JEE Main 2025 April 8th Shift 2 Chemistry Question Paper

Time Allowed :3 Hours	Maximum Marks :300	Total Questions :75

General Instructions

Read the following instructions very carefully and strictly follow them:

1. Multiple choice questions (MCQs)
2. Questions with numerical values as answers.
3. There are three sections: **Mathematics, Physics, Chemistry**.
4. **Mathematics:** 25 (20+5) 10 Questions with answers as a numerical value. Out of 10 questions, 5 questions are compulsory.
5. **Physics:** 25 (20+5) 10 Questions with answers as a numerical value. Out of 10 questions, 5 questions are compulsory..
6. **Chemistry:** 25 (20+5) 10 Questions with answers as a numerical value. Out of 10 questions, 5 questions are compulsory.
7. Total: 75 Questions (25 questions each).
8. 300 Marks (100 marks for each section).
9. **MCQs:** Four marks will be awarded for each correct answer and there will be a negative marking of one mark on each wrong answer.
10. **Questions with numerical value answers:** Candidates will be given four marks for each correct answer and there will be a negative marking of 1 mark for each wrong answer.

Chemistry

Section - A

51. Given below are two statements:
Statement I: H_2Se is more acidic than H_2Te
Statement II: H_2Se has higher bond enthalpy for dissociation than H_2Te
In the light of the above statements, choose the correct answer from the options given below.
(1)Statement I is false but Statement II is true
(2)Statement I is true but Statement II is false
(3)Both Statement I and Statement II are false
(4)Both Statement I and Statement II are true

52. The correct decreasing order of spin only magnetic moment values (BM) of Cu^{+}, Cu^{2+}, Cr^{2+} and Cr^{3+} ions is:

(1) $Cu^{+} > Cu^{2+} > Cr^{3+} > Cr^{2+}$

(2) $Cr^{3+} > Cr^{2+} > Cu^{+} > Cu^{2+}$

(3) $Cu^{2+} > Cu^{+} > Cr^{2+} > Cr^{3+}$

(4) $Cr^{2+} > Cr^{3+} > Cu^{2+} > Cu^{+}$

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53. Match the LIST-I with LIST-II

LIST-I (Reagent)	**LIST-II (Functional Group detected)**
A. Sodium bicarbonate solution	I. double bond/unsaturation
B. Neutral ferric chloride	II. carboxylic acid
C. Ceric ammonium nitrate	III. phenolic -OH
D. Alkaline $KMnO_4$	IV. alcoholic -OH

Choose the correct answer from the options given below:

(1)A-III, B-III, C-I, D-IV

(2)A-III, B-II, C-IV, D-I

(3)A-II, B-III, C-IV, D-I

(4)A-II, B-IV, C-III, D-I

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54. Given below are two statements:

Statement I: A homoleptic octahedral complex, formed using monodentate ligands, will not show stereoisomerism

Statement II: cis- and trans-platin are heteroleptic complexes of Pd.

In the light of the above statements, choose the correct answer from the options given below

(1)Both Statement I and Statement II are false

(2)Statement I is true but Statement II is false

(3)Statement I is false but Statement II is true

(4)Both Statement I and Statement II are true

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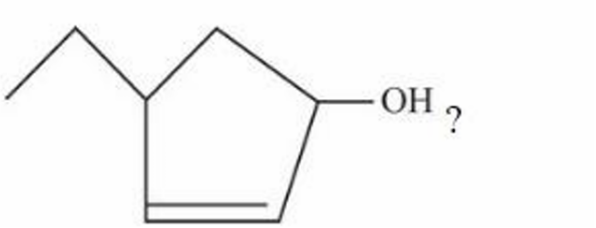
55. What is the correct IUPAC name of the following compound?



