1 What will be the mass of one atom of ^{12}C:

✗ A. $1\ amu$

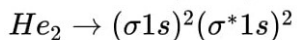**✓ B.** $1.9923 \times 10^{-23}\ g$

✗ C. $1.6603 \times 10^{-22}\ g$

✗ D. $6\ amu$

Mass of one mole of $^{12}C = 12\ g$

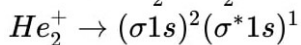So, mass of 1 atom of $^{12}C,= \frac{12}{6.022 \times 10^{23}} = 1.9923 \times 10^{-23}\ g$

---

2 Bond order of He_2, He_2^+ and He_2^{2+} are respectively:

✗ A. $1, \frac{1}{2}, 0$

✓ B. $0, \frac{1}{2}, 1$

✗ C. $\frac{1}{2}, 1, 0$

✗ D. $1, 0, \frac{1}{2}$

Bond order (B.O.) $= \frac{N_{BMO} - N_{ABMO}}{2}$

$He_2 \rightarrow (\sigma 1s)^2 (\sigma^* 1s)^2$

$\therefore$B.O. $= \frac{2-2}{2} = \frac{0}{2} = 0$

$He_2^+ \rightarrow (\sigma 1s)^2 (\sigma^* 1s)^1$

$\therefore$B.O. $= \frac{2-1}{2} = \frac{1}{2}$

$He_2^{2+} \rightarrow (\sigma 1s)^2 (\sigma^* 1s)^0$
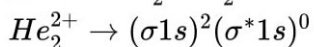
$\therefore$B.O. $= \frac{2-0}{2} = 1$

3   To a solution of a colourless efflorescent sodium salt, when dilute acid is added, a colourless gas is evolved along with formation of a white precipitate. Acidified dichromate solution turns green when the colourless gas is passed through it. The sodium salt is

✖ A. Na_2SO_3

✖ B. Na_2S

✓ C. $Na_2S_2O_3$

✖ D. $Na_2S_4O_6$

$$Na_2S_2O_3(aq) + 2HCl(aq) \rightarrow \underset{White}{S(s)} + SO_2(g) + H_2O(l) + 2NaCl(aq)$$

$$3SO_2(g) + Na_2Cr_2O_7(g) + H_2SO_4(aq) \rightarrow Cr_2(SO_4)_3(aq) + K_2SO_4(aq) + H_2O(l)$$
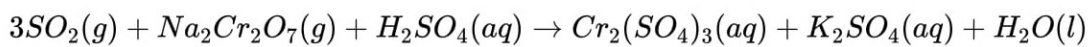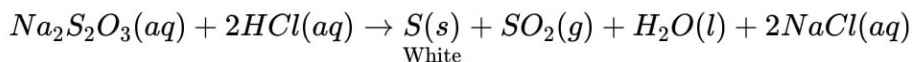
Na_2SO_3 and $Na_2S_4O_6$ both produces SO_2 on treatment with HCl but does not give white precipitate of sulphur.
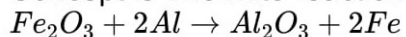
4   The reaction for obtaining the metal (M) from its oxide M_2O_3 ore is given by

$$M_2O_3(s) + 2Al(l) \xrightarrow{Heat} Al_2O_3(l) + 2M(s), (s = \text{solid}, l = \text{liquid})$$
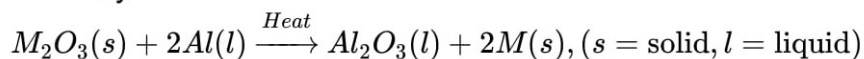
in that case, M is

✖ A. Copper

✖ B. Calcium

✓ C. Iron

✖ D. Zinc

Concept is Thermite reaction.
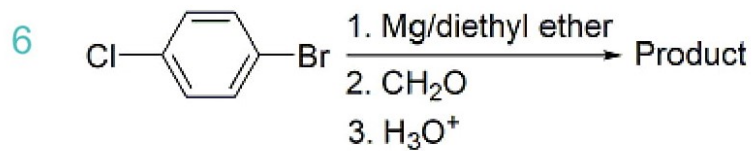$Fe_2O_3 + 2Al \rightarrow Al_2O_3 + 2Fe$
This reduction property of Aluminium is used in welding broken pieces of heavy iron objects like railway tracks.

5   In the extraction of Ca by electro reduction of molten $CaCl_2$ some CaF_2 is added to the electrolyte for the following reason:
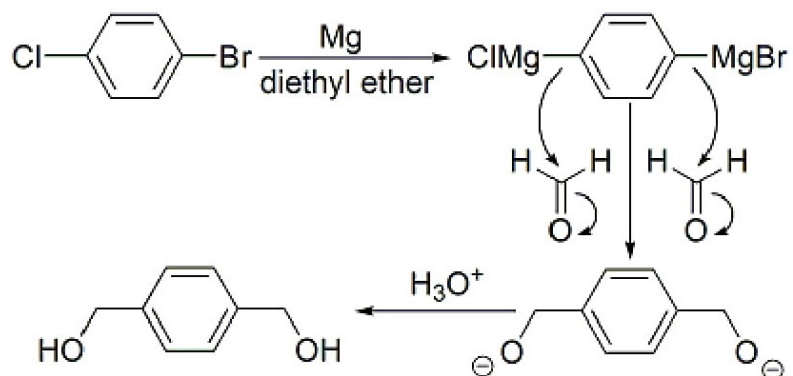
✔ **A.** To keep the electrolyte in liquid state at temperature lower than the melting point of $CaCl_2$

