

JEE Main 2025 April 2 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.

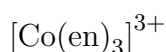
Chemistry

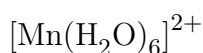
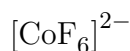
SECTION-A

51. When a concentrated solution of sulphanilic acid and 1-naphthylamine is treated with nitrous acid (273 K) and acidified with acetic acid, the mass (g) of 0.1 mole of product formed is: (Given molar mass in g mol^{-1} : H : 1, C : 12, N : 14, O : 16, S : 32)

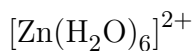
- (1) 343 (2) 330 (3) 33 (4) 66

52. The d-orbital electronic configuration of the complex among





, and



that has the highest Crystal Field Stabilization Energy (CFSE) is:

- (1) $t_{2g}^6 e_g^0$ (2) $t_{2g}^6 e_g^4$ (3) $t_{2g}^3 e_g^2$ (4) $t_{2g}^4 e_g^2$

53. Given below are two statements:

Statement (I): Neopentane forms only one monosubstituted derivative.

Statement (II): The melting point of neopentane is higher than n-pentane.

In the light of the above statements, choose the most appropriate answer from the options given below:

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

54. Which among the following molecules is (a) involved in sp^3d hybridization, (b) has different bond lengths, and (c) has lone pair of electrons on the central atom?

- (1) PF_5 (2) XeF_4 (3) SF_4 (4) XeF_2

55. Formation of $\text{Na}_4[\text{Fe}(\text{CN})_5\text{NOS}]$, a purple colored complex formed by addition of sodium nitroprusside in sodium carbonate extract of salt indicates the presence of:

- (1) Sodium ion (2) Sulphate ion (3) Sulphide ion (4) Sulphite ion

56. In 3,3-dimethylhex-1-ene-4-yne, there are _____ sp^3 , _____ sp^2 and _____ sp hybridized carbon atoms respectively:

- (1) 4, 2, 2 (2) 3, 3, 2 (3) 2, 4, 2 (4) 2, 2, 4

57. Which of the following statements are true?

(A) The subsidiary quantum number l describes the shape of the orbital occupied by the electron.

(B)  $\Rightarrow$ is the boundary surface diagram of the $2p_x$ orbital.

(C) The + and - signs in the wave function of the $2p_x$ orbital refer to charge.

(D) The wave function of $2p_x$ orbital is zero everywhere in the xy plane.

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

58. The type of hybridization and the magnetic property of $[MnCl_4]^{2-}$ are:

- (1) d^2sp^3 , paramagnetic with four unpaired electrons
(2) sp^3d^2 , paramagnetic with four unpaired electrons
(3) d^2sp^3 , paramagnetic with two unpaired electrons
(4) sp^3d^2 , paramagnetic with two unpaired electrons
-

59. Consider the following reactions. From these reactions which reaction will give carboxylic acid as a major product?

- (A) $R - C \equiv N$
 (i) H^+/H_2O (mild condition)
 $\xrightarrow{\hspace{1.5cm}}$
- (B) $R - MgX$
 (ii) CO_2 (iii) H_3O^+
 $\xrightarrow{\hspace{1.5cm}}$
- (C) $R - C \equiv N$
 (i) $SnCl_2/HCl$ (ii) H_3O^+
 $\xrightarrow{\hspace{1.5cm}}$
- (D) $RCH_2OH \xrightarrow{PCC}$
- (E) $COCl \xrightarrow{(i) H_2[Pd-BaSO_4]} (ii) Br_2/H_2O$

Choose the correct answer from the options given below:

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

60. Electronic configuration of four elements A, B, C and D are given below:

- (A) $1s^2 2s^2 2p^3$
(B) $1s^2 2s^2 2p^4$
(C) $1s^2 2s^2 2p^5$
(D) $1s^2 2s^2 2p^7$

Which of the following is the correct order of increasing electronegativity (Pauling's scale)?

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

61. Match List-I with List-II

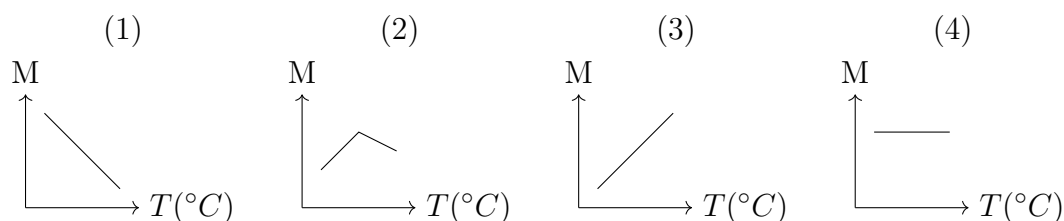
List-I (Purification technique)	List-II (Mixture of organic compounds)
(A) Distillation (simple)	(I) Diesel + Petrol
(B) Fractional distillation	(II) Aniline + Water
(C) Distillation under reduced pressure	(III) Chloroform + Aniline
(D) Steam distillation	(IV) Glycerol + Spent-lye

Choose the correct answer from the options given below:

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

62. g of NaCl is added to water in a beaker with a lid. The temperature of the system is raised from 1°C to 25°C. Which out of the following plots is best suited for the change in the molarity (M) of the solution with respect to temperature?

