JEE Main 2025 April 3 Shift 1 Chemistry Question Paper

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

Chemistry

Section - A

51. Which of the following postulate of Bohr's model of hydrogen atom in not in agreement with quantum mechanical model of an atom ?

(1) An atom in a stationary state does not emit electromagnetic radiation as long as it stays in the same state

(2) An atom can take only certain distinct energies E_1, E_2, E_3, etc. These allowed states of constant energy are called the stationary states of atom

(3) When an electron makes a transition from a higher energy stationary state to a lower energy stationary state, then it emits a photon of light

(4) The electron in a H atom's stationary state moves in a circle around the nucleus

52. Given below are two statements: Statement I : The N-N single bond is weaker and longer than that of P-P single bond Statement II : Compounds of group 15 elements in +3 oxidation states readily undergo disproportionation reactions. In the light of above statements, choose the correct answer from the options given below

(1) Statement I is true but Statement II is false
(2) Both Statement I and Statement II are false
(3) Statement I is false but Statement II is true
(4) Both Statement I and Statement II are true

53. Given below are two statements:
Statement I: A catalyst cannot alter the equilibrium constant (K_c) of the reaction, temperature remaining constant.
Statement II: A homogeneous catalyst can change the equilibrium composition of a system, temperature remaining constant.
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) Both Statement I and Statement II are true
(3) Both Statement I and Statement II are false
(4) Statement I is true but Statement II is false

54. The metal ions that have the calculated spin only magnetic moment value of **4.9 B.M. are A.** Cr^{2+} **B.** Fe^{2+} **C.** Fe^{3+} **D.** Co^{2+} **E.** Mn^{2+} **Choose the correct answer from the options given below**

(1) A, C and E only
(2) B and E only
(3) B and E only
(4) A, B and E only

**55.** In a reaction A + B → C, initial concentrations of A and B are related as $[A]_0 = 8[B]_0$. The half lives of A and B are 10 min and 40 min, respectively. If they start to disappear at the same time, both following first order kinetics, after how much time will the concentration of both the reactants be same?
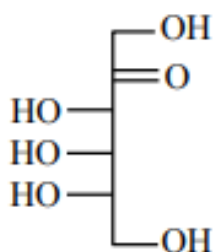
(1) 60 min
(2) 80 min
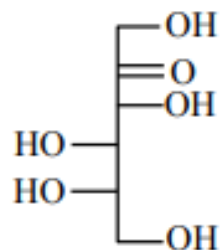
(3) 20 min
(4) 40 min

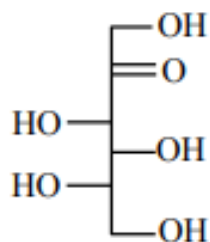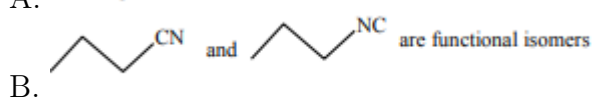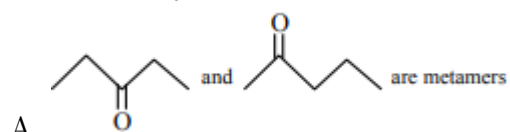## 56. Which of the following is the correct structure of L-fructose?
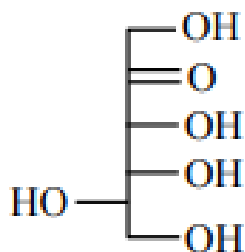
(1)

(2)
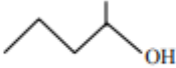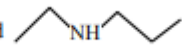
(3)

(4)

---

57. Identify the correct statements from the following

A. and are metamers

B. and are functional isomers

C. and are position isomers

D. and are homologous

Choose the **correct** answer from the options given below

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

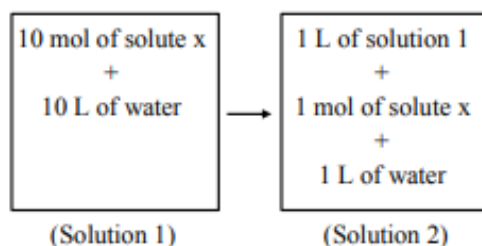58. **Among 10^{-10} g (each) of the following elements, which one will have the highest number of atoms?**
Element : Pb, Po, Pr and Pt