✖ **B.** To effect precipitation of Ca

✖ **C.** To effect the electrolysis at lower voltage

✖ **D.** To increase the current efficiency

To keep the electrolyte in liquid state at temperature lower than the m.p. of $CaCl_2$.
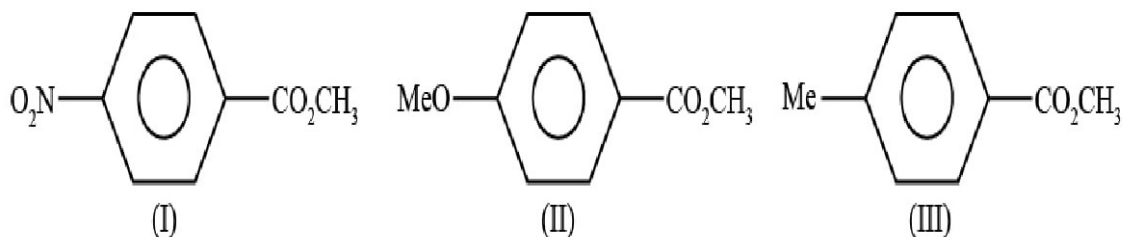
6   Cl—⬡—Br $\xrightarrow[\begin{array}{l}\text{2. CH}_2\text{O}\\\text{3. H}_3\text{O}^+\end{array}]{\text{1. Mg/diethyl ether}}$ Product

This product in the above reaction is

ⓧ A.   Br—⬡—CH$_2$OH

ⓧ B.   Cl—⬡(—CH$_2$OH)(—CH$_2$OH)

✓ C.   Cl—⬡(—CH$_2$OH)(—CH$_2$OH)

ⓧ D.   HOH$_2$C—⬡—CH$_2$OH

Cl—⬡—Br $\xrightarrow[\text{diethyl ether}]{\text{Mg}}$ ClMg—⬡—MgBr

H$_3$O$^+$

HO—⬡—OH

7

O_2N—⟨benzene ring⟩—CO_2CH_3 MeO—⟨benzene ring⟩—CO_2CH_3 Me—⟨benzene ring⟩—CO_2CH_3

(I)   (II)   (III)

For the above three esters, the order of rates of alkaline hydrolysis is

ⓧ **A.** I > II > III

ⓧ **B.** II > III > I

✓ **C.** I > III > II

ⓧ **D.** III > I > II

Under alkaline condition, hydroxide attaks on carbonyl carbon of esters to furnish repective acids.

So when the $\delta+$ charge on carbonyl carbon increases, attack of OH^- becomes more favourable and the rate of hydrolysis increases .

NO_2 showing strong -I effect will increase the $\delta+$ charge. OCH_3 shows $+M$ effect and CH_3 shows $+I$ effect so they diminishes $\delta+$ charge. Since $+M$ is more effective than $+I$, hence rate will be least for compound (II).
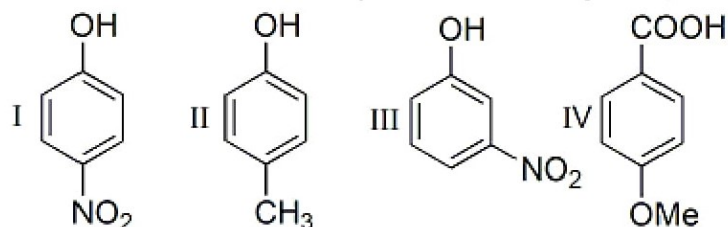
8 $\xrightarrow[Warm]{50\% \ aq. \ NaOH}$ $Ph - CO\overset{\oplus}{O}\overset{\ominus}{N}a$ + an alcohol
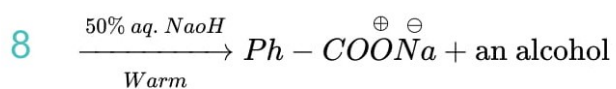
This alcohol is

(×) **A.** $Ph - CHD - OH$

(×) **B.** $Ph - CHD - OD$

(✓) **C.** $Ph - CD_2 - OH$

(×) **D.** $Ph - CD_2 - OD$

This is an application of Cannizaro reaction in which a non-enolized aldehyde undergoes disproportionation to give a carboxylic acid and a primary alcohol under basic condition.
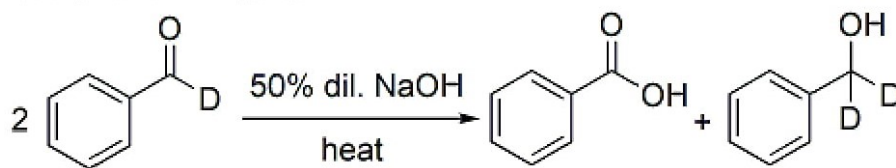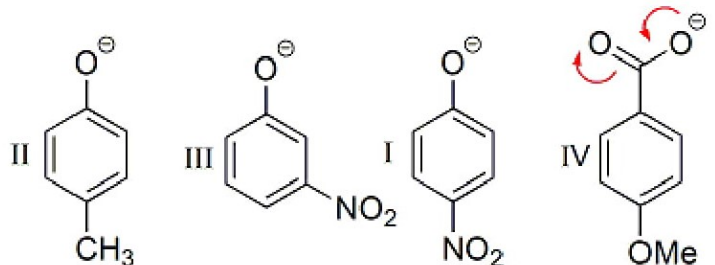
9   The correct order of acidity for the following compounds is:

(×) **A.** II < IV < III < I

(✓) **B.** II < III < I < IV

(×) **C.** II < III < IV < I

(×) **D.** III < II < I < IV

Acidity will be most when the conjugate base is most stabilised.

