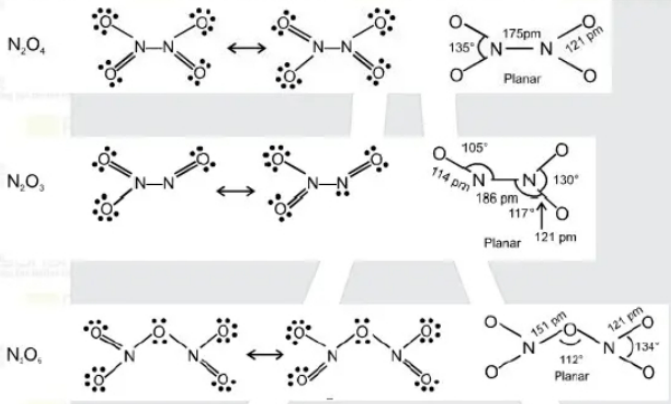


2. Isotopes of hydrogen have different **[IO-HYD] E**

(1) Proton (2) Neutron (3) Electron (4) Proton &Neutron

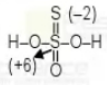
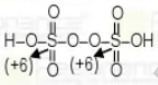
Ans. (2)

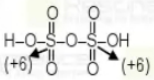
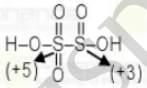
Sol. Isotopes have same proton & electron but different neutron.

3. How many of following compounds have sulphur atom in two different oxidation state.

(a) $H_2S_2O_3$ (b) $H_2S_2O_8$ (c) $H_2S_2O_7$ (d) $H_2S_2O_5$ **[IO-PBC-XVI] M**

Ans. (2)

Sol. $H_2S_2O_3 \Rightarrow$  $H_2S_2O_8 \Rightarrow$ 

$H_2S_2O_7 \Rightarrow$  $H_2S_2O_5 \Rightarrow$ 

4. Identify the correct statement regarding SF_4 **[IO-CBO] M**

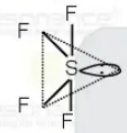
(1) It have one lone pair at equatorial position with two lone pair- bond pair repulsion at 90°

(2) It have one lone pair at axial position with two lone pair-bond pair repulsion at 90°

(3) It have one lone pair at equatorial position with three lone pair –bond pair repulsion at 90°

(4) It have one lone pair at axial position with three lone pair – bond pair repulsion at 90°

Ans. (1)

Sol. 

Lone pair at equatorial position with 2 lone pair – bond pair repulsion at 90°

5. Which of the following oxide is basic in nature. **[IO-PTB] E**

(1) SiO_2 (2) CaO (3) Al_2O_3 (4) SO_2

Ans. (2)

Sol. Acidic $\Rightarrow SiO_2, SO_2$

Amphoteric $\Rightarrow Al_2O_3$

Basic $\Rightarrow$ CaO

6. Which set of complex ions represent paramagnetic character. **[IO-COR] M**

(i) $[Fe(CN)_6]^{3-}$ (ii) $[Fe(CN)_6]^{4-}$ (iii) $[Ti(CN)_6]^{3-}$ (iv) $[Co(CN)_6]^{3-}$ (v) $[Ni(CN)_6]^{4-}$

(1) (i),(ii),(iii) (2) (i),(iii),(v) (3) (i),(ii),(iii),(iv) (4) (iii),(iv)

Ans. (2)

Sol.

Complex	Electronic configuration	Unpaired electron
(i) $[Fe(CN)_6]^{3-}$	$Fe^{3+} \Rightarrow 3d^5 \Rightarrow t_{2g}^{2,2,1}, e^{0,0}$	1
(ii) $[Fe(CN)_6]^{4-}$	$Fe^{2+} \Rightarrow 3d^6 \Rightarrow t_{2g}^{2,2,2}, e^{0,0}$	0
(iii) $[Ti(CN)_6]^{3-}$	$Ti^{3+} \Rightarrow 3d^1 \Rightarrow t_{2g}^{1,0,0}, e^{0,0}$	1
(iv) $[Co(CN)_6]^{3-}$	$Co^{3+} \Rightarrow 3d^6 \Rightarrow t_{2g}^{2,2,2}, e^{0,0}$	0
(v) $[Ni(CN)_6]^{4-}$	$Ni^{2+} \Rightarrow 3d^8 \Rightarrow t_{2g}^{2,2,2}, e^{1,1}$	2

7. In extraction of copper following reaction take place **[IO-MTL] E**

$FeO + SiO_2 \longrightarrow FeSiO_3$

In which FeO and $FeSiO_3$ act as

(1) Flux, Slag (2) Slag, Flux (3) Gangue, Slag (4) Slag, Flux

Ans. (3)