(1) Po
(2) Pr
(3) Pb
(4) Pt

---

59. **Which of the following statements are correct? A. The process of the addition an electron to a neutral gaseous atom is always exothermic B. The process of removing an electron from an isolated gaseous atom is always endothermic C. The 1st ionization energy of the boron is less than that of the beryllium D. The electronegativity of C is 2.5 in CH_4 and CCl_4 E. Li is the most electropositive among elements of group 1 Choose the correct answer from the options given below**

(1) B and C only
(2) A, C and D only
(3) B and D only
(4) B, C and E only

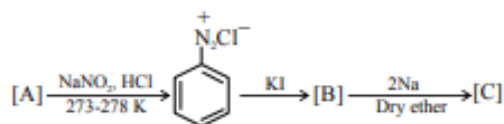60. **Which of the following properties will change when system containing solution 1 will become solution 2 ?**

10 mol of solute x
+
10 L of water

(Solution 1)

⟶

1 L of solution 1
+
1 mol of solute x
+
1 L of water

(Solution 2)

(1) Molar heat capacity
(2) Density
(3) Concentration
(4) Gibbs free energy
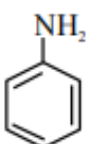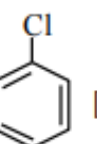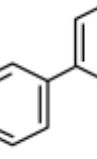
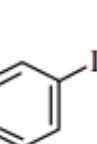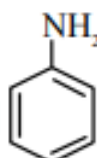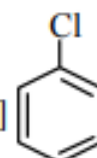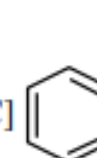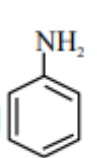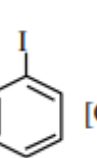**61. Number of molecules from below which cannot give iodoform reaction is:**
Ethanol, Isopropyl alcohol, Bromoacetone, 2-Butanol, 2-Butanone, Butanal, 2-Pentanone, 3-Pentanone, Pentanal and 3-Pentanol

(1) 2
(2) 4
(3) 3
(4) 2

---

62. Identify [A], [B], and [C], respectively in the following reaction sequence :

$[A] \xrightarrow[273\text{-}278\ K]{NaNO_2,\ HCl}$ (benzenediazonium chloride, $\overset{+}{N_2}Cl^-$) $\xrightarrow{KI} [B] \xrightarrow[\text{Dry ether}]{2Na} [C]$

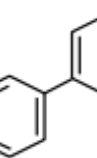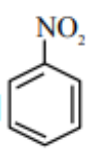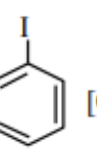(1) [A] aniline (NH_2), [B] chlorobenzene (Cl), [C] iodobenzene (I)

(2) [A] aniline (NH_2), [B] chlorobenzene (Cl), [C] benzene

(3) [A] aniline (NH_2), [B] iodobenzene (I), [C] biphenyl

(4) [A] nitrobenzene (NO_2), [B] iodobenzene (I), [C] biphenyl

---

63. In the following reactions, which one is NOT correct?

5

(1)

(2)

(3)

(4)

---
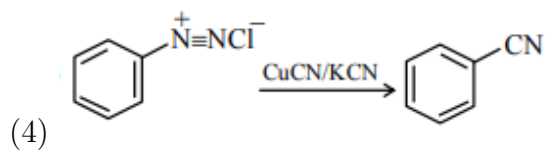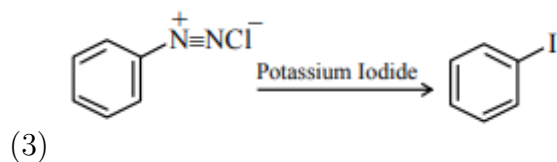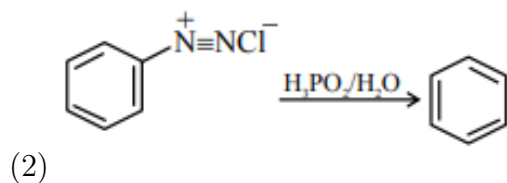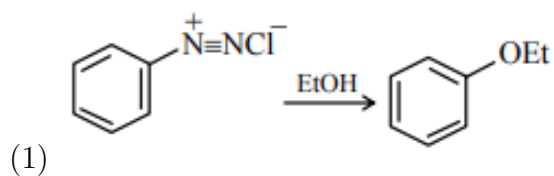
64. The correct order of the complexes

$[\text{Co}(\text{NH}_3)_5(\text{H}_2\text{O})]^{3+}$ (A),

$[\text{Co}(\text{NH}_3)_6]^{3+}$ (B),

$[\text{Co}(\text{CN})_6]^{3-}$ (C),

$[\text{CoCl}(\text{NH}_3)_5]^{2+}$ (D)

in terms of wavelength of light absorbed is:

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

---

65. In the following system, $PCl_5(g) \rightleftharpoons PCl_3(g) + Cl_2(g)$ at equilibrium, upon addition of xenon gas at constant T and p, the concentration of

(1) PCl_5 will increase
(2) Cl_2 will decrease
(3) PCl_5, PCl_3 and Cl_2 remain constant
(4) PCl_3 will increase

66. 2 moles each of ethylene glycol and glucose are dissolved in 500 g of water. The boiling point of the resulting solution is: (Given: Ebullioscopic constant of water $= 0.52 \, \text{K kg mol}^{-1}$)

(1) 379.2 K
(2) 377.3 K
(3) 375.3 K
(4) 277.3 K

---

67. Which compound would give 3-methyl-6-oxoheptanal upon ozonolysis ?

(1)

(2)

(3)

(4)

---
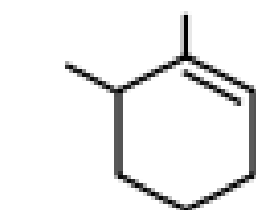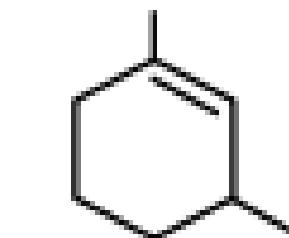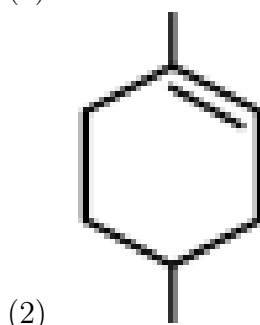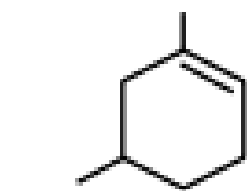
68. Match the LIST-I with LIST-II

LIST-I	LIST-II
A. PF_5	I. dsp^2
B. SF_6	II. sp^3d
C. $Ni(CO)_4$	III. sp^3d^2
D. $[PtCl_4]^{2-}$	IV. sp^3

Choose the **correct** answer from the options given below :

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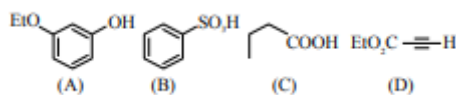(4) A-III, B-I, C-IV, D-II

---

69. The least acidic compound, among the following is

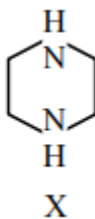
(A)   (B)   (C)   (D)

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

---

70. Correct order of limiting molar conductivity for cations in water at 298 K is :

(1) $H^+ > K^+ > Ca^{2+} > Mg^{2+}$
(2) $H^+ > Ca^{2+} > Mg^{2+} > K^+$
(3) $Mg^{2+} > H^+ > Ca^{2+} > K^+$
(4) $H^+ > Na^+ > Ca^{2+} > Mg^{2+} > K^+$

Section - B

71. During estimation of Nitrogen by Dumas' method of compound X (0.42 g) :

X

mL of N_2 gas will be liberated at STP. (nearest integer)
(Given molar mass in g mol^{-1} : C : 12, H : 1, N : 14)

---

72. 0.5 g of an organic compound on combustion gave 1.46 g of CO_2 and 0.9 g of H_2O. The percentage of carbon in the compound is _____ (Nearest integer)
(Given : Molar mass (in g mol^{-1}) C : 12, H : 1, O : 16)

---

73. The number of optical isomers exhibited by the iron complex (A) obtained from the following reaction is _____ $FeCl_3 + KOH + H_2C_2O_4 \rightarrow A$

---

74. Given: $\Delta H_f^0[C(graphite)] = 710$ kJ mol^1 $\Delta_c H^0 = 414$ kJ mol^1 $\Delta_{H-H}^0 = 436$ kJ mol^1 $\Delta_{C-H}^0 = 611$ kJ mol^1 The $\Delta H_{C=C}^0$ for $CH_2 = CH_2$ is _____ kJ mol^{-1} (nearest integer value)

---

75. Consider the following reactions $A + HCl + H_2SO_4 \rightarrow CrO_2Cl_2 + SideProducts$ Little amount $CrO_2Cl_2(vapour) + NaOH \rightarrow B + NaCl + H_2O$ $B + H^+ \rightarrow C + H_2O$ The number of terminal 'O' present in the compound 'C' is _____