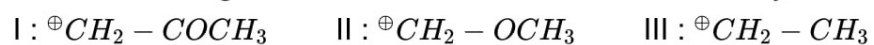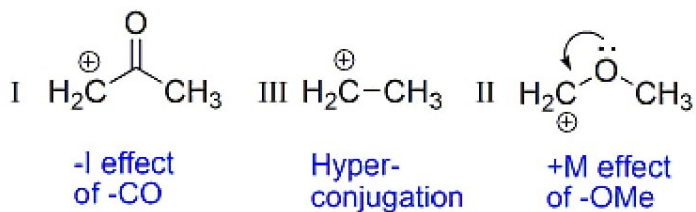| II	III	I	IV
+I effect of CH_3	–I effect of NO_2	–R effect of NO_2	Resonance effect

Carboxylic acid is more acidic than phenol.
For nitro substituted phenol, NO_2 when present at para position will show maximum acidity due to -R effect while at meta position it shows only -I effect. Since -R effect is more pronounced over -I therefore (I) will be more acidic than (III).
Methyl group destabilises the conjugate base through +I effect and hence (II) will be least acidic.
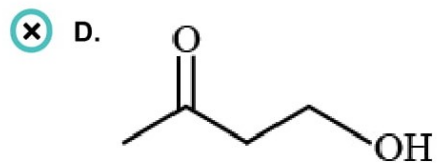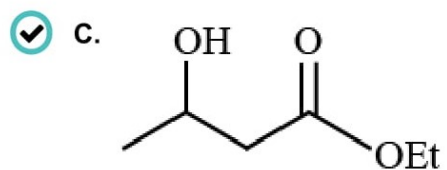
10 For the following carbocations the correct order of stability is

I : $^{\oplus}CH_2 - COCH_3$ II : $^{\oplus}CH_2 - OCH_3$ III : $^{\oplus}CH_2 - CH_3$

(×) A. III < II < I

(×) B. II < I < III

(×) C. I < II < III

(✓) D. I < III < II

I $H_2\overset{\oplus}{C}\overset{O}{\underset{}{\overset{\|}{C}}}CH_3$ III $H_2\overset{\oplus}{C}-CH_3$ II $H_2C\overset{\cdot\cdot}{\underset{\oplus}{O}}CH_3$

-I effect   Hyper-   +M effect
of -CO   conjugation   of -OMe

11 The reduction product of ethyl-3-oxobutanoate by $NaBH_4$ in methanol is

A.

B.

C.

D.
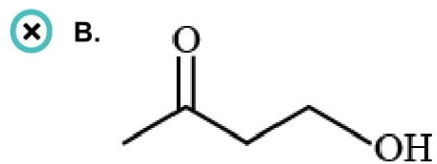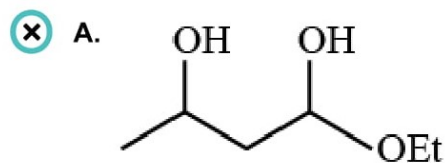
Ethyl-3-oxobutanoate has two functional groups a ketone and an ester. $NaBH_4$ does not reduce esters.
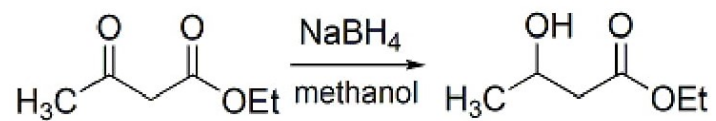
12 What is the major product of the following reaction?
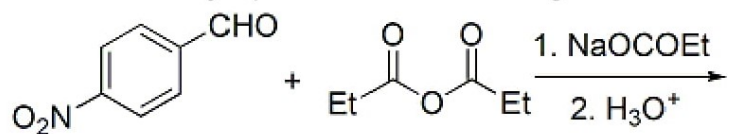
A.

B.

C.

D.

This is Perkin reactio which produces an α,β-unsaturated aromatic acid by the aldol condensation of an aromatic aldehyde and an acid anhydride, in the presence of an alkali salt of the acid.

13   The maximum number of electrons in an atom in which the last electron filled has the quantum numbers n = 3, l = 2 and m = - 1 is
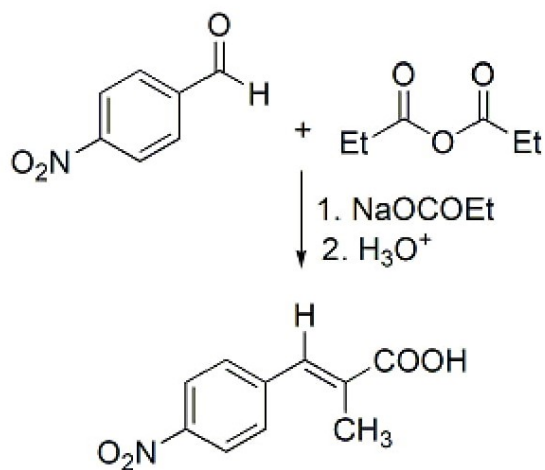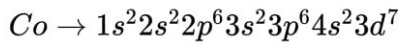
(×) **A.** 17

(✓) **B.** 27

(×) **C.** 28

(×) **D.** 30

$Co \rightarrow 1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^7$

$\therefore 3d^7$

n = 3

l = 2

m = - 1

↑↓	↑↓	↑	↑	↑

---

14   In the face-centred cubic lattice structure of gold the closest distance between gold atoms is: ('a' being the edge length of the cubic unit cell)

(×) **A.** $a\sqrt{2}$

(✓) **B.** $\dfrac{a}{\sqrt{2}}$

(×) **C.** $\dfrac{a}{2\sqrt{2}}$

(×) **D.** $2\sqrt{2}$

For, FCC, the closet distance between two atoms is 2R.

