JEE Main 2024 Chemistry Question Paper April 8 Shift 2

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. What is the structure of carbocation?

(1) Tetrahedral
(2) Triagonal planar
(3) Diagonal
(4) Diagonal planar

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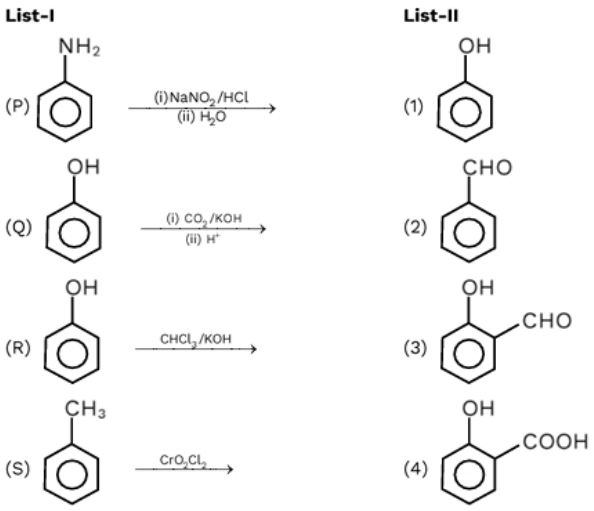
2. Match List-I with List-II and select the correct option:



(1) P $\rightarrow$ 1; Q $\rightarrow$ 4; R $\rightarrow$ 3; S $\rightarrow$ 2
(2) P $\rightarrow$ 2; Q $\rightarrow$ 4; R $\rightarrow$ 3; S $\rightarrow$ 1
(3) P $\rightarrow$ 1; Q $\rightarrow$ 3; R $\rightarrow$ 4; S $\rightarrow$ 2
(4) P $\rightarrow$ 3; Q $\rightarrow$ 4; R $\rightarrow$ 1; S $\rightarrow$ 2

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3. Which of the following have bond order = 2?

(1) O_2
(2) C_2H_6
(3) H_2
(4) Ne_2

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4. Given A $\longrightarrow$ B with rate constant k_1, and B $\longrightarrow$ C with k_2. Rate of formation of B = 0. What is concentration of B in terms of A?

(1) $\frac{k_1}{k_2}[A]$
(2) $\frac{k_2}{k_1}[A]$
(3) $k_1k_2[A]$
(4) $k_1k_2[A]$

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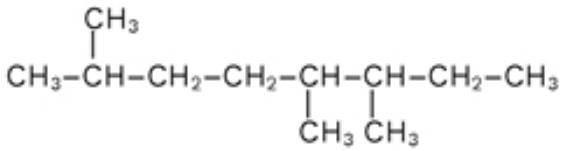
5. Write the IUPAC name of the given compound:



(1) 2,5,6 Trimethyloctane
(2) 3,4,7 Trimethyloctane
(3) 2,4-Dimethyl-6-ethylheptane
(4) 3,6-Dimethyl-2-ethylheptane

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6. What will be the wave function of σ^* (destructive)?

(1) $\psi_A - \psi_B$
(2) $\psi_A + \psi_B$
(3) $\psi_A + 2\psi_B$
(4) $\psi_A - 2\psi_B$

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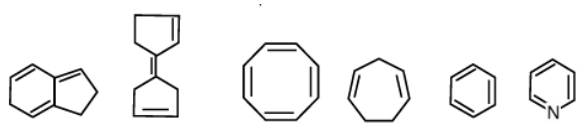
7. Count the number of aromatic compounds from the given structures:



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8. Match the correct magnetic moment of the given compound:

	List-I		List-II
(P)	$[CoF_6]^{3-}$	(1)	5
(Q)	$[Ni(CN)_4]^{2-}$	(2)	0
(R)	$[Ni(NH_3)_6]^{2+}$	(3)	3
(S)	$[Fe(H_2O)_6]^{3+}$	(4)	6

(1) P $\rightarrow$ 1; Q $\rightarrow$ 2; R $\rightarrow$ 3; S $\rightarrow$ 4
(2) P $\rightarrow$ 2; Q $\rightarrow$ 1; R $\rightarrow$ 3; S $\rightarrow$ 4
(3) P $\rightarrow$ 1; Q $\rightarrow$ 3; R $\rightarrow$ 4; S $\rightarrow$ 2

(4) P $\rightarrow$ 4; Q $\rightarrow$ 3; R $\rightarrow$ 2; S $\rightarrow$ 1

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9. If de-Broglie wavelength of electron is equal to the de-Broglie wavelength of proton, then what is the relation between their kinetic energy?