Sol. $\underset{\text{Gangue}}{FeO} + \underset{\text{Flux}}{SiO_2} \longrightarrow \underset{\text{Slag}}{FeSiO_3}$

8. How many of two following show Cis-Trans isomers **[IO-COR] E**

(i) $CoCl_3.4NH_3$ (ii) $CoCl_3.5NH_3$ (iii) $CoCl_3.6NH_3$ (iv) $CoCl_3.3NH_3$

Ans. (1)

Sol. (i) $CoCl_3.4NH_3 \Rightarrow [Co(NH_3)_4Cl_2]Cl$ (ii) $CoCl_3.5NH_3 \Rightarrow [Co(NH_3)_5Cl]Cl_2$

(iii) $CoCl_3.6NH_3 \Rightarrow [Co(NH_3)_6]Cl_3$ (iv) $CoCl_3.3NH_3 \Rightarrow [Co(NH_3)_3Cl_3]$

9. pH of a buffer solution of **[PC-IEQ] E**

$CH_3CH_2COOH(aq.)$ & $CH_3CH_2COONa(aq.)$ is 4.

then ratio of $\frac{[CH_3CH_2COO^-]}{[CH_3CH_2COOH]}$ is –

Given $k_a = 10^{-5}$

(1) 0.1 (2) 10 (3) 0.2 (4) 20

Ans. (1)

Sol. $pH = pk_a + \log \frac{[CH_3CH_2COO^-]}{[CH_3CH_2COOH]}$

$4 = 5 + \log \frac{[CH_3CH_2COO^-]}{[CH_3CH_2COOH]}$

$\frac{[CH_3CH_2COO^-]}{[CH_3CH_2COOH]} = \frac{1}{10} = 0.1$

10. A compound contain 8.64 mass % of hydrogen, 74 mass% of carbon and 17.36 mass% of nitrogen and have molecular mass 162. then possible compound is **[PC-MOL] E**

(1) C_5H_7N (2) $C_{10}H_{14}N_2$ (3) $C_4H_6N_2$ (4) C_2H_3N

Ans. (2)

Sol. GMM of $C_{10}H_{14}N_2$ $\Rightarrow 120 + 14 + 28$

$\Rightarrow 162$

11. Using following statements identify correct set of statements **[PC-ATS] E**

(i) n can have value 1,2,3,4,... ...

(ii) Number of orbital for given value of ℓ is $(2\ell + 1)$

(iii) Value of spin quantum numbers is always $\pm\frac{1}{2}$

(iv) For $\ell = 5$ total number of orbital is 9

(1) (i),(ii),(iii) (2) (i),(ii),(iv) (3) (i),(ii),(iii),(iv) (4) (i),(iii),(iv)

Ans. (1)

Sol. For $\ell = 5$ total number of orbital is $(2\ell + 1) = 11$

12. The value of $E^0_{Sn^{4+}/Sn^{2+}}$ is ___ $\times 10^{-2}$V **[PC-ECH] M**

given $\begin{pmatrix} E^0_{Sn^{2+}|Sn} = -0.14V \\ E^0_{Sn^{4+}|Sn} = +0.15V \end{pmatrix}$

Ans. (44)

Sol. (i) $Sn^{2+} + 2e^- \longrightarrow Sn$ $E^0_1 = -0.14V$

$\Delta G^0_1 = -2F(-0.14)$

(ii) $Sn^{4+} + 4e^- \longrightarrow Sn$ $E^0_2 = +0.15V$

$\Delta G^0_2 = -4F(+0.15)$

Target $Sn^{4+} + 2e^- \longrightarrow Sn^{2+}$ $E^0_3 = ?$

$\Delta G^0_3 = -2F[E^0_3]$

Target Eq. = Eq. ii – Eq. i

$-2F(E^0_3) = -4F(0.15) - (-2F(-0.14))$

$E^0_3 = \frac{4\times0.15 + 2\times0.14}{2} = 2 \times 0.15 + 0.14$

$= 0.30 + 0.14$

$= 0.44\ V = 44 \times 10^{-2}V$

13. Match the column **[PC-SC] E**

Column – I	**Column – II**
(I) Positive Colloid	(a) $Fe_2O_3.xH_2O$
(II) Macro molecular colloid	(b) CdS
(III) Negative Colloid	(c) Starch
(IV) Gel	(d) Cheese