Taking 'a' is the edge length

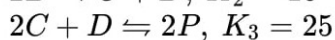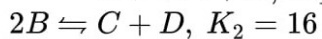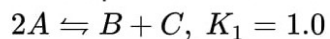$(4R)^2 = a^2 + a^2$

$\Rightarrow 16R^2 = 2a^2$

$\Rightarrow R = \dfrac{a}{2\sqrt{2}}$

$\Rightarrow 2R = \dfrac{a}{\sqrt{2}}$

15 The equilibrium constant for the following reaction are given at $25\,^{\circ}C$

$$2A \rightleftharpoons B + C, \ K_1 = 1.0$$
$$2B \rightleftharpoons C + D, \ K_2 = 16$$
$$2C + D \rightleftharpoons 2P, \ K_3 = 25$$

The equilibrium constant for the reaction $P \rightleftharpoons A + \frac{1}{2}B$ at $25\,^{\circ}C$ is

✓ **A.** $\dfrac{1}{20}$

✕ **B.** 20

✕ **C.** $\dfrac{1}{42}$

✕ **D.** 21

Given,
$$2A \rightleftharpoons B + C, \ K_1$$
$$2B \rightleftharpoons C + D, \ K_2$$
$$2C + D \rightleftharpoons 2P, \ K_3$$
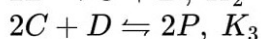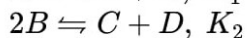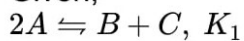
$$\therefore K_1 = \frac{[B][C]}{[A]^2}$$
$$K_2 = \frac{[C][D]}{[B]^2}$$
$$K_3 = \frac{[P]^2}{[C]^2[D]}$$

Required reaction is
$$P \rightleftharpoons A + \frac{1}{2}B$$
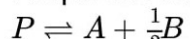
$$K_4 = \frac{[A][B]^{\frac{1}{2}}}{[P]}$$

$$\therefore K_4 = \sqrt{\frac{1}{K_3} \times \frac{1}{K_2} \times \frac{1}{K_1}}$$

$$\Rightarrow K_4 = \sqrt{\frac{1}{25} \times \frac{1}{16} \times \frac{1}{1.0}}$$

Solving these we get $K_4 = \frac{1}{20}$

16 Among the following, the ion which will be more effective for flocculation of $Fe(OH)_3$ sol is:

✓ **A.** PO_4^{3-}

✗ **B.** SO_4^{2-}

✗ **C.** SO_3^{2-}

✗ **D.** NO_3^-

Based on Hardy & Schulze rule greater the valency on oppositely charged ions, greater is the flocculation.

---

17 The mole fraction of ethanol in water is 0.08. Its molality is:

✗ **A.** $6.32\ molkg^{-1}$

✓ **B.** $4.83\ molkg^{-1}$

✗ **C.** $3.82\ molkg^{-1}$

✗ **D.** $2.84\ molkg^{-1}$

Given, mole fraction of ethanol is 0.08
∴ mole fraction of water $= 1 - 0.08 = 0.92$
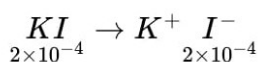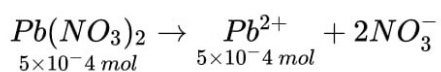Again, 0.92 mol of water $= \frac{0.92 \times 18}{1000} = 0.0165\ Kg$

So, the molality of the solution is $\frac{0.08}{0.0165} = 4.848\ mol/kg$

18 5 ml of $0.1M$ $Pb(NO_3)_2$ is mixed with 10 ml of 0.02 M KI. The amount of PbI_2 precipitated will be about:

(×) **A.** 10^{-2} mol

(✓) **B.** 10^{-4} mol

(×) **C.** 2×10^{-4} mol

(×) **D.** 10^{-3} mol

5 ml of 0.1 M $Pb(NO_3)_2 = 5 \times 0.1 \times 10^{-3} = 5 \times 10^{-4}$ mol
10 ml of 0.02 M $KI = 10 \times 0.02 \times 10^{-3} = 2 \times 10^{-4}$ mol

$$\underset{5\times10^{-4}\, mol}{Pb(NO_3)_2} \rightarrow \underset{5\times10^{-4}\, mol}{Pb^{2+}} + 2NO_3^-$$

$$\underset{2\times10^{-4}}{KI} \rightarrow K^+ \underset{2\times10^{-4}}{I^-}$$
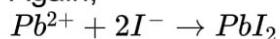
Again,
$Pb^{2+} + 2I^- \rightarrow PbI_2$
$\therefore$ Limiting reagent is I^-, hence amount of PbI_2 precipitated will be 10^{-4} mol.

---

19 At 273 K temperature and 76 cm Hg pressure, the density of a gas is 1.964 gL^{-1}. The gas is :

(×) **A.** CH_4

(×) **B.** CO

(×) **C.** He

(✓) **D.** CO_2

We know,
$$PV = nRT$$
$$\Rightarrow PV = \frac{W}{M}RT$$
Or, $M = \frac{dRT}{P}$
Given, $d = 1.964$ g/l
$P = 76$ $cm = 760$ $mmHg = 1$ atm
$R = 0.0821$ l atm $K^{-1}mol^{-1}$
$T = 273$ K
$\therefore M = \frac{1.964\times0.0821\times273}{1} \approx 44$
So, gas is CO_2

20 Equal masses of ethane and hydrogen are mixed in an empty container at 298 K. The fraction of total pressure exerted by hydrogen is

