

JEE Main 2025 April 3 Shift 2 Chemistry Question Paper

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

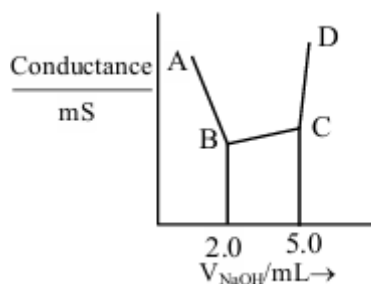
Read the following instructions very carefully and strictly follow them:

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. 40 mL of a mixture of CH_3COOH and HCl (aqueous solution) is titrated against 0.1 M NaOH solution conductometrically. Which of the following statement is correct?



- (1) The concentration of CH_3COOH in the original mixture is 0.005 M
- (2) The concentration of HCl in the original mixture is 0.005 M
- (3) CH_3COOH is neutralised first followed by neutralisation of HCl
- (4) Point 'C' indicates the complete neutralisation HCl

52. 10 mL of 2 M NaOH solution is added to 20 mL of 1 M HCl solution kept in a beaker. Now, 10 mL of this mixture is poured into a volumetric flask of 100 mL containing 2 moles of HCl and made the volume upto the mark with distilled water. The solution in this flask is :

- (1) 0.2 M NaCl solution
- (2) 20 M HCl solution
- (3) 10 M HCl solution
- (4) Neutral solution

53. Fat soluble vitamins are : A. Vitamin B_1 B. Vitamin C C. Vitamin E D. Vitamin B_{12} E. Vitamin K

Choose the correct answer from the options given below :

- (1) C and D Only
- (2) A and B Only
- (3) B and C Only
- (4) C and E Only

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

LIST-I		LIST-II	
A.	Pnicogen (group 15)	I.	Ts
B.	Chalcogen (group 16)	II.	Og
C.	Halogen (group 17)	III.	Lv
D.	Noble gas (group 18)	IV.	Mc

Choose the correct answer from the options given below :

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

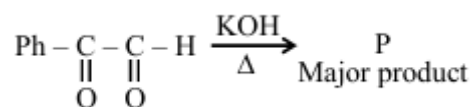
55. For electron in '2s' and '2p' orbitals, the orbital angular momentum values, respectively are :

- (1) $\sqrt{2}\frac{h}{2\pi}$ and 0
 (2) $\frac{h}{2\pi}$ and $\sqrt{2}\frac{h}{2\pi}$
 (3) 0 and $\sqrt{6}\frac{h}{2\pi}$
 (4) 0 and $\sqrt{2}\frac{h}{2\pi}$

56. Compounds that should not be used as primary standards in titrimetric analysis are : A. $\text{Na}_2\text{Cr}_2\text{O}_7$ B. Oxalic acid C. NaOH D. $\text{FeSO}_4 \cdot 6\text{H}_2\text{O}$ E. Sodium tetraborate
 Choose the most appropriate answer from the options given below :

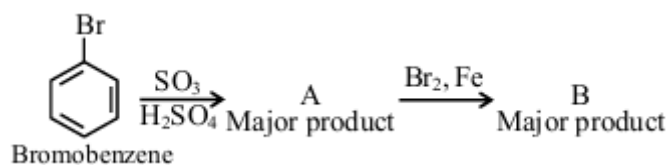
- (1) B and D Only
 (2) D and E Only
 (3) C, D and E Only
 (4) A, C and D Only

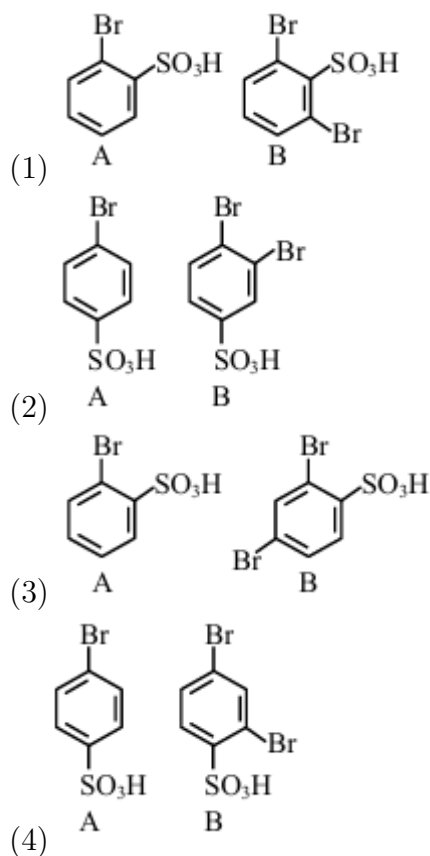
57. The major product (P) in the following reaction is :



