# JEE Main 2024 Chemistry Question Paper April 5 Shift 1

| Time Allowed :3 Hours | Maximum Marks :300 | Total Questions :90 |
|---|---|---|

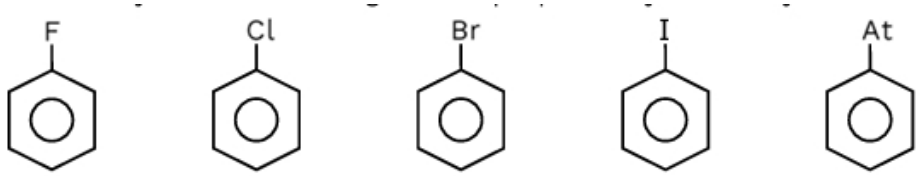
## General Instructions

**Read the following instructions very carefully and strictly follow them:**

1. The test is of 3 hours duration.
2. The question paper consists of 90 questions, out of which 75 are to attempted. The maximum marks are 300.
3. There are three parts in the question paper consisting of Physics, Chemistry and Mathematics having 30 questions in each part of equal weightage.
4. Each part (subject) has two sections.
   (i) Section-A: This section contains 20 multiple choice questions which have only one correct answer. Each question carries 4 marks for correct answer and –1 mark for wrong answer.
   (ii) Section-B: This section contains 10 questions. In Section-B, attempt any five questions out of 10. The answer to each of the questions is a numerical value. Each question carries 4 marks for correct answer and –1 mark for wrong answer. For Section-B, the answer should be rounded off to the nearest integer

## Chemistry

**1. How many of the following can be prepared by Sandmeyer reaction:**

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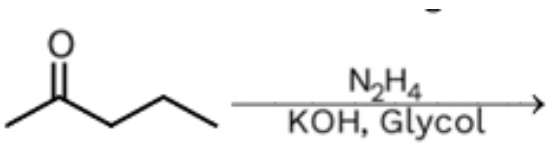
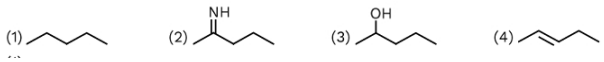
**2. Which of the following is the correct product for the given reaction?**

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**3. Which of the following elements shows maximum oxidation state?**

(1) Mn
(2) Ti
(3) Co
(4) Na

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**4. Which of the following has lowest paramagnetic character in +2 oxidation state with water?**

(1) Fe
(2) Co
(3) Ni
(4) Mn

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**5. In the Lewis dot structure for $NO_2^-$, total numbers of valence electrons around nitrogen is:**

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**6. Find the total numbers of $\sigma$ and $\pi$ bonds in ethylene, respectively.**

(1) 4,1
(2) 5,1
(3) 4,0
(4) 5,0

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**7. Which of the following are correct statement(s) for the given species:**
**$O^{2-}$, $F^-$, $Na^+$, $Mg^{2+}$**
(a) $O^{2-}$ is largest in size
(b) $Mg^{2+}$ is smallest in size
(c) All have same effective nuclear charge
(d) All are isoelectronic

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

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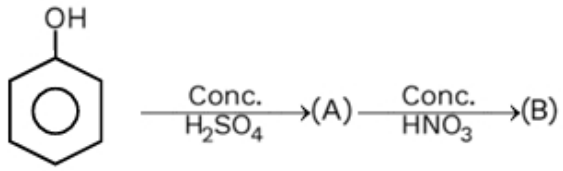
**8. Find the sum of total number of O atom(s) in A and B.**

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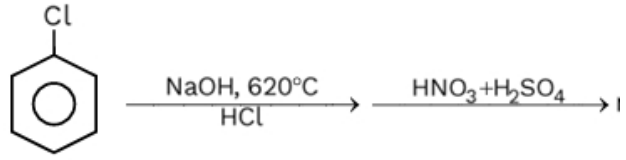
**9. Find the major product in the following reaction:**




(1) Orthonitrophenol
(2) Paranitrophenol
(3) Picric acid
(4) Metanitrophenol

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**10. Which of the following will give a positive Ninhydrin test?**

(1) Cellulose
(2) Starch
(3) Polyvinyl chloride
(4) Egg albumin

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**11. Correct order of boiling point for**
**(P) Diethyl ether**
**(Q) n-butanol**

**(R) n-butane**
**(S) Ethylmethyl ketone**

(1) P ¿ Q ¿ R ¿ S
(2) Q ¿ S ¿ P ¿ R
(3) S ¿ R ¿ Q ¿ P
(4) S ¿ Q ¿ P ¿ R

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**12. Assertion:** Cis-but-2-ene is polar while trans-but-2-ene is non-polar.
**Reason:** Dipole moment of trans but-2-ene is zero.