Correct match is

	I	II	III	IV
(1)	(a)	(c)	(b)	(d)
(2)	(a)	(b)	(c)	(d)
(3)	(b)	(c)	(a)	(d)
(4)	(a)	(c)	(d)	(b)

Ans. (1)

Sol. Position colloide ⇒ $Fe_2O_3.xH_2O$

Macro molecular colloid ⇒ Starch

Negative Colloid ⇒ CdS

Gel ⇒ Cheese

14. 2.5 gram of a protein dissolve in 500 gram of water at 300K. The observed value of osmotic pressure is 0.410 atm. Then number of glycein unit present in protein is : **[PC-SCP] E**

Ans. (4)

Sol. $\pi = CRT$

$$0.410 = \left[\frac{2.5 \times 1000}{M.wt. \times 500}\right] \times 0.082 \times 300$$

$$0.410 = \frac{2.5 \times 2 \times 0.082 \times 300}{M.wt.}$$

$$0.410 = \frac{123}{M.wt.}$$

M.wt. = 300 g/mol.

Molar mass of glycein = 75 g/mol.

Number of glycein unit per molecule of protein = $\frac{300}{75} = 4$

15. 0.450 gram of an organic compound containing Carbon, Hydrogen & Oxygen on complete combustion give 0.735 gram CO_2 and 0.45 gram of water, then mass % of oxygen in compound is (Report your answer to nearest integer) **[PC-MOL] M**

Ans. (44)

Sol. $C_xH_yO_z + O_2(g) \longrightarrow CO_2(g) + H_2O(g)$

0.450 g excess 0.735 g 0.45 g

$$W_{Carbon} = \left(\frac{0.732}{44}\right) 12 = 0.2 \text{ gram}$$

$$W_{Hydrogen} = \left(\frac{0.45}{18}\right) 2 = 0.05 \text{ gram}$$

Total weight of carbon &hydrogen = 0.25 g

Mass of oxygen = 0.450 – 0.25 = 0.20 g

$$\text{Mass \% of oxygen} = \left(\frac{0.20}{0.45} \times 100\right) = 44.44\% \approx 44$$

Resonance | JEE MAIN-2022 | DATE : 28-06-2022 (SHIFT-2) | PAPER-1 | MEMORY BASED | CHEMISTRY

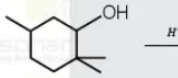
16. 0.2 gram of an ideal gas at 300K temperature and at 1 bar pressure, occupying 0.082 L volume then molar mass of gas is (in gram) : **[PC-GST] E**

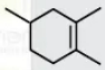
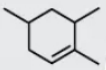
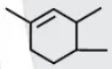
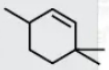
Ans. (60)

Sol. $PV = nRT$

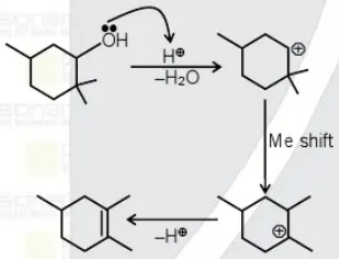
$$1 \times 0.082 = \frac{0.2}{M.wt.} \times 0.082 \times 300$$

M.wt. = 60 gram/mole

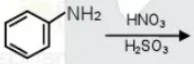
17.  Major product is **OC**

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

Ans. (1)

Sol. 

18. Find correct option regarding the reaction

 **OC**

(a) HNO_3 acts as acid

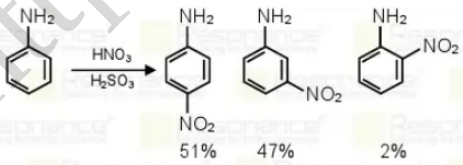
(b) H_2SO_4 acts as acid

(c) Major product is formed at ortho, meta.

(d) Major product is formed at para, meta position.

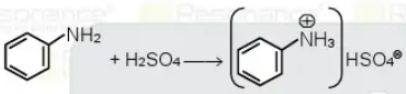
(1) a, b, c, d (2) b, d (3) a, c, d (4) c, d

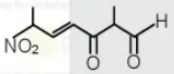
Ans. (2)

Sol. 

51% 47% 2%

H_2SO_4 is strong acid, hence

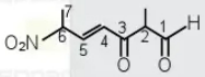


19.  ; Nomenclature the structure? **OC**

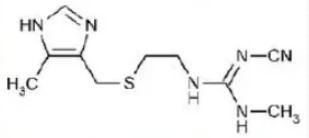
(1) 2-methyl-6-nitro-3-oxohept-4-enal (2) 2,6-dimethyl-6-nitro-oxohex-4-enal

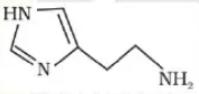
(3) 2-methyl-6-nitrohept-4-en-1,3-dione (4) 2-methyl-6-nitro-3-oxo hept-3-enal

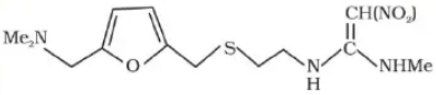
Ans. (1)

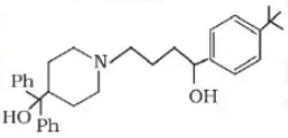
Sol. 