✔ **A.** 15 : 16

✘ **B.** 1 : 1

✘ **C.** 1 : 4

✘ **D.** 1 : 6

$P_{H_2} \propto x_{H_2}$

$\dfrac{P_{H_2}}{P_T} = x_{H_2} = \dfrac{x_{H_2}}{x_2 + x_{ethane}}$

$x_{H_2} = \dfrac{w/2}{(w/2) + (w/30)} = \dfrac{15}{16}$

---

21 An ideal gas expands adiabatically against vacuum. Which of the following is correct for the given process?

✘ **A.** $\Delta S = 0$

✘ **B.** $\Delta T = -ve$

✔ **C.** $\Delta U = 0$

✘ **D.** $\Delta P = 0$

$W = -p_{ext}\triangle V$
since it working aginst the vaccume so $-P_{ext} = 0$
$W = 0 \times \triangle V = 0$
For adiabatic process:
$q = 0$
$\triangle U = q + W$
$\triangle U = 0 + 0 = 0$

22 K_f (water) $= 1.86\ K\ kg\ mol^{-1}$. The temperature at which ice begins to separate from a mixture of 10 mass % ethylene glycol is

⊗ **A.** $-1.86\,°C$

⊗ **B.** $-3.72\,°C$

✓ **C.** $-3.3\,°C$

⊗ **D.** $-3\,°C$

$\Delta T_f = T_f^\circ - T_f$ and 10 mass % means

$100g\ sol^n \longrightarrow$ 10 g of ethylene glycol and 90 g H_2O

Also, $\Delta T_f = \dfrac{K_f \times W_B \times 1000}{M_B \times W_A}$

Substituting the values, we get
$T_f = -3.3\,°C$

---

23 The radius of the first Bohr orbit of a hydrogen atom is $0.53 \times 10^{-8}\ cm$. The velocity of the electron in the first Bohr orbit is:

✓ **A.** $2.188 \times 10^8\ cms^{-1}$

⊗ **B.** $4.376 \times 10^8\ cms^{-1}$

⊗ **C.** $1.094 \times 10^8\ cms^{-1}$
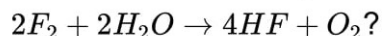
⊗ **D.** $2.188 \times 10^9\ cms^{-1}$

We know,
$mvr = \dfrac{nh}{2\pi}$

$\Rightarrow v = \dfrac{nh}{2\pi mr}$

$\Rightarrow v = \dfrac{1 \times 6.6 \times 10^{-34}}{2 \times 3.14 \times 9.1 \times 10^{-31} \times 0.53 \times 10^{-10}} \qquad = 2.18 \times 10^6\ ms^{-1} \qquad = 2.18 \times 10^6\ cms^{-1}$

24 Which of the following statements is not true for the reaction:
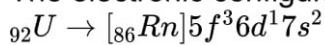$2F_2 + 2H_2O \rightarrow 4HF + O_2$?

❌ **A.** F_2 is more strongly oxidising than O_2

❌ **B.** $F - F$ bond is weaker than $O = O$ bond

❌ **C.** $H - F$ bond is stronger than $H - O$ bond

✔ **D.** F is less electronegative than O

Fluorine is the most electronegative element in the periodic table. So the statement F is less electronegative than O is incorrect.

---

25 The number of unpaired electrons in the uranium $(_{92}U)$ atom is:

✔ **A.** 4

❌ **B.** 6

❌ **C.** 3

❌ **D.** 1

The electronic configuration of uranium atom is,
$_{92}U \rightarrow [_{86}Rn]5f^3 6d^1 7s^2$
$\therefore$ No. of unpaired electrons is $3 + 1 = 4$

---

26 The difference between orbital angular momentum of an electron in a $4f$ orbital and another electron in a $4s$ orbital is:

✔ **A.** $2\sqrt{3}$

❌ **B.** $3\sqrt{2}$

❌ **C.** $\sqrt{3}$

❌ **D.** 2

Orbital angular momentum is given by the formula,
$\sqrt{l(l+1)} . \frac{h}{2\pi}$
$\therefore$ For $4f$, $l = 3$
$\Rightarrow$ orbital angular momentum $= \sqrt{12} . \frac{h}{2\pi}$
For $4s$, $l = 0$,
$\Rightarrow$ orbital angular momentum $= 0$
$\therefore$ Difference $= \sqrt{12} - 0 = \sqrt{12} = 2\sqrt{3}$

**27** Which of the following has the largest number of atoms?

(×) **A.** $1\,g\,of\,Ag$

(×) **B.** $1\,g\,of\,Fe$

(×) **C.** $1\,g\,of\,Cl_2$

(✓) **D.** $1\,g\,of\,Mg$

The more is the number of mole, the more is the number of atoms.
Since among the following Mg has the smallest atomic number so it will have the highest number of mole and thus also has highest number of atoms.

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28 Indicate the correct IUPAC name of the co-ordination compound shown in the figure.
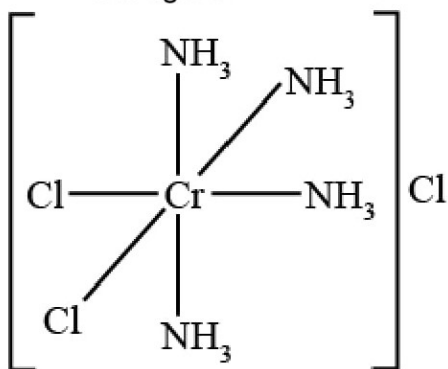
(×) **A.** Cis-dichlorotetraminochromium (III) chloride

(×) **B.** Trans-dichlorotetraminochromium (III) chloride

(×) **C.** Trans-tetraminedichlorochromium (III) chloride

(✓) **D.** Cis-tetraamminedichlorochromium (III) chloride
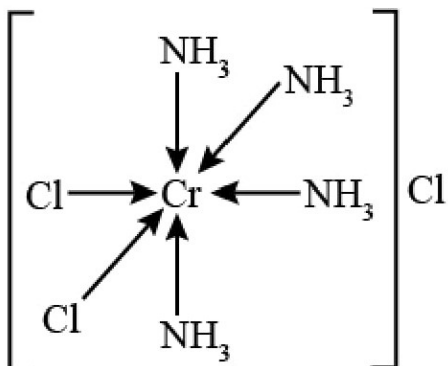
Name of ligands should be in alphabetical order while naming the complex.

