Section - B

CHEMISTRY

Q.1 The order of solubility of lithium halides in non-polar solvents follows the order :

(a) **LiI > LiBr > LiCl > LiF** (b) **LiF > LiI > LiBr > LiCl**

(c) **LiCl > LiF > LiI > LiBr** (d) **LiBr > LiCl > LiF > LiI**

Q.2 The number of spectral lines produced according to Bhor's concept when one electron jumps from **5th** to **2nd** shell are :

(a) **6** (b) **8**

(c) **10** (d) **12**

Q.3 In which of the following processes energy is absorbed ?

(a) $Cl + e^- \rightarrow Cl^-$ (b) $O^- \rightarrow O^{2-} - e^-$

(c) $O^{2-} \rightarrow e^- + O^-$ (d) $Na^+ - e^- \rightarrow Na$

Q.4 A compound was found in contain **21.67 % Mg** , **21.4 % C** and **57.0 % O** by mass. What is the simplest formula of this compound ?

(a) $MgCO_3$ (b) MgC_2O_4

(c) Mg_2CO_3 (d) $Mg(CO)_4$

Q.5 Solubility of calcium phosphate (molecular mass, **M**) in water is **W g** per **100 mL** at **25°C** will be approximately :

(a) $10^9\left(\frac{W}{M}\right)^5$ (b) $10^7\left(\frac{W}{M}\right)^5$

(c) $10^5\left(\frac{W}{M}\right)^5$ (d) $10^3\left(\frac{W}{M}\right)^5$

Q.6 What is the minimum pH necessary to cause a precipitate of $Pb(OH)_2$ ($K_{sp} = 1.2 \times 10^{-5}$) to form in a **0.12 M** $PbCl_2$ solution ?

(a) **12.4** (b) **10.8**

(c) **12.0** (d) **11.1**

Q.7 A gas expands adiabatically at constant pressure such that :

$T \propto \frac{1}{\sqrt{V}}$ The value of γ, i.e., (C_P / C_v) of the gas will be :

(a) **1.30** (b) **1.50** (c) **1.70** (d) **2**

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Q.8 What is the correct relation between critical temperature T_C, Boyle's temperature T_B and inversion temperature T_i -

(a) $T_i > T_B > T_C$ (b) $T_C > T_B > T_i$

(c) $T_B > T_i > T_C$ (d) $T_B = T_C < T_i$

Q.9 The ionic radii of Rb^+ and I^- are **1.46 Å** and **2.16 Å**. The most probable type of structure exhibited by it is :

(a) **CsCl type** (b) **ZnS type**

(c) **NaCl type** (d) **CaF_2 type**

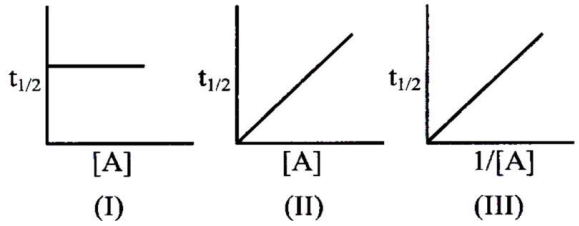
Q.10 Smoke is a colloidal dispersion of :

(a) **A gas in a solid** (b) **A solid in a gas**

(c) **A gas in a gas** (d) **A liquid in a gas**

Q.11 Consider the plots, given below, for the type of reaction,

$nA \longrightarrow B + C$



These plots respectively corresponds to the reaction order :

(a) **0, 1, 2** (b) **1, 2, 0**

(c) **1, 0, 2** (d) **None of these**

Q.12 When $AgNO_3$ is added to a solution of $Co(NH_3)_5Cl_3$, the precipitate of **AgCl** shows two ionisable chloride ions. This means :

(a) **Two chlorine atom satisfy primary valency and one secondary valency**

(b) **One chlorine atom satisfy primary as well as secondary valency**

(c) **Three chlorine atoms satisfy primary valency**

(d) **Three chlorine atoms satisfy secondary valency**

Q.13 Concentration of copper pyrites is done by :

(a) **Gravity separation** (b) **Froath floatation process**

(c) **Electromagnetic separation** (d) **Roasting**

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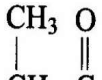
Q.14 The IUPAC name of  is :