(1) KE_e ¿ KE_p
(2) KE_e ¡ KE_p
(3) $KE_e = KE_p$
(4) $2KE_e = KE_p$

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10. Consider the given reaction: $Cr_2O_7^{2-} \rightleftharpoons CrO_4^{2-}$. Above reaction shifts forward in which medium?

(1) Acidic
(2) Basic
(3) Neutral
(4) Slightly acidic

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11. Statement-I: Benzene sulphonyl chloride reacts with 1°, 2° and 3° amines. Statement-II: All products of the above reaction are soluble in NaOH. Select the correct option.

(1) Both statements are correct
(2) Both statements are incorrect
(3) Statement-I is correct, Statement-II is incorrect
(4) Statement-I is incorrect, Statement-II is correct

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12. Total number of carbon atoms in tyrosine

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13. Find the total number of correct statements:

(1) N_2 behaves as inert gas at room temperature
(2) Oxides of metals are basic generally
(3) Oxides of non-metals are acidic generally
(4) As we move down the group in group 15, stability of +5 oxidation state decreases
(5) General oxidation states of group 15 are +3, +5, –3

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14. Statement-I: In S_N2, stereospecific product is formed. Statement-II: In S_N1, racemic product is formed. Select the correct option.

(1) Both Statement-I and Statement-II are correct
(2) Both Statement-I and Statement-II are incorrect
(3) Statement-I is correct, Statement-II is incorrect
(4) Statement-I is incorrect, Statement-II is correct

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15. What is the formula of canary yellow precipitate?

(1) $(NH_4)_3[P(Mo_3O_{10})_4]$
(2) $(NH_4)_2[P(Mo_3O_{10})_2]$
(3) $(NH_4)[P(Mo_3O_{10})_3]$
(4) $(NH_4)_4[P(Mo_3O_{10})_3]$

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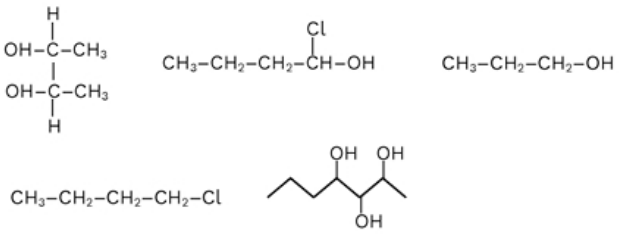
16. Count the total number of optically active compounds from the given structures:



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17. For the reaction $Tl^{+}_{(0.001M)} + Cu_{(s)} \rightleftharpoons Tl_{(s)} + Cu^{2+}_{(0.01M)}$, $E^{\circ} = 0.56$ V. E_{cell} can be increased by:

(1) By increasing $[Cu^{2+}]$
(2) By decreasing $[Cu^{2+}]$
(3) By increasing $[Tl^{+}]$
(4) By decreasing $[Tl^{+}]$

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18. The moles of H_2O and C_2H_5OH are g and l mole respectively. The mass percent of C_2H_5OH will be:

(1) 22.11%
(2) 11.22%
(3) 12%
(4) 10%

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19. Match the tests with the corresponding functional groups:

List-I (Test):
(P) Bayer's reagent
(Q) CAN test
(R) Phthalein dye test
(S) Schiff test

List-II (Group):
(1) Aldehyde
(2) –OH group
(3) Unsaturation
(4) Phenol

(1) P→3; Q→2; R→4; S→1
(2) P→1; Q→2; R→4; S→3
(3) P→3; Q→4; R→2; S→1
(4) P→2; Q→3; R→1; S→4

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20. Given wavelength of wave is 15800 Å. Find its wave number = x $\times$ 10^{-1} cm^{-1}. Find x.

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21. Statement-I : Kjeldahl's method is not used for pyridine. Statement-II : Kjeldahl's method easily converts pyridine into N_2. Select the correct option.

(1) Both Statement-I and Statement-II are correct
(2) Both Statement-I and Statement-II are incorrect
(3) Statement-I is correct, Statement-II is incorrect
(4) Statement-I is incorrect, Statement-II is correct

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22. Given $_{vap}$ = 40 kJ/mol for $H_2O(l)$. At T = 273 K and P = 1 bar, find Δ U_{vap} (in kJ/mol) for $H_2O(l)$.

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23. Correct order of acidic strength will be: (I) HCOOH (II) CH_3COOH (III) C_2H_5COOH (IV) C_3H_7COOH

(1) (I) ¿ (II) ¿ (III) ¿ (IV)
(2) (II) ¿ (I) ¿ (III) ¿ (IV)
(3) (IV) ¿ (II) ¿ (III) ¿ (I)
(4) (IV) ¿ (III) ¿ (II) ¿ (I)