29 A homonuclear diatomic gas molecule shows 2 electron magnetic moment. The one-electron and two-electron reduced species obtained from above gas molecule can act as both oxidizing and reducing agents. When the gas molecule is one-electron oxidized the bond length decreases compared to the neutral molecule. The gas molecule is:

$\times$ A. N_2

$\times$ B. Cl_2

$\checkmark$ C. O_2

$\times$ D. B_2

Oxygen (O_2)
The electronic configuration of O_2 is
$$\sigma_{1s}^2 \sigma_{1s}^{*2} \sigma_{2s}^2 \sigma_{2s}^{*2} \sigma_{2p_z}^2 \pi_{2p_x}^2 \pi_{2p_y}^2 \pi_{2p_x}^{*1} \pi_{2p_y}^{*1}$$
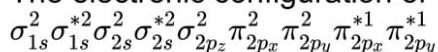
Since is has 2 unpaired electron so it shows two-electron magnetic moment. The one-electron and two-electron reduced species of O_2 can loose as well as gain electron, hence, acts as both reducing as well as oxidizing agent.
When the gas molecule is one-electron oxidized the bond length decreases compared to the neutral molecule since electron goes from the antibonding orbital.
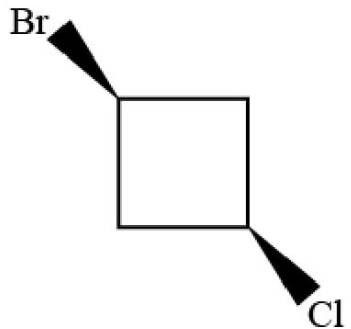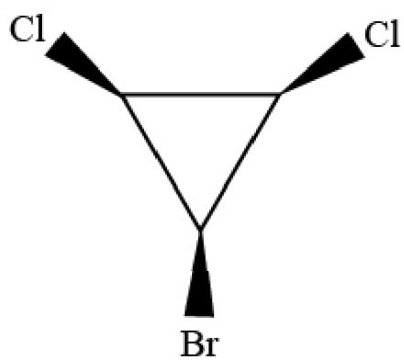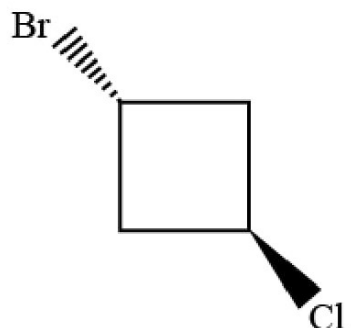
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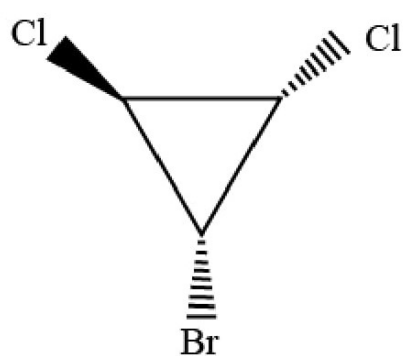
30 $CH_3 - O - CH_2 - Cl \xrightarrow[\Delta]{aq.^{\ominus}OH} CH_3 - O - CH_2 - OH$ Which information below regarding this reaction is applicable?

$\times$ A. It follows S_N2 pathway, because it is a primary alkyl chloride

$\checkmark$ B. It follows S_N1 pathway, because the intermediate carbocation is resonance stabilized

$\times$ C. S_N1 pathway is not followed, because the intermediate carbocation is destabilised by -I effect of oxygen.

$\times$ D. A mixed S_N1 and S_N2 pathway is followed

Reaction proceeds via S_N1 pathway having stable intermediate. Here intermediate formed is stabilised by +M effect of OCH_3 group.

$$CH_3 - O - \overset{\oplus}{C}H_2 \leftrightarrow CH_3 - \overset{\oplus}{O} = CH_2$$
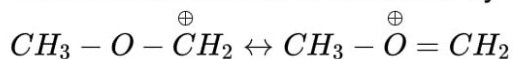
31 Which of the following compounds is asymmetric?

× **A.**

Br

Cl

× **B.**

Cl   Cl

Br

× **C.**

Br

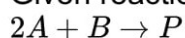Cl

✓ **D.**

Cl   Cl

Br

Asymmetric compound does not contain any mirror plane and are non-superimposable on its mirror image.

32 For a reaction $2A + B \rightarrow P$, when concentration of B alone is doubled, $t_{\frac{1}{2}}$ does not change and when concentrations of both A and B is doubled, rate increases by a factor of 4. The unit of rate constant is,

(×) **A.** s^{-1}

(✓) **B.** $L\ mol^{-1}s^{-1}$

(×) **C.** $mol\ L^{-1}s^{-1}$

(×) **D.** $L^2\ mol\ L^{-2}s^{-1}$

Given reaction is,
$2A + B \rightarrow P$
$\therefore r = K[A]^2[B]$
For first order reaction, $t_{\frac{1}{2}} = \frac{0.693}{k}$

So $t_{\frac{1}{2}}$ does not depend on the concentration of the reactant for first order reaction.
 Hence the order of the reaction with respect to $[B]$ is one.

