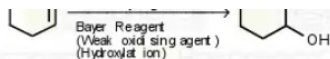
Ninhydrin is useful for identification of  $\alpha$ -amino acid which react with ninhydrin and give deep blue colour.



A, B are respectively.

- (1) both diol
- (2) both dicarboxylic acid
- (3) A is dicarboxylic acid and B is diol





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25. Orlon is a :

- (1) Polyamide      (2) Polyester      (3) Polyacrylonitrile      (4) Polycarbonate

Ans. (3)

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26. Which of the following is better for green chemistry in day to day life (Domestic purpose)

- (1)  $\text{Cl}_2 = \text{CCl}_2$  as dry cleaning agent liquid      (2) Liquid  $\text{CO}_2$  for cloth cleaning  
 (2)  $\text{Cl}_2$  gas as a bleaching agent of paper      (4)  $\text{CCl}_4$  as dry cleaning agent

Ans. (2)

Sol.  $\text{CCl}_2 = \text{CCl}_2$  was earlier used as solvent for dry cleaning agent but it is carcinogen. So liquid  $\text{CO}_2$  is used. Replacement of halogenated solvent by liquid  $\text{CO}_2$  will result in less harm to ground water.

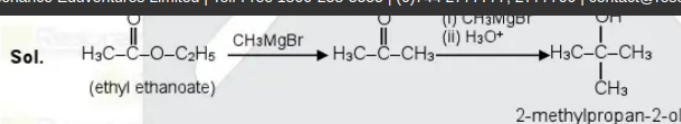
27. Which of the following incorrect :

- (1) Amylose is branched      (2) Starch is made up of  $\alpha$ -glucose  
 (3) Glycogen is also called animal starch      (4)  $\beta$ -glycosidic linkage for cellulose

Ans. (1)

28. How many mole of  $\text{CH}_3\text{MgBr}$  are required to convert ethylethanoate to 2-methylpropan-2-ol :

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