(1) Both A and R are correct and R is the correct explanation of A.
(2) Both A and R are correct, but R is not the correct explanation of A.
(3) A is correct but, R is incorrect.
(4) R is correct but, A is incorrect.

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**13. Assertion: For group 13 element stability of +1 oxidation state increases down the group.**
**Reason: Atomic size of Ga is greater than Al.**

(1) Both A and R are true and R is the correct explanation of A
(2) Both A and R are true but R is not the correct explanation of A
(3) If A is true but R is false
(4) If A is false but R is true

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**14.** $\mathbf{Fe_2O_3(s) + 3CO(g) \rightarrow 2Fe(s) + 3CO_2(g)}$
Equilibrium does not shift according to Le Chatelier's principle.
**Which of the following is correct?**

(1) Removal of $CO_2$
(2) Addition of $CO_2$
(3) Removal of CO
(4) Addition of $Fe_2O_3$

**15. Predict the correct order of strength of ligands: $Br^-$, $H_2O$, $NH_3$**

(1) $Br^-$ ¡ $H_2O$ ¡ $F^-$ ¡ $NH_3$
(2) $H_2O$ ¡ $Br^-$ ¡ $F^-$ ¡ $NH_3$
(3) $Br^-$ ¡ $F^-$ ¡ $H_2O$ ¡ $NH_3$
(4) $Br^-$ ¡ $H_2O$ ¡ $NH_3$ ¡ $F^-$

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**16. Molar conductivity of divalent cation and anion are 57 and 73 S $cm^{-1}$ $mol^{-1}$. The molar conductivity of solution is .....**

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**17. For the reaction 2A + B → C, the following data is given:**

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|---|---|---|---|
| **[A] (mol/L)** | 0.1 | 0.4 | 0.4 |
| **[B] (mol/L)** | 0.1 | 0.1 | 0.2 |
| **Rate (mol/L/s)** | $6 \times 10^{-3}$ | $12 \times 10^{-3}$ | $48 \times 10^{-3}$ |

**Find the order of reaction.**

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**18. Most abundant isotopes of boron has X number of neutrons.**
**B + $O_2$ → Oxidation number of boron (Y)**
**Find X + Y?**

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**19. Find the spin-only magnetic moment of the strongest oxidizing agent?**

(1) $Ti^{2+}$
(2) $V^{2+}$
(3) $Mn^{2+}$
(4) $Co^{3+}$

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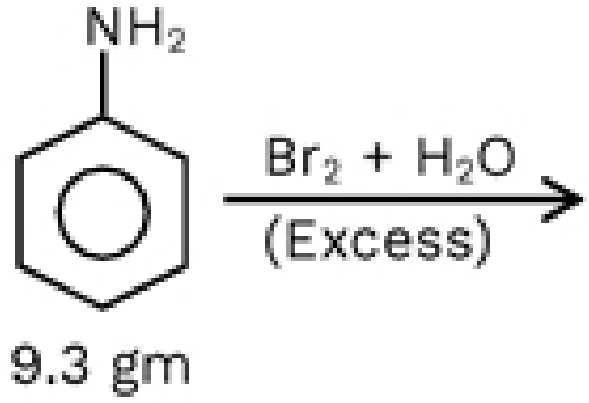
**20. 9.3 gm of $NH_2$ reacts with excess $Br_2$ and $H_2O$ to form white ppt. 24.6 gm of white ppt is obtained.**
**Find the % yield of the white ppt product.**

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**21. Which of the following cations will give a green color in reducing flame in borax bead test?**

(1) Iron
(2) Cobalt
(3) Manganese
(4) Nickel

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**22. Which postulate of Dalton's theory is wrong?**

(1) Matter consists of indivisible atoms.
(2) All atoms of a given element have identical properties but different masses.
(3) Compounds are formed when atoms of different elements combine in a fixed ratio.
(4) Chemical reaction involves rearrangement of atoms.

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**23. The heat of combustion of solid benzoic acid at constant volume is $-321.30$ K at $27°$C.**
**The heat of combustion at constant pressure is $(-321.30-x)$ KJ. Find the value of $x$.**