JEE Main 2025 April 7 Shift 1 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:

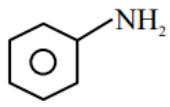
1. Multiple choice questions (MCQs)
2. Questions with numerical values as answers.
3. There are three sections: **Mathematics, Physics, Chemistry**.
4. **Mathematics:** 25 (20+5) 10 Questions with answers as a numerical value. Out of 10 questions, 5 questions are compulsory.
5. **Physics:** 25 (20+5) 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: Ozonolysis followed by treatment with Zn, H_2O of cis-2-butene gives ethanal.
Statement II: The product obtained by ozonolysis followed by treatment with Zn, H_2O of 3, 6-dimethyloct-4-ene has no chiral carbon atom.
In the light of the above statements, choose the correct answer from the options given below.
(1) Both Statement I and Statement II are true
(2) Statement I is false but Statement II is true
(3) Statement I is true but Statement II is false
(4) Both Statement I and Statement II are false

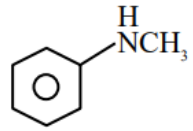
52. Which of the following amine(s) show(s) positive carbamylamine test?

A. 

B. $(CH_3)_2NH$

C. CH_3NH_2

D. $(CH_3)_3N$

E. 

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

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53. Reaction A(g) $\rightarrow$ 2B(g) + C(g) is a first-order reaction. It was started with pure A.

The following table shows the pressure of the system at different times:

t(min)	Pressure of system at time t(mm Hg)
10	160
∞	240

Which of the following options is incorrect?
(1) Initial pressure of A is 80 mm Hg
(2) The reaction never goes to completion
(3) Rate constant of the reaction is 1.693 min^{-1}
(4) Partial pressure of A after 10 minutes is 40 mm Hg

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54. Total enthalpy change for freezing of 1 mol water at 10°C to ice at -10°C is _____ (Given: $\Delta_{\text{fus}}H = x\,\text{kJ/mol}$, $C_p[\text{H}_2\text{O}(l)] = y\,\text{J mol}^{-1}\text{K}^{-1}$, and $C_p[\text{H}_2\text{O}(s)] = z\,\text{J mol}^{-1}\text{K}^{-1}$)
(1) $-x - 10y - 10z$
(2) $-10(100x + y + z)$
(3) $10(100x + y + z)$
(4) $x - 10y - 10z$

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55. An aqueous solution of HCl with pH 1.0 is diluted by adding equal volume of water (ignoring dissociation of water). The pH of HCl solution would be:

(Given log 2 = 0.30)

(1) reduce to 0.5
(2) increase to 1.3
(3) remain same
(4) increase to 2

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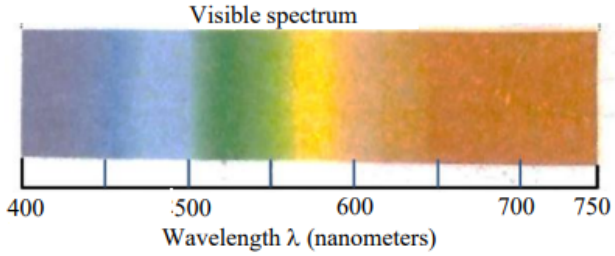
56. Given below are two statements: Statement I: Dimethyl ether is completely soluble in water. However, diethyl ether is soluble in water to a very small extent.
Statement II: Sodium metal can be used to dry diethyl ether and not ethyl alcohol.
In the light of the given statements, choose the correct answer from the options given below:
(1) Statement I is false but Statement II is true
(2) Both Statement I and Statement II are false
(3) Statement I is true but Statement II is false
(4) Both Statement I and Statement II are true

57.



Which of the following statements are correct, if the threshold frequency of caesium is 5.16×10^{14} Hz?
(A) When Cs is placed inside a vacuum chamber with an ammeter connected to it and yellow light is focused on Cs, the ammeter shows the presence of current.
(B) When the brightness of the yellow light is dimmed, the value of the current in the ammeter is reduced.
(C) When a red light is used instead of the yellow light, the current produced is higher with respect to the yellow light.
(D) When a blue light is used, the ammeter shows the formation of current.
(E) When a white light is used, the ammeter shows formation of current.

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58. Which of the following is the correct IUPAC name of the given organic compound (X)?