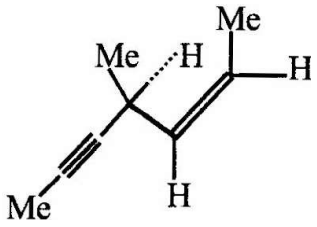
(a) **1-hydroxy-4-methyl-3-pentanone**

(b) **2-methyl-5-hydroxy-3-pentanone**

(c) **4-methyl-3-oxo-1-pentanol**

(d) **Hexanol-1-one-3**

Q.15



Hydrogenation of the above compound in the presence of poisoned palladium catalyst gives :

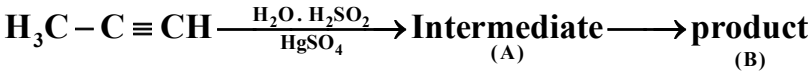
(a) **optically active compound**

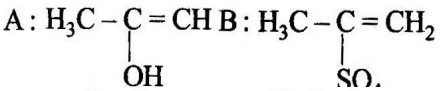
(b) **an optically active compound**

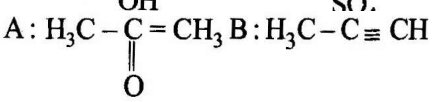
(c) **a racemic mixture**

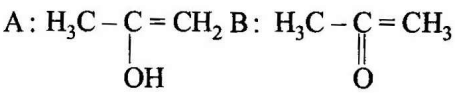
(d) **a diastereometric mixture**

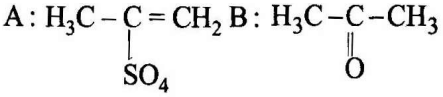
Q.16 Predict the correct intermediate and product in the following reaction :



(a) 

(b) 

(c) 

(d) 

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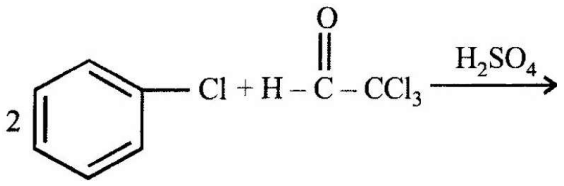
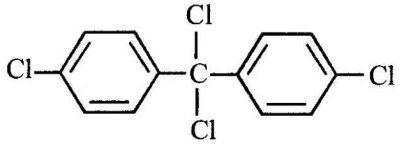
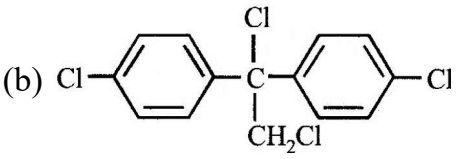
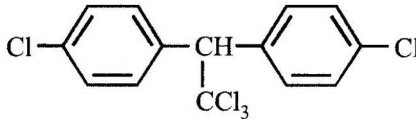
Q.17 Chlorobenzene reacts with trichloro acetaldehyde in the presence of H_2SO_4 .

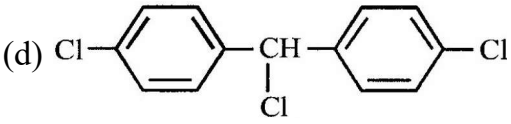


The major product formed is :

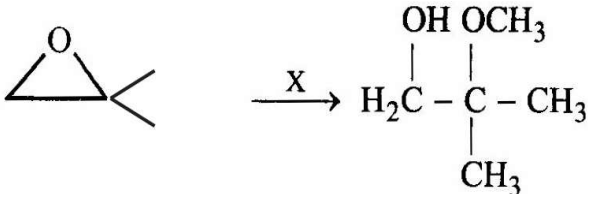
(a) 

(b) 

(c) 

(d) 

Q.18 What is **X** in the following reaction ?