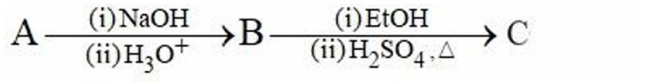
(1) 4-Ethyl-1-hydroxycyclopent-2-ene

(2) 1-Ethyl-3-hydroxycyclopent-2-ene

(3) 1-Ethylcyclopent-2-en-3-ol

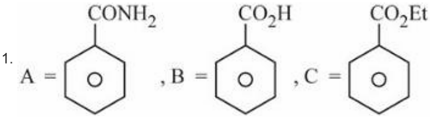
(4) 4-Ethylcyclopent-2-en-1-ol

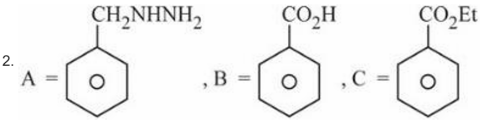
56.

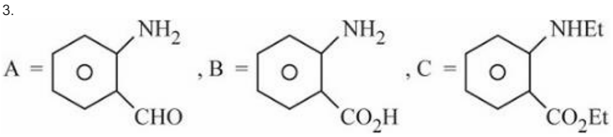


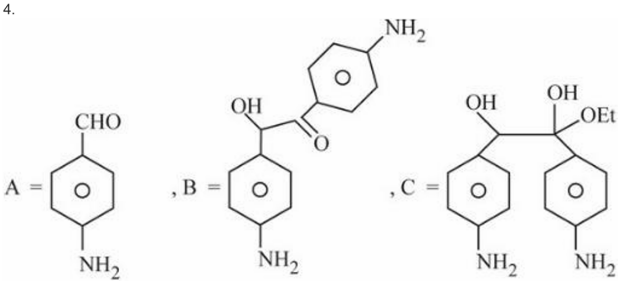
A shows positive Lassaigne's test for N and its molar mass is 12(1)
B gives effervescence with aqueous NaHCO(3)
C gives fruity smell.

Identify A, B, and C from the following.

1. 

2. 

3. 

4. 

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57. On combustion 0.210 g of an organic compound containing C, H and O gave 0.127 g H_2O and 0.307 g CO_2. The percentages of hydrogen and oxygen in the given organic compound respectively are:
(1)6.72, 39.87
(2)6.72, 53.41
(3)7.55, 43.85
(4)53.41, 39.6

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58. HA $(aq) \rightleftharpoons H^+(aq) + A^-(aq)$
The freezing point depression of a 0.1 m aqueous solution of a monobasic weak acid HA is 0.20 °C. The dissociation constant for the acid is Given: $K_f(H_2O) = 1.8\,\text{K kg mol}^{-1}$, molality molarity
(1)1.1×10^{-2}
(2)1.38×10^{-3}
(3)1.90×10^{-3}
(4)1.89×10^{-1}

59. Match the LIST-I with LIST-II

LIST-I	LIST-II
A. Carbocation	I. Species that can supply a pair of electrons.
B. C-Free radical	II. Species that can receive a pair of electrons.
C. Nucleophile	III. sp^2 hybridized carbon with empty p-orbital.
D. Electrophile	IV. sp^2/sp^3 hybridized carbon with one unpaired electron.

Choose the correct answer from the options given below:

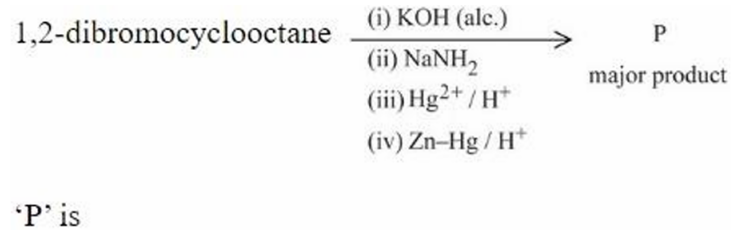
(1)A-III, B-III, C-I, D-IV

(2)A-III, B-IV, C-II, D-I

(3)A-IV, B-II, C-III, D-I

(4)A-III, B-IV, C-I, D-II

60.



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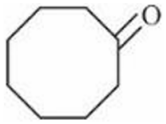
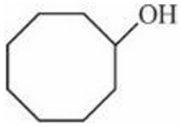
2. 

3. 