Again since when concentrations of both A and B is doubled, rate increases by a factor of 4, so the the order of the reaction with respect to $[A]$ is also one.
Hence the overall order of the reaction is 2.

$\therefore$ the unit of rate constant is $L\ mol^{-1}s^{-1}$

33 A solution is saturated with $SrCO_3$ and SrF_2. The $[CO_3^{2-}]$ is found to be $1.2 \times 10^{-3} M$. if the value of solublity product of $SrCO_3$ and SrF_2 are 7.0×10^{-10} and 7.9×10^{-9} resectively. The concentration of F^- in the solution would be

    ❌ **A.** $3.7 \times 10^{-6} M$

    ❌ **B.** $3.2 \times 10^{-3} M$

    ❌ **C.** $5.1 \times 10^{-7} M$

    ✔️ **D.** $3.7 \times 10^{-2} M$
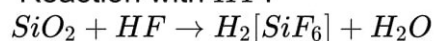
It is AB_2 type salt,
$\therefore K_{SP} = 4S^3$
$(7.9 \times 10^{-10} = 1.2 \times 10^{-3} \times [F^-]^2) \because [Sr^{2+}] = [CO_3^{2-}] = 1.2 \times 10^{-3} M$
$\therefore [F^-] = 3.7 \times 10^{-2} M$

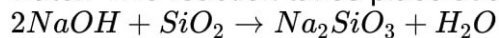**34** SiO_2 is attacked by which one/ones of the following?

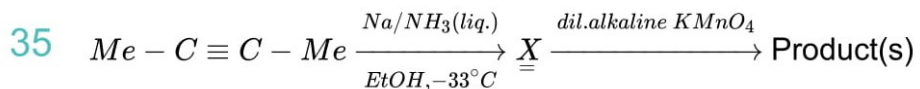   ✔️ A   HF

    B   conc. HCl

    ✔️ C   hot NaOH

    D   Fluorine

Reaction with HF:
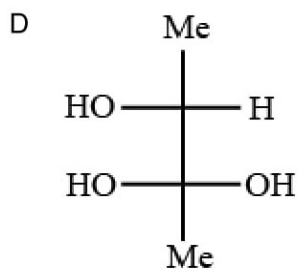$SiO_2 + HF \rightarrow H_2[SiF_6] + H_2O$
Sodium hydroxide reacts with silicon dioxide to produce sodium silicate and water. This reaction takes place at a temperature of $900 - 1000\ ^{\circ}C$.
$2NaOH + SiO_2 \rightarrow Na_2SiO_3 + H_2O$

35 $Me - C \equiv C - Me \xrightarrow[EtOH, -33°C]{Na/NH_3(liq.)} \underset{=}{X} \xrightarrow{dil.alkaline\ KMnO_4}$ Product(s)

The product(s) from the above reaction will be

✔ A

Me
|
H————OH
|
HO————H
|
Me

B

Me
|
H————OH
|
H————OH
|
Me

✔ C

Me
|
HO————H
|
H————OH
|
Me

D

Me
|
HO————H
|
HO————OH
|
Me
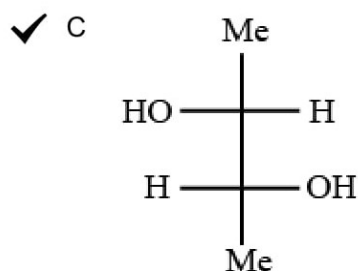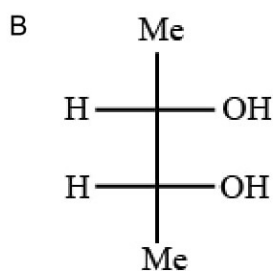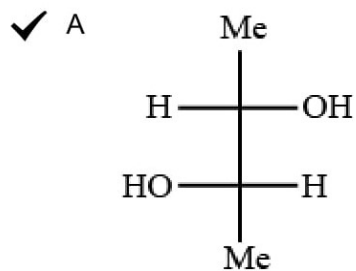
Na in $liq.$ NH_3 reduces alkynes to trans alkenes. Cold alkaline $KMnO_4$ does syn dihydroxylation on alkene to produce vicinol diols. Here trans alkenes give pair of enantiomers while cis alkenes give meso compound.

$H_3C\!\!-\!\!\equiv\!\!-\!CH_3$ $\xrightarrow[\text{EtOH, -33 °C}]{\text{Na/liq. NH}_3}$ (trans-but-2-ene structure with H_3C and CH_3)

$\downarrow$ alk. $KMnO_4$

$\underset{HO}{\overset{H_3C}{\underset{(S)}{|}}}\text{(S)}\ \overset{OH}{\underset{CH_3}{|}}$ $+$ $\underset{HO}{\overset{H_3C}{\underset{(R)}{|}}}\text{(R)}\ \overset{OH}{\underset{CH_3}{|}}$

$\|$ $\qquad\qquad$ $\|$

```
        CH3                    CH3
       (S)                    (R)
  H ———— OH            HO ———— H
       (S)                    (R)
 HO ———— H             H ———— OH
        CH3                    CH3
```

