# JEE MAIN 2023

## JAN ATTEMPT

## PAPER-1 (B.Tech / B.E.)

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# QUESTIONS & SOLUTIONS
### Reproduced from Memory Retention

**SHIFT - 1**

📅 1 FEBRUARY, 2023
🕐 9:00 AM to 12:00 Noon

Duration : 3 Hours

Maximum Marks : 300

## SUBJECT - CHEMISTRY

# CHEMISTRY

**1.** Sum of oxidation state of Bromine in Bromic Acid and perbromic acid.

**Ans.** 12 (Chemical Bonding)

**Sol.** Bromic acid: $HBrO_3 \Rightarrow$ oxidation number of Br = +5

Perbromic acid: $HBrO_4 \Rightarrow$ oxidation number of Br = +7

Sum of oxidation number = 12

**2.** **Statement-1:** Oxides of chlorine are explosive.

**Statement-2:** Reactivity of substance depends on its reactivity with oxygen and halogen.

(1) Both S-1 and S-2 are correct

(2) Both S-1 and S-2 are incorrect

(3) S-1 is correct but S-2 are incorrect

(4) S-2 is correct but S-1 are incorrect

**Ans.** **(3)** (p-Block)

**3.** $A_{0.95}O$ contains $A^{2+}$ and $A^{3+}$. Arrangement would be:

(Solid State)

**Ans.** $A^{2+}, O^{2-}, A^{2+}, O^{2-}, A^{2+}, O^{2-} \ A^{2+}, O^{2-}$

$O^{2-}, A^{2+}, O^{2-}, A^{2+}, O^{2-}, A^{2+} \ O^{2-} \ A^{2+}$

$A^{2+}, O^{2-}, A^{3+}, O^{2-}, A^{3+}, O^{2-} \ A^{2+}, O^{2-}$

$O^{2-}, A^{2+}, O^{2-}, \qquad O^{2-}, A^{2+}, O^{2-} \ A^{2+}$

$A^{2+}, O^{2-}, A^{2+}, O^{2-}, A^{2+}, O^{2-} \ A^{2+}, O^{2-}$

**4.** **Assertion(A):** He, Ne, Ar, Kr : Out of these, Kr adsorbs most.

**Reason(R):** Critical pressure and critical volume of Kr is maximum but at critical conditions, Z for Kr is minimum.

(Real Gas)

**Ans.** A – True

R – False

**5.** Correct statements about $Mn_2O_7$ are:

(A) Mn–O–Mn linkage

(B) Mn–Mn linkage

(C) Tetrahedral about both Mn

(D) Octahedral about both Mn

(1) A & C       (2) B & D       (3) A & D       (4) B & C

**Ans.** **(1)** (d- & f-Block)

**Sol.**

**6.** Which of the following are double salts?

(1) $K_2SO_4.Al_2(SO_4)_3.24H_2O$      (2) $KCl.MgCl_2.6H_2O$

(3) Both (1) and (2)      (4) None of these

**Ans.** **(3)**      **(Coordination compounds)**

**7.** $FeCl_3 + K_4[Fe(CN)_6] \longrightarrow$ ?

(1) $Fe_4[Fe(CN)_6]_3$      (2) $Fe_3[Fe(CN)_6]_2$

**Ans.** **(1)**      **(Qualitative analysis)**

**8.** Which of the following complexes have maximum splitting of d-orbitals ?

(1) $[Fe(CN)_6]^{4-}$      (2) $[Fe(NH_3)_6]^{2+}$      (3) $[FeCl_6]^{4-}$      (4) $[Fe(C_2O_4)_3]^{4-}$

**Ans.** **(1)**      **(Coordination compounds)**

**Sol.** Splitting $\propto$ strength of ligands

$CN^-$ is strongest.

**9.**

| | Column-I<br>(Compounds) | | Column-II<br>(Compound Names) |
|---|---|---|---|
| (A) | NaOH | (i) | Washing soda |
| (B) | $CaSO_4$ (anhy.) | (ii) | Caustic soda |
| (C) | $Na_2CO_3.10H_2O$ | (iii) | Dead burnt plaster |
| (D) | $Ca(OH)_2$ | (iv) | Slaked lime |

**Ans.** **A-(ii), B-(iii), C-(i), D-(iv)**      **(s-Block)**

**10.** **Assertion :** Hydrogen is an environment/eco-friendly fuel.

**Reason :** Hydrogen is the lightest element.

(1) Both assertion and reason are true and reason is correct explanation of assertion.

(2) Both assertion and reason are true but reason is not correct explanation of assertion.