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61. In a first order decomposition reaction, the time taken for the decomposition of reactant to one fourth and one eighth of its initial concentration are t_1 and t_2 (s), respectively. The ratio t_1/t_2 will be:

(1)$\frac{4}{3}$

(2)$\frac{3}{4}$

(3)$\frac{2}{3}$

(4)$\frac{3}{2}$

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62. Match the LIST-I with LIST-II

LIST-I (Complex/Species)	LIST-II (Shape & magnetic moment)
A. $[Ni(CO)_4]$	I. Tetrahedral, 2.8 BM
B. $[Ni(CN)_4]^{2-}$	II. Square planar, 0 BM
C. $[NiCl_4]^{2-}$	III. Tetrahedral, 0 BM
D. $[MnBr_4]^{2-}$	IV. Tetrahedral, 5.9 BM

Choose the correct answer from the options given below:
(1)A-I, B-II, C-III, D-IV
(2)A-III, B-II, C-I, D-IV
(3)A-III, B-IV, C-II, D-I
(4)A-IV, B-I, C-III, D-II

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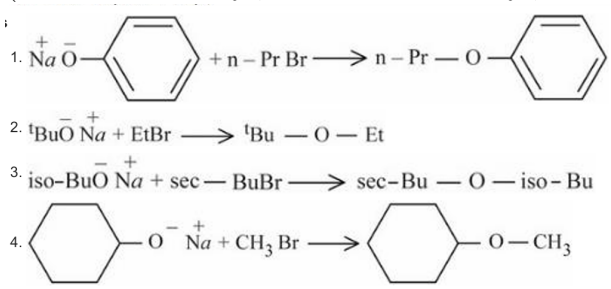
63. Which one of the following reactions will not lead to the desired ether formation in major proportion?
(iso-Bu = isobutyl, sec-Bu = sec-butyl, nPr = n-propyl, tBu = tert-butyl, Et = ethyl)



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64. Correct statements for an element with atomic number 9 are
A. There can be 5 electrons for which $m_s = +\frac{1}{2}$ and 4 electrons for which $m_s = -\frac{1}{2}$
B. There is only one electron in p_z orbital.
C. The last electron goes to orbital with $n = 2$ and $l = 1$.
D. The sum of angular nodes of all the atomic orbitals is 1.
Choose the correct answer from the options given below:
(1)A and B Only
(2)A, C and D Only
(3)C and D Only
(4)A and C Only

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65. The number of species from the following that are involved in sp^3d^2 hybridization is

$$[\mathrm{Co(NH_3)_6}]^{3+}, \mathrm{SF_6}, [\mathrm{CrF_6}]^{3-}, [\mathrm{CoF_6}]^{3-}, [\mathrm{Mn(CN)_6}]^{3-}$$

and

$$[\mathrm{MnCl_6}]^{3-}$$

(1)3
(2)4
(3)6
(4)5

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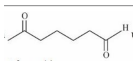
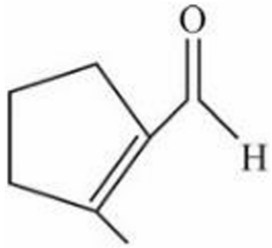
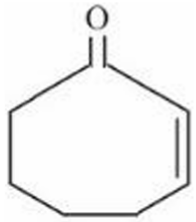
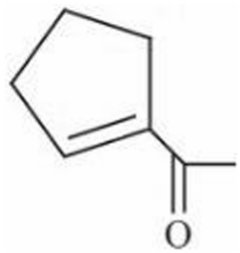
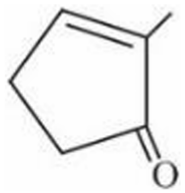
66. When  **undergoes intramolecular aldol condensation, the major product formed is:**

1. 

2. 

3. 

4. 