(a) CH_3OH , H_2SO_4 (b) CH_3OH , $CH_3O^- \overset{+}{N}a$

(c) H_2O / H_2SO_4 followed by CH_3OH (d) CH_3MgBr / either followed by H_3O^+

Q.19 Match the compounds given in List-I with List-II and select the suitable option using the code given below :

List - I	List - II
(A) Benzaldehyde	(i) Phenolphthalein
(B) Phthalic anhydride	(ii) Benzoin condensation
(C) Phenyl benzoate	(iii) Oil of wintergreen
(D) Methyl salicylate	(iv) Fries rearrangement

Codes :

(a) **A → (iv) , B → (i) , C → (iii) , D → (ii)** (b) **A → (iv) , B → (ii) , C → (iii) , D → (i)**

(c) **A → (ii) , B → (iii) , C → (iv) , D → (i)** (d) **A → (ii) , B → (i) , C → (iv) , D → (iii)**

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Q.20 Match the compounds given in List-I with their characteristic reactions given in List-II. Select the correct option :

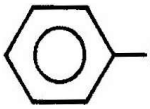
List - I	**List - II**
(1) $CH_3CH_2CH_2CH_2NH_2$	(i) alkaline hydrolysis
(2) $CH_3C \equiv CH$	(ii) with KOH (alc.) & $CHCl_3$ produced bad smell.
(3) $CH_3CH_2COOCH_3$	(iii) gives white ppt. with ammonical $AgNO_3$
(4) $CH_3CH(OH)CH_3$	(iv) with Lucaus reagent cloudiness appears after 5 minutes.

(a) **1 → (iv) , 2 → (ii) , 3 → (iii) , 4 → (i)** (b) **1 → (ii) , 2 → (i) , 3 → (iv) , 4 → (iii)**
(c) **1 → (iii) , 2 → (ii) , 3 → (i) , 4 → (iv)** (d) **1 → (ii) , 2 → (iii) , 3 → (i) , 4 → (iv)**

Q.21 The following carbohydrate is :

(a) **a ketohexose** (b) **an aldohexose**
(c) **an α-furanose** (d) **an α-pyranose**

Q.22 Which one of the following sets forms the biodegradable polymer ?

(a) **$CH_2 = CH - CN$ and $CH_2 = CH - CH = CH_2$**
(b) **$H_2N - CH_2 - COOH$ and $H_2N - (CH_2)_5 - COOH$**
(c) **$HO - CH_2 - CH_2 - OH$ and** 
(d)  **and $CH_2 = CH - CH = CH_2$**

Q.23 Sodium thiosulphate is used in photography :

(a) **To convert metallic silver into silver salt**
(b) **AgBr grain is reduced to non-metallic silver**
(c) **To remove reduced silver**
(d) **To remove undecomposed AgBr in the form of $Na_3[Ag(S_2O_3)_2]$ (a complex salt)**

Space for Rough Work

Q.24 Sodium sulphate is soluble in water whereas barium sulphate is sparingly soluble because :

(a) **The hydration energy of Na_2SO_4 is less than its lattice energy.**

(b) **The hydration energy of Ba_2SO_4 is more than its lattice energy.**

(c) **The lattice energy of $BaSO_4$ is more than its hydration energy.**

(d) **The lattice energy has no role to play in solubility.**

Q.25 In the puriftcation of bauxite by Hall's process :

(a) **Bauxite ore is heated with NaOH solution at 50°C**

(b) **Bauxite ore is fused with Na_2CO_3**

(c) **Bauxite ore is fused with coke and heated at 1800°C in a current of nitrogen.**

(d) **Bauxite ore is heated with $NaHCO_3$**

Q.26 When orthoboric acid **(H_3BO_3)** is heated, the residue left is :

(a) **Metaboric acid** (b) **Boron**

(c) **Boric anhydride** (d) **Borax**

Q.27 In graphite, the electrons are :

(a) **localised on every third carbon atom**

(b) **present in antibonding ornitals**

(c) **localised on each carbon atom**

(d) **spread out between the structure**

Q.28 Of the following which is paramagnetic and has three electron bond in its structure ?

(a) **N_2O** (b) **NO**

(c) **N_2O_3** (d) **N_2O_5**

Q.29 Sulphuric acid reacts with **PCl_5** to give :

(a) **Thionyl chloride** (b) **Sulphur monochloride**

(c) **Sulphuryl chloride** (d) **Sulphur tetrachloride**

Q.30 When iodine reacts with **NaF**, **NaBr** and **NaCl** :

(a) **It gives mixture of F_2 , Cl_2 and Br_2** (b) **It gives chlorine**

(c) **It gives bromine** (d) **None of these**

Space for Rough Work