The structure of compound X is as follows:

$$H_3C - CH_3 - CH = CH - H - Br$$

(1) 2-Bromo-2-methylbut-2-ene
(2) 3-Bromo-3-methylprop-2-ene
(3) 1-Bromo-2-methylbut-2-ene
(4) 4-Bromo-3-methylbut-2-ene

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59. At the sea level, the dry air mass percentage composition is given as nitrogen gas : 70.0, oxygen gas : 27.0, and argon gas : 3.0. If the total pressure is 1.15 atm, then calculate the ratio of the following respectively:

(i) **Partial pressure of nitrogen gas to partial pressure of oxygen gas**
(ii) **Partial pressure of oxygen gas to partial pressure of argon gas**

(Given: Molar mass of N, O, and Ar are 14, 16, and 40 g mol^{-1} respectively)
(1) 4.26, 19.3
(2) 2.59, 11.85
(3) 5.46, 17.8
(4) 2.96, 11.2

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60. Given below are two statements:
Statement I: Mohr's salt is composed of only three types of ions—ferrous, ammonium, and sulphate.
Statement II: If the molar conductance at infinite dilution of ferrous, ammonium, and sulphate ions are x_1, x_2, and x_3 S $cm^2\,mol^{-1}$, respectively, then the molar conductance for Mohr's salt solution at infinite dilution would be given by $x_1 + x_2 + 2x_3$.

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

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61. The number of valence electrons present in the metal among Cr, Co, Fe, and Ni which has the lowest enthalpy of atomisation is
(1) 8
(2) 9
(3) 6
(4) 10

62. When a salt is treated with sodium hydroxide solution, it gives gas X. On passing gas X through reagent Y, a brown coloured precipitate is formed. X and Y respectively, are:

(1) X = NH and Y = HgO
(2) X = NH and Y = KHgI + KOH
(3) X = NHCl and Y = KOH
(4) X = HCl and Y = NHCl

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63. The group 14 elements A and B have the first ionisation enthalpy values of 708 and 715 kJ mol^{-1} respectively. The above values are lowest among their group members. The nature of their ions A^{2+} and B^{4+} respectively is:

(1) both reducing
(2) both oxidising
(3) reducing and oxidising
(4) oxidising and reducing

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64. The first transition series metal 'M' has the highest enthalpy of atomisation in its series. One of its aquated ion (M^{n+}) exists in green colour. The nature of the oxide formed by the above M^{n-} ion is:

(1) neutral
(2) acidic
(3) basic
(4) amphoteric

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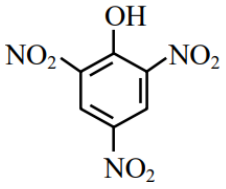
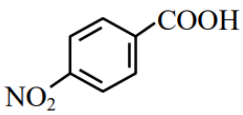
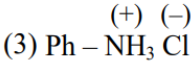
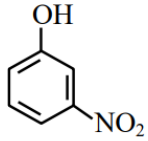
65. Which of the following compounds is least likely to give effervescence of CO_2 in presence of aq. $NaHCO_3$?

(1) 

(2) 

(3) 

(4) 

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

LIST-I Molecule/ion		LIST-II Bond pair : lone pair (on the central atom)	
A.	ICl_2^-	I.	4 : 2
B.	H_2O	II.	4 : 1
C.	SO_2	III.	2 : 3
D.	XeF_4	IV.	2 : 2

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

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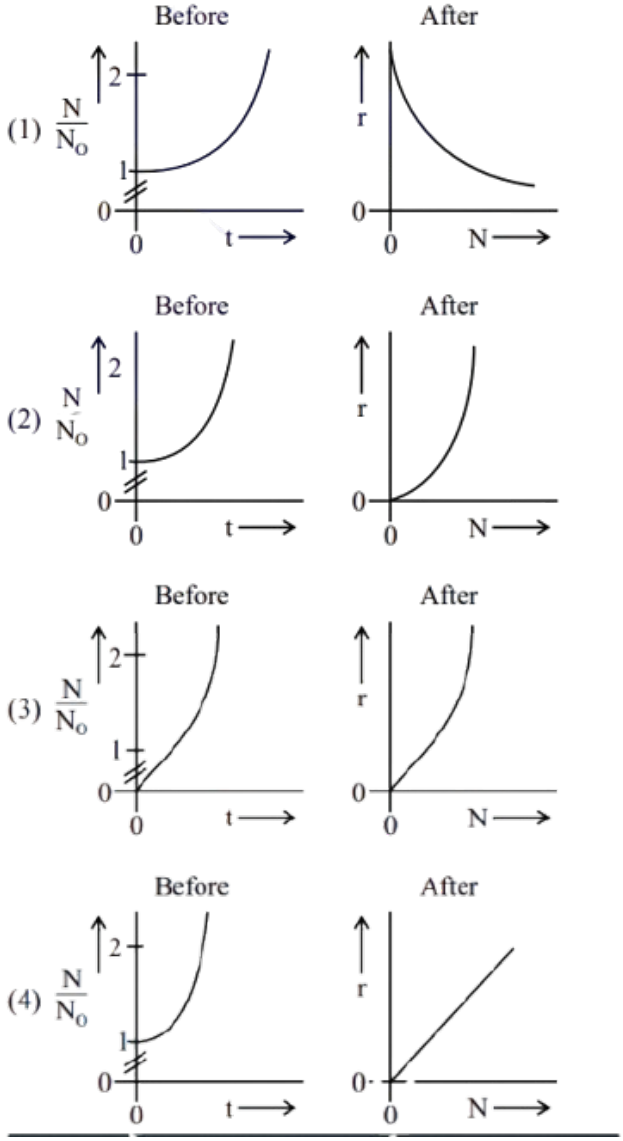
67. A person's wound was exposed to some bacteria and then bacteria growth started to happen at the same place. The wound was later treated with some antibacterial medicine and the rate of bacterial decay (r) was found to be proportional with the square of the existing number of bacteria at any instance. Which of the following set of graphs correctly represents the 'before' and 'after' situation of the application of the medicine?