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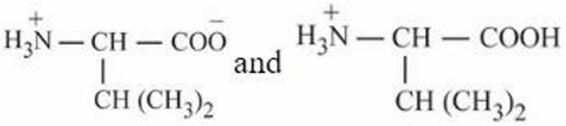
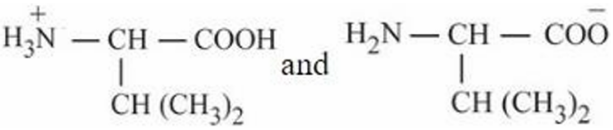
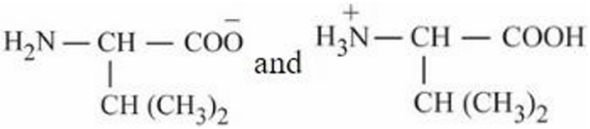
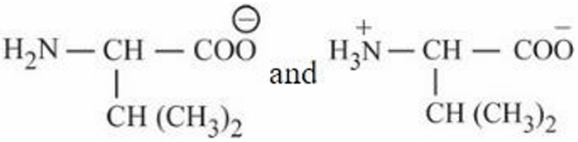
67. Choose the correct option for structures of A and B, respectively:

1. 

2. 

3. 

4. 

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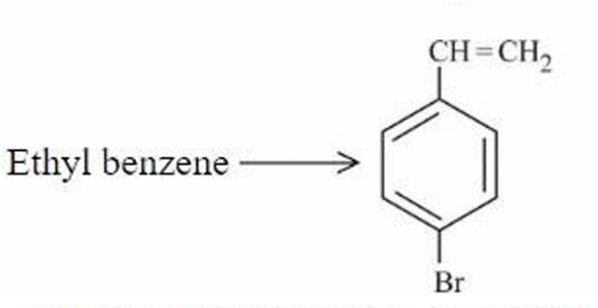
68. Choose the correct set of reagents for the following conversion:



(1) $Cl_2/Fe; Br_2/anhy.AlCl_3; aq.\ KOH$
(2) $Br_2/Fe; Cl_2, \Delta; alc.\ KOH$
(3) $Cl_2/anhy.AlCl_3; Br_2/Fe; alc.\ KOH$
(4) $Br_2/anhy.AlCl_3; Cl_2, \Delta; aq.\ KOH$

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69. Which of the following binary mixture does not show the behavior of minimum boiling azeotropes?
(1)$CS_2 + CH_3COCH_3$
(2)$H_2O + CH_3COC_2H_5$
(3)$C_6H_5OH + C_6H_5NH_2$
(4)$CH_3OH + CHCl_3$

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70. The atomic number of the element from the following with lowest 1^{st} ionization enthalpy is:
(1)87
(2)19

(3)32
(4)35

Section - B

71. 20 mL of sodium iodide solution gave 4.74 g silver iodide when treated with excess of silver nitrate solution. The molarity of the sodium iodide solution is _____ M. (Nearest Integer value)
(Given : Na = 23, I = 127, Ag = 108, N = 14, O = 16 g mol^{-1})

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72. The equilibrium constant for decomposition of H_2O (g)

$$H_2O(g) \rightleftharpoons H_2(g) + \frac{1}{2}O_2(g) \quad (\Delta G^\circ = 92.34\,\text{kJ mol}^{-1})$$

is 8.0×10^{-3} at 2300 K and total pressure at equilibrium is 1 bar. Under this condition, the degree of dissociation (α) of water is _____ $\times 10^{-2}$ (nearest integer value).
[Assume α is negligible with respect to 1]

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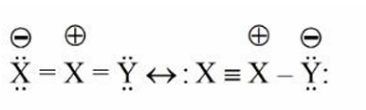
73. Resonance in X_2Y can be represented as



The enthalpy of formation of X_2Y is 80 kJ mol^{-1}, and the magnitude of resonance energy of X_2Y is:

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74. The energy of an electron in first Bohr orbit of H-atom is -13.6 eV. The magnitude of energy value of electron in the first excited state of Be^{3+} is _____ eV (nearest integer value)

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75. Consider the following half cell reaction

$$Cr_2O_7^{2-}(aq) + 6e^- + 14H^+(aq) \longrightarrow 2Cr^{3+}(aq) + 7H_2O(1)$$

The reaction was conducted with the ratio of

$$\frac{[Cr^{3+}]^2}{[Cr_2O_7^{2-}]} = 10^{-6}$$

The pH value at which the EMF of the half cell will become zero is _____ (nearest integer value)
[Given : standard half cell reduction potential

$$E^{\circ}_{Cr_2O_7^{2-},H^+/Cr^{3+}} = 1.33V, \quad \frac{2.303RT}{F} = 0.059V$$