- (1) $\text{Ph}-\underset{\text{OH}}{\underset{|}{\text{CH}}}-\text{CH}_2\text{OH}$
 (2) $\text{Ph}-\underset{\text{OH}}{\underset{|}{\text{CH}}}-\text{COO}^-\text{K}^+$
 (3) $\text{Ph}-\underset{\text{O}}{\underset{\parallel}{\text{C}}}-\text{COO}^-\text{K}^+$
 (4) $\text{Ph}-\underset{\text{O}}{\underset{\parallel}{\text{C}}}-\text{CH}_2\text{OH}$

58. In the following series of reactions identify the major products A and B respectively.





59. The standard cell potential (E_{cell}°) of a fuel cell based on the oxidation of methanol in air that has been used to power a television relay station is measured as 1.21 V. The standard half cell reduction potential for O_2/H_2O (E_{O_2/H_2O}°) is 1.229 V. Choose the correct statement:

- (1) The standard half cell reduction potential for the reduction of CO_2 (E_{CO_2/CH_3OH}°) is 19 mV
 - (2) Oxygen is formed at the anode.
 - (3) Reactants are fed at one go to each electrode.
 - (4) Reduction of methanol takes place at the cathode.
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60. Identify the diamagnetic octahedral complex ions from below ; A. $[Mn(CN)_6]^{3-}$ B. $[Co(NH_3)_6]^{3+}$ C. $[Fe(CN)_6]^{4-}$ D. $[Co(H_2O)_3F_3]$

Choose the correct answer from the options given below :

- (1) B and D Only
 - (2) A and D Only
 - (3) A and C Only
 - (4) B and C Only
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61. In Dumas' method for estimation of nitrogen 0.4 g of an organic compound gave 60 mL of nitrogen collected at 300 K temperature and 715 mm Hg pressure. The percentage composition of nitrogen in the compound is (Given : Aqueous tension at 300 K = 15 mm Hg)

- (1) 15.71
- (2) 20.95
- (3) 17.46
- (4) 7.85

62. Mass of magnesium required to produce 220 mL of hydrogen gas at STP on reaction with excess of dil. HCl is Given : Molar mass of Mg is 24 g mol^{-1} .

- (1) 235.7 g
- (2) 0.24 mg
- (3) 236 mg
- (4) 2.444 g

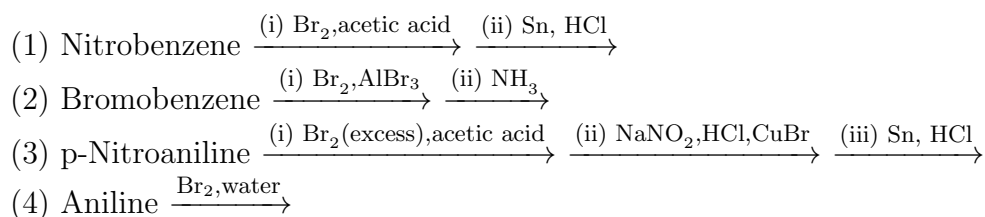
63. Given below are two statements : Statement I : Wet cotton clothes made of cellulose based carbohydrate takes comparatively longer time to get dried than wet nylon polymer based clothes. Statement II : Intermolecular hydrogen bonding with water molecule is more in nylon-based clothes than in the case of cotton clothes. 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 true (4) Both Statement I and Statement II are false