(3) Assertion is true but reason is false.

(4) Assertion is false but reason is true.

**Ans.** **(2)**      **(Hydrogen)**

**11.** The density of 3M solution of NaCl is 1 g/ml. The molality is $x \times 10^{-2}$. x is :

**Ans.** **364** (Mole concept)

**Sol.** 1000 ml solution contain 3 mol NaCl i.e. 175.5 g NaCl

Also, weight of solution = density × volume = 1000 gram

$\Rightarrow$ Weight of solvent is 1000 – 175.5 = 824.5 gram

$\Rightarrow$ Molality of NaCl solution = $\dfrac{\text{Moles of NaCl}}{\text{Wt. of solvent (in gram)}} \times 1000$

$$= \dfrac{3}{824.5} \times 1000$$

$$= 3.64 = 364 \times 10^{-2}$$

$$\Rightarrow x = 364$$

**12.** An electron in ground state of H-atom absorbs 12.75 eV and jumps to a higher orbit. Final orbit number = ?

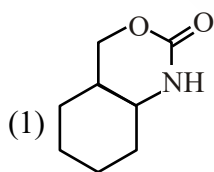**Ans.** **4** (Atomic structure)

**Sol.** $12.75 = 13.6\,(1)^2 \left[\dfrac{1}{1^2} - \dfrac{1}{n^2}\right]$

$\therefore n = 4$

**13.**
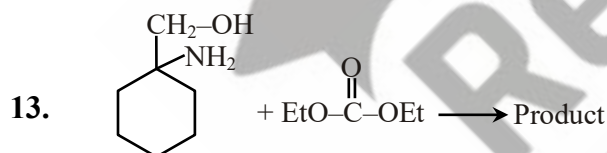


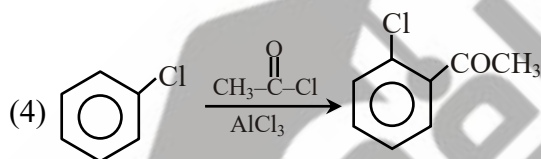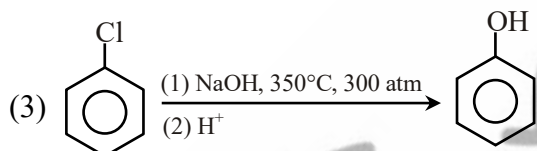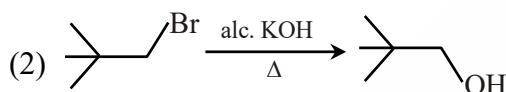Product is [Carboxylic acid & Derivative]
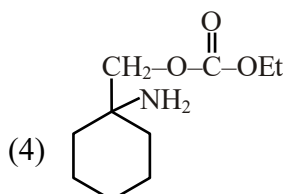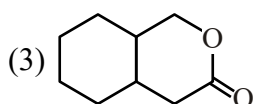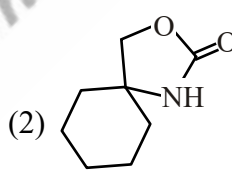


**Ans.** **(2)**

**14.** How can photochemical smog be controlled?　　　　　　　　**[Environmental chemistry]**

(1) Catalytic convertors are used in the automobiles which prevent the release of nitrogen oxide and hydrocarbon to the atmosphere

(2) Height of chimney should be increase

(3) Control of primary precursor such as $O_3$ and PAN

(4) Control of secondary precursor such as $NO_2$ and hydrocarbon

**Ans.** **(1)**

**15.** Which of the following product is incorrect?

**[Haloalkane, Haloarenes Alcohols & Ethers Part-1 &2]**

(1) $\text{CH}_2\text{Br}$ $\xrightarrow{\text{alc. KOH(aq)}}$ $\text{OH}$

(2) $\xrightarrow[\Delta]{\text{alc. KOH}}$ (from Br) → product with OH

(3) $C_6H_5Cl$ $\xrightarrow[\text{(2) H}^+]{\text{(1) NaOH, 350°C, 300 atm}}$ $C_6H_5OH$

(4) $C_6H_5Cl$ $\xrightarrow[\text{AlCl}_3]{\text{CH}_3\text{-C(=O)-Cl}}$ product (Cl, COCH$_3$ on ring)

**Ans.** **(2)**

**16.** Match the column-I and column-II　　　　　　　　**[Chemistry in every day life]**

| Column-I | Column-II |
|---|---|
| (A) Tranquilizers | (P) Soframicine |
| (B) Antiboitic | (Q) Antidepressant |
| (C) Antiseptic | (R) Terfenadine |
| (D) Antihistamine | (S) Salvarsan |