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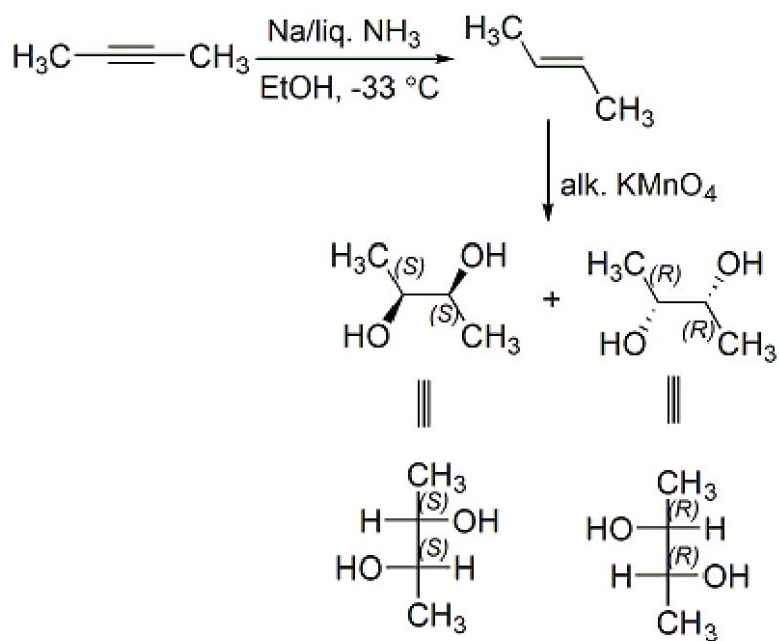
36 Which of the following give(s) a meso-compound as the main product?

✔ **A** (hex-3-ene structure) $\xrightarrow[\text{CH}_2\text{Cl}_2]{Br_2}$

✔ **B** (3,4-dimethylhex-3-ene structure) $\xrightarrow[\text{Pd - C}]{H_2}$

C (3-hexyne structure) $\xrightarrow[\text{Lindlars catalyst}]{H_2}$

D (cyclohexene structure) $\xrightarrow[\text{CCl}_4]{Br_2}$
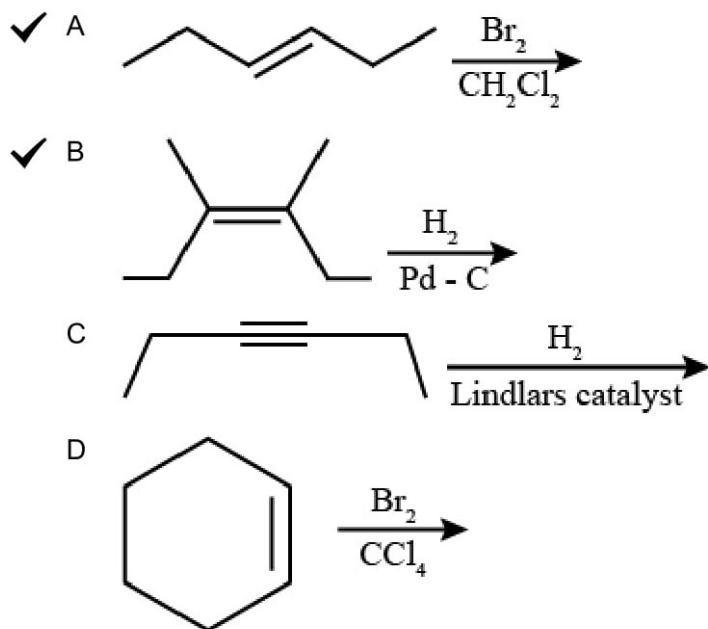
Hex-3-ene reacts with Br_2 in presence of CCl_4 gives 3, 4 - dibromohexane (meso-compound) and 3, 4 - dimethylhex-3-ene undergoes reduction with $Pd - C$ to give meso compound.

37 For spontaneous polymerization, which of the following is (are) correct?

✓ A ΔG is negative

✓ B ΔH is negative

C Δs is positive

✓ D Δs is negative

For spontaneity, ΔG should be -ve. In polymerisation reaction lot of heat is generated, so ΔH is -ve. And the final product from monomer i.e. polymer is well defined structure (orderly manner), so ΔS is -ve.

**38** Which of the following statement(s) is/are incorrect:

A A sink of SO_2 pollutant is O_3 in the atmosphere

✓ B FGD is a process of removing NO_2 from atmosphere

✓ C NO_x in fuel gases can be removed by alkaline scrubbing

D The catalyst used to convert CCl_4 to CF_4 by HF is SbF_5.

FGD is a set of technologies used to remove SO_2 from exhaust flue gases of fossil-fuel power plants and from the emissions of other SO_2 emitting processes.
NO_x in fuel gases can be removed by pyrolusite slowly.

39 The total number of alkyl bromides (including stereoisomers) formed in the reaction $Me_3 - C - CH = CH_2 + HBr \rightarrow$ will be

✗ A. 1

✗ B. 2

✓ C. 3

✗ D. No bromide forms
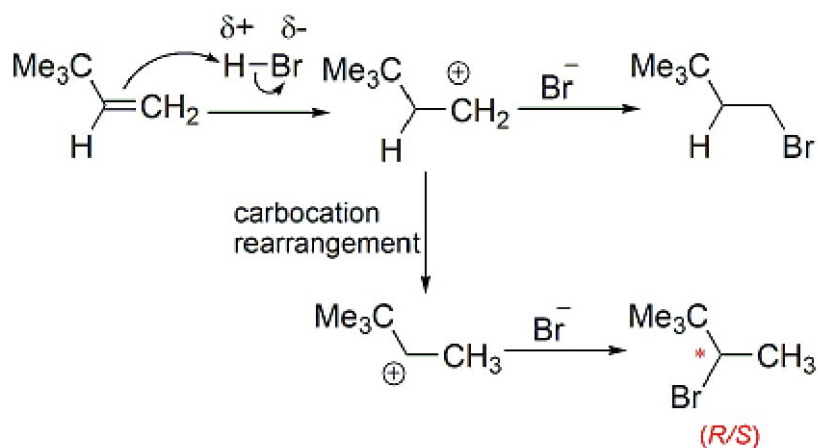
So total number of isomers (including stereoisomer) formed is 3.