[Given: N = No. of bacteria, t = time, bacterial growth follows 1st order kinetics.]



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68. Given below are two statements:

Statement I: D-(+)-glucose + D-(+)-fructose $\xrightarrow{H_2O}$ sucrose

sucrose $\xrightarrow{\text{Hydrolysis}}$ D-(+)-glucose + D-(+)-fructose

Statement II: Invert sugar is formed during sucrose hydrolysis.

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

(1) Both Statement I and Statement II are true.

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

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

(4) Both Statement I and Statement II are false.

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69. An octahedral complex having molecular composition $Co.5NH_3.Cl.SO_4$ has two isomers A and B. The solution of A gives a white precipitate with $AgNO_3$ solution

and the solution of B gives a white precipitate with $BaCl_2$ solution. The type of isomerism exhibited by the complex is,

(1) Co-ordinate isomerism
(2) Linkage isomerism
(3) Ionisation isomerism
(4) Geometrical isomerism

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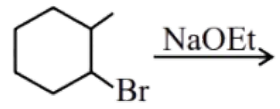
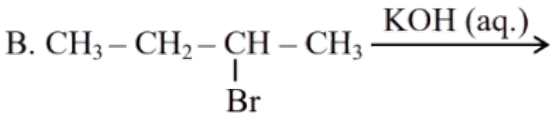
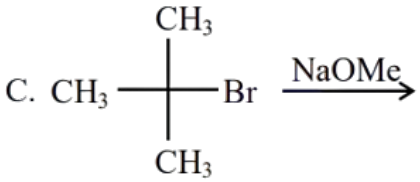
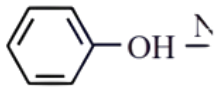
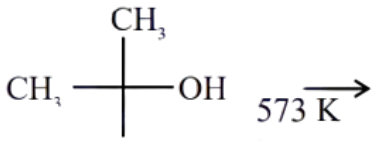
70. The reactions which cannot be applied to prepare an alkene by elimination, are

A. 

B. 

C. 

D. 

E 

Choose the correct answer from the options given below:

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

SECTION-B

71. An organic compound weighing 500 mg, produced 220 mg of CO_2 on complete combustion. The percentage composition of carbon in the compound is ..... % (nearest integer).

(Given molar mass in g mol^{-} of C: 12, O: 16)

72. Thyroxine, the hormone has the given structure.
The percentage of iodine in thyroxine is ..... % (nearest integer). (Given molar mass in g mol^{-} C:12, H:1, O:16, N:14, I:127)

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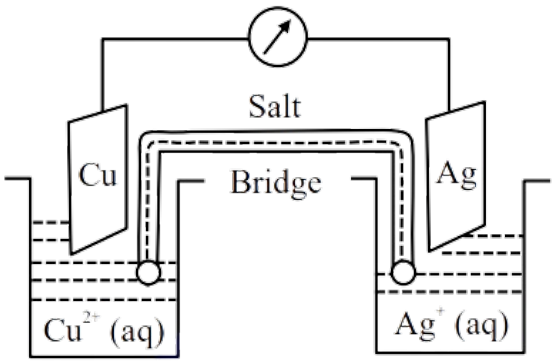
73. 1 Faraday electricity was passed through Cu^{2+} (1.5 M, 1 L)/Cu and 0.1 Faraday was passed through Ag^{+} (0.2 M, 1 L) electrolytic cells. After this, the two cells were connected as shown below to make an electrochemical cell. The emf of the cell thus formed at 298 K is:



Given:

$$E^{\circ}_{Cu^{2+}/Cu} = 0.34\,V$$
$$E^{\circ}_{Ag^{+}/Ag} = 0.8\,V$$
$$\frac{2.303RT}{F} = 0.06\,V$$

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74. The percentage dissociation of a salt (MX_3) solution at a given temperature (van't Hoff factor $i = 2$) is ..... % (Nearest integer)

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75. The number of paramagnetic complexes among $[FeF_6]^{3-}, [Fe(CN)_6]^{3-}, [Mn(CN)_6]^{3-}, [Co(C_2O$ and $[CoF_6]^{3-}$, which involved d^2sp^3 hybridization is .....