[Consider the solubility of NaCl remains unchanged over the temperature range]



63. Arrange the following in order of magnitude of work done by the system/on the system at constant temperature:

- (a) $|W_{\text{reversible}}|$ for expansion in infinite stage
 (b) $|W_{\text{irreversible}}|$ for expansion in single stage
 (c) $|W_{\text{reversible}}|$ for compression in infinite stage
 (d) $|W_{\text{irreversible}}|$ for compression in single stage

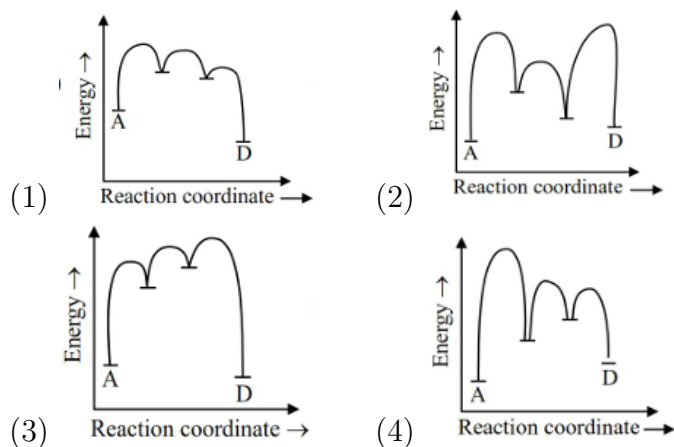
Choose the correct answer from the options given below:

- (1) $a > b > c > d$ (2) $d > c = a > b$
 (3) $c = a > d > b$ (4) $a > c > b > d$

63. Arrange the following in order of magnitude of work done by the system/on the system at constant temperature:

- (a) $|W_{\text{reversible}}|$ for expansion in infinite stage
 (b) $|W_{\text{irreversible}}|$ for expansion in single stage

68. Which of the following graphs correctly represents the variation of thermodynamic properties of Haber's process?



69. A tetrapeptide "X" on complete hydrolysis produced glycine (Gly), alanine (Ala), valine (Val), and leucine (Leu) in equimolar proportions. The number of possible tetrapeptide sequences involving each of these amino acids is:

- (1) 16 (2) 32 (3) 8 (4) 24
-

70. For a first-order reaction, the time required for completion of 90% of the reaction is 't' minutes. What percentage of the reaction will be completed in $\frac{t}{2}$ minutes?

- (1) 45% (2) 68% (3) 75% (4) 80%
-

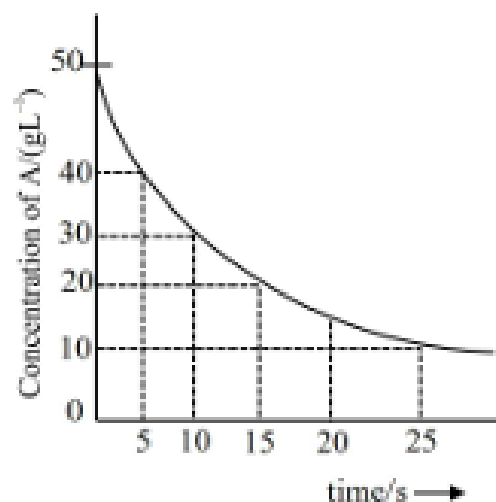
SECTION-B

71. For the reaction $A \rightarrow B$, the time required (in seconds) for the concentration of A to reduce to 2.5 from an initial concentration of 50 is _____. (Nearest integer)

Given: $\log_{10} 2 = 0.3010$

(Nearest integer)

Given : $\log 2 = 0.3010$



72. A 0.2 (w/v) solution of NaOH has resistivity 870.0. The molar conductivity of the solution will be _____ $\times 10^2$. (Nearest integer)

73. For the reaction sequence: $\text{CH}_3\text{CH}_2\text{CH}_2\text{CH}(\text{Br})\text{CH}_3 \xrightarrow{\text{[alcoholic KOH]}} \text{P} \xrightarrow{\text{[Br}_2\text{]}} \text{Q}$ with 151 of 2-bromopentane (80% yield to P, 100% to Q), the mass of Q obtained is _____. (Molar masses: C=12, H=1, Br=80)

74. When 1 each of compounds AB and AB₂ are dissolved in 15 of water separately, they increase the boiling point by 2.7 and 1.5 respectively. The atomic mass of A is 25 amu. (Given: $K_b = 0.5$)

75. The spin-only magnetic moment value of M^{n+} ion (from Ni, Zn, Mn, Cu) with least enthalpy of atomization is _____. Here n = number of diamagnetic complexes among: $\text{K}_2[\text{NiCl}_4]$, $[\text{Zn}(\text{H}_2\text{O})_6]\text{Cl}_2$, $\text{K}_3[\text{Mn}(\text{CN})_6]$, $[\text{Cu}(\text{PPh}_3)_3]\text{I}$