64. Given below are two statements : Statement I : CrO_3 is a stronger oxidizing agent than MoO_3 Statement II : Cr(VI) is more stable than Mo(VI) 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 true (4) Both Statement I and Statement II are false

65. Given below are two statements : Statement I : Hyperconjugation is not a permanent effect. Statement II : In general, greater the number of alkyl groups attached to a positively charged C-atom, greater is the hyperconjugation interaction and stabilization of the cation. In the light of the 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

66. Given below are two statements : Statement I : When a system containing ice in equilibrium with water (liquid) is heated, heat is absorbed by the system and there is no change in the temperature of the system until whole ice gets melted. Statement II : At melting point of ice, there is absorption of heat in order to overcome intermolecular forces of attraction within the molecules of water in ice and kinetic energy of molecules is not increased at melting point. In the light of the above statements, choose the correct answer from the options given below: (1) Statement I is true but Statement II is false (2) Statement I is false but Statement II is true (3) Both Statement I and Statement II are true (4) Both Statement I and Statement II are false

67. The sequence from the following that would result in giving predominantly 3, 4, 5-Tribromoaniline is :



68. The correct orders among the following are:

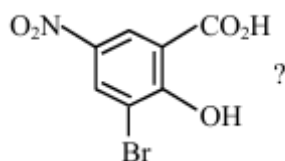
- A. Atomic radius : B > Al > Ga > In > Tl
- B. Electronegativity : Al > Ga > In > Tl > B
- C. Density : Tl > In > Ga > Al > B

D. 1st Ionisation Energy : In > Al > Ga > Tl > B

Choose the correct answer from the options given below :

- (1) B and D Only
- (2) A and C Only
- (3) C and D Only
- (4) A and B Only

69. What is the correct IUPAC name of



- (1) 3-Bromo-2-hydroxy-5-nitrobenzoic acid
- (2) 3-Bromo-4-hydroxy-1-nitrobenzoic acid
- (3) 2-Hydroxy-3-bromo-5-nitrobenzoic acid
- (4) 5-Nitro-3-bromo-2-hydroxybenzoic acid

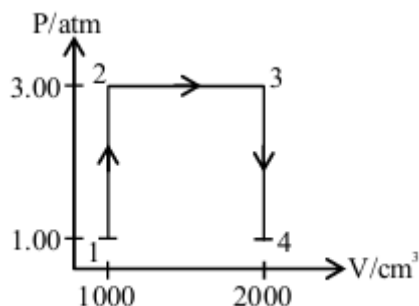
70. Consider the following statements related to temperature dependence of rate constants. Identify the correct statements, A. The Arrhenius equation holds true only for an elementary homogeneous reaction. B. The unit of A is same as that of k in Arrhenius equation. C. At a given temperature, a low activation energy means a fast reaction. D. A and Ea as used in Arrhenius equation depend on temperature. E. When Ea \gg RT. A and Ea become interdependent. Choose the correct answer from the options given below :

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

Section - B

71. X g of nitrobenzene on nitration gave 4.2 g of m-dinitrobenzene. X = _____ g. (nearest integer) [Given : molar mass (in g mol⁻¹) C : 12, H : 1, O : 16, N : 14]

72. A perfect gas (0.1 mol) having $\bar{C}_V = 1.50 R$ (independent of temperature) undergoes the above transformation from point 1 to point 4. If each step is reversible, the total work done (w) while going from point 1 to point 4 is (_____) J (nearest integer) [Given : $R = 0.082 \text{ L atm K}^{-1}$]



73. A sample of n-octane (1.14 g) was completely burnt in excess of oxygen in a bomb calorimeter, whose heat capacity is 5 kJ K^{-1} . As a result of combustion, the temperature of the calorimeter increased by 5 K. The magnitude of the heat of combustion at constant volume is _____ kJ mol^{-1} (nearest integer).

74. Among, Sc, Mn, Co and Cu, identify the element with highest enthalpy of atomisation. The spin only magnetic moment value of that element in its +2 oxidation state is _____ BM (in nearest integer).

75. The total number of structural isomers possible for the substituted benzene derivatives with the molecular formula C_7H_{12} is _____.