**Ans.** (A) → (Q), (B) → (S), (C) → (P), (D) → (R)

**17.** Which of the following compound shows fastest rate of dehydration

**[Haloalkane, Haloarenes Alcohols & Ethers Part-1 &2]**

(1) (phenol with OH) (2) (cyclohexadienol with OH) (3) (cyclohexenol with OH) (4) (cyclohexenol with OH)
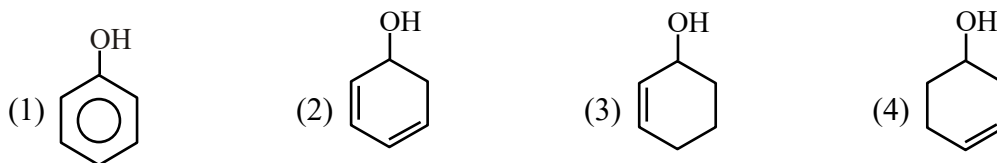
**Ans. (2)**

**18.** Match the following

**[Biomolecules]**

|   | Compounds |   | Lab test |
|---|---|---|---|
| 1. | Primary amine | (p) | Biuret test |
| 2. | Carbohydrates | (q) | Schiffs test |
| 3. | Tripeptide | (r) | Carbyl amine test |
| 4. | Aldehyde | (s) | Molish test |

(1) 1–r, 2–s, 3–p, 4–q

(2) 1–p, 2–q, 3–r, 4–s

(3) 1–q, 2–s, 3–p, 4–r

(4) 1–q, 2–p, 3–r, 4–s

**Ans. (1)**

**19.** How many molecules are chiral

**[Stereoisomerism]**

(1) 
$$
\begin{array}{c}
COOH \\
H \!-\!\!\!-\! OH \\
H \!-\!\!\!-\! OH \\
COOH
\end{array}
$$

(2) (cyclohexane with OH, HO, OH substituents)

(3) (phenyl–CH(CH₃)–CH(OH)–CH₂–C₆H₄–Cl structure)

(4) (cyclohexane with =CH–Ph and CH₃, H substituents)
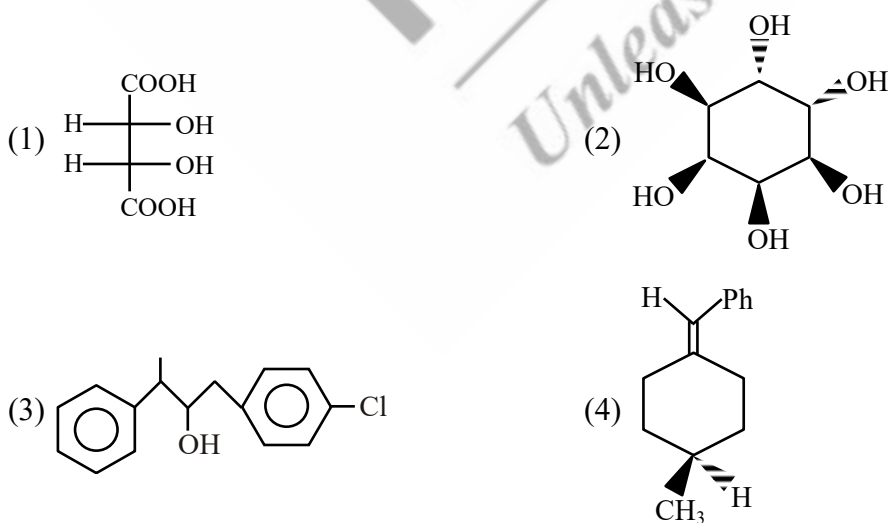
**Ans. (3, 4)**

**20.** Observe the following reaction                                       **[Hydrocarbon]**

$(B) \xleftarrow{\text{Na/NH}_3\text{(l)}} CH_3-C \equiv C-CH_3 \xrightarrow{\text{H}_2/\text{Pd}-\text{BaSO}_4} (A)$
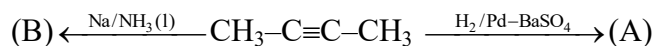
(A) $H_2O$ solubility $\rightarrow A > B$

(B) Dipole moment $A > B$ because dipole moment A is zero

(C) Boiling point of $A > B$ and melting point of $B > A$

(D) Reactivity order with $Br_2$ is $B > A$

Choose incorrect option

(1) B, D                 (2) A, C, D                 (3) B, C, D                 (4) A, B, D

**Ans.** **(1)**