20. Structure of Tegamet is :

(1) 

(2) 

(3) 

(4) 

Ans. (1)

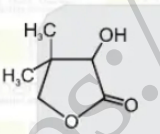
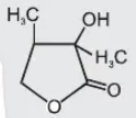
21. Photochemical smog is mixture of :

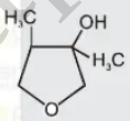
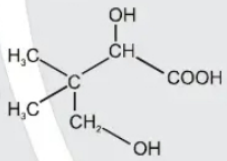
(1) $NO_2 + O_3 + PAN$ (2) $H_2O + O_3 + CH_4$

(3) $NO + NO_2$ (4) $SO_2 + SO_3 + NO_2$

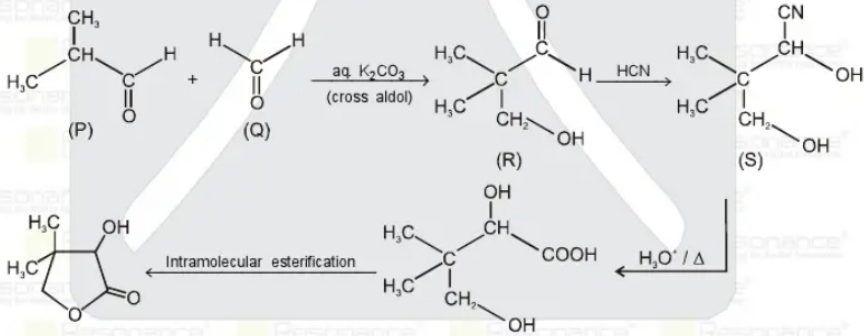
Ans. (1)

21. Isobutyl aldehyde + formaldehyde $\xrightarrow[2.\ KCN\ 3.\ H_3O^+/\Delta]{1.\ K_2CO_3}$

(1)  (2) 

(3)  (4) 

Ans. (1)

Sol. 

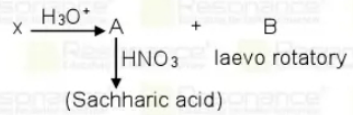
23. Disachharide x on hydrolysis gives A and B. A on HNO_3 treatment gives saccharic Acid and B is leavorotatory

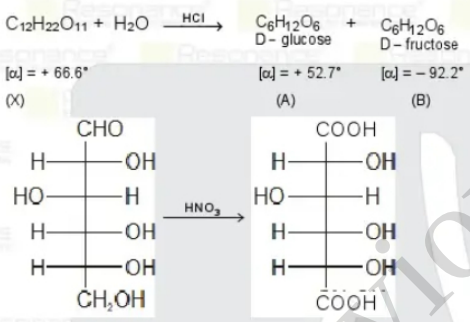
identify x

(1) Sucrose (2) Maltose (3) Lactose (4) Cellulose

Ans. (1)

Sol.



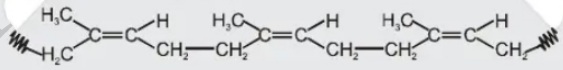


24. **Statement-I :** Natural rubber is linear polymer of isoprene unit with cis isomer.
Statement-II : Polymer of isoprene is polar and has coil like structure.
(1) Statement-I is correct only. (2) Statement-II is correct only.
(3) Both statement-I & II are correct. (4) None of the statement is correct.

Ans. (3)

Sol. **Natural rubber**

Natural rubber is a polymer of isoprene, and obtained from natural source-latex tree. In natural rubber, isoprene units are joined together in head-to-tail fashion and all double bonds in the polymer chain have cis configurations as shown in the given figure.



Cis-1,4-polyisoprene
(Natural rubber)

The polymer contains cis repeating units and has a molecular weight ranging from 100,000 upto 1,000,000.

The cis arrangement of the double bonds in natural rubber prevents the rubber molecules from fitting into an ordered structure. Thus, rubber is an amorphous polymer. Because of the random coiling of its polymer chains, rubber stretches easily. When strectched, the rubber molecules are forced into a higher energy state. when the tension is released, rubber snaps back to its original random coiled state.