JEE Main 2025 April 2 Shift 1 Chemistry Question Paper

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

General Instructions

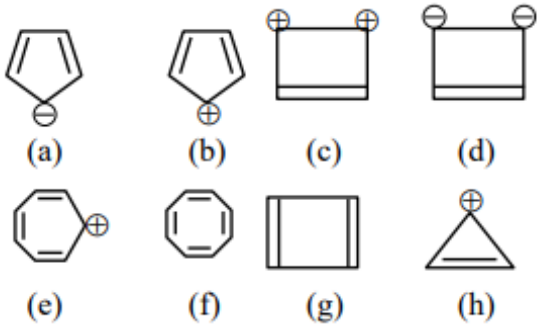
Read the following instructions very carefully and strictly follow them:

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. Designate whether each of the following compounds is aromatic or not aromatic.



(1) e, g aromatic and a, b, c, d, f, h not aromatic
(2) b, e, f, g aromatic and a, c, d, h not aromatic
(3) a, b, c, d aromatic and e, f, g, h not aromatic
(4) a, c, d, e, h aromatic and b, f, g not aromatic

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52. An optically active alkyl halide C_4H_9Br [A] reacts with hot KOH dissolved in ethanol and forms alkene [B] as major product which reacts with bromine to give dibromide [C]. The compound [C] is converted into a gas [D] upon reacting with alcoholic $NaNH_2$. During hydration 18 gram of water is added to 1 mole of gas [D] on warming with mercuric sulphate and dilute acid at 333 K to form compound [E]. The IUPAC name of compound [E] is :

(1) But-2-yne (2) Butan-2-ol (3) Butan-2-one (4) Butan-1-al

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53. The property/properties that show irregularity in the first four elements of group-17 are:
(A) Covalent radius
(B) Electron affinity
(C) Ionic radius
(D) First ionization energy

Choose the correct answer from the options given below: (1) B and D only (2) A and C only (3) B only (4) A, B, C and D

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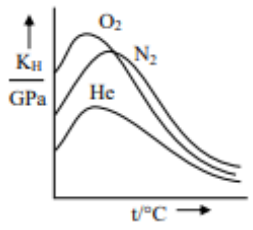
54. Which of the following graph correctly represents the plots of K_H at 1 bar gases in water versus temperature?

(1)



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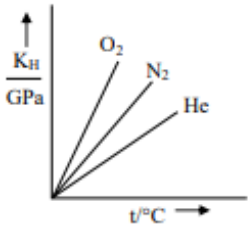

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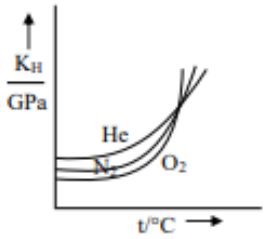

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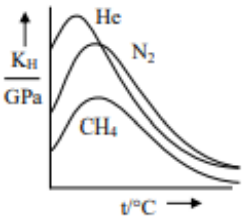

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55. According to Bohr's model of hydrogen atom, which of the following statement is incorrect?

(1) Radius of 3rd orbit is nine times larger than that of 1st orbit. (2) Radius of 8th orbit is four times larger than that of 4th orbit. (3) Radius of 6th orbit is three times larger than that of 4th orbit. (4) Radius of 4th orbit is four times larger than that of 2nd orbit.

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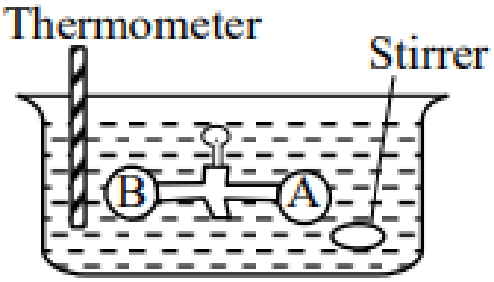
56. Two vessels A and B are connected via stopcock. Vessel A is filled with a gas at a certain pressure. The entire assembly is immersed in water and allowed to come to thermal equilibrium with water. After opening the stopcock the gas from vessel A expands into vessel B and no change in temperature is observed in the thermometer. Which of the following statement is true?



(1) $dw = 0$
(2) $dq = 0$
(3) $du = 0$
(4) The pressure in the vessel B before opening the stopcock is zero

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57. A solution is made by mixing one mole of volatile liquid A with 3 moles of volatile liquid B. The vapor pressure of pure A is 200 mm Hg and that of the solution is 500 mm Hg. The vapor pressure of pure B and the least volatile component of the solution, respectively, are:

(1) 1400 mm Hg, A (2) 1400 mm Hg, B
(3) 600 mm Hg, A (4) 600 mm Hg, B

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58. Consider the above reaction, what mass of CaCl will be formed if 250 ml of 0.76 M HCl reacts with 1000 g of CaCO?

(1) 3.908 g (2) 2.636 g
(3) 10.545 g (4) 5.272 g

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59. If equal volumes of AB and XY (both are salts) aqueous solutions are mixed, which of the following combination will give precipitate of AY, at 300 K?

(1) K (300 K) for $AB = 5.2 \times 10^3$
(2) K (300 K) for $AB = 1.0 \times 10^3$
(3) K for 10^{-10} M AB, 5×10^{-10} M XY
(4) K for 15×10^{-10} M XY

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60. Among SO, NF, NH, XeF, CIF, and SF, the hybridization of the molecule with non-zero dipole moment and one or more lone-pairs of electrons on the central atom is:

(1) sp^3
(2) sp^2
(3) sp^3d^2
(4) sp^3d

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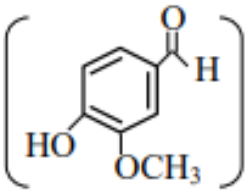
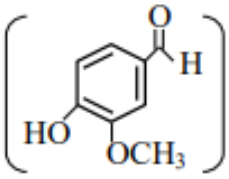
61. Given below are two statements:
Statement I: Vanillin will react with NaOH and also with Tollen's reagent.



Statement II: Vanillin will undergo self-aldol condensation very easily.



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

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62. Identify the correct statement among the following:

(1) All naturally occurring amino acids except glycine contain one chiral centre.
(2) All naturally occurring amino acids are optically active.

(3) Glutamic acid is the only amino acid that contains a –COOH group at the side chain.
(4) Amino acid, cysteine easily undergoes dimerization due to the presence of free SH group.

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63. The correct order of basic nature on aqueous solution for the bases NH_3, NH_2, CH_3NH_2, $CH_3CH_2NH_2$, $(CH_3CH_2)_2NH$ is:

(1) $NH_3 > NH_2 > CH_3NH_2 > CH_3CH_2NH_2 > (CH_3CH_2)_2NH$
(2) $NH_2 > NH_3 > CH_3NH_2 > CH_3CH_2NH_2 > (CH_3CH_2)_2NH$
(3) $NH_3 > CH_3NH_2 > NH_2 > CH_3CH_2NH_2 > (CH_3CH_2)_2NH$
(4) $NH_3 > CH_3CH_2NH_2 > NH_2 > CH_3NH_2 > (CH_3CH_2)_2NH$

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64. Given below are two statements:
Statement I: The metallic radius of Al is less than that of Ga.

Statement II: The ionic radius of Al^{3+} is less than that of Ga^{3+}.

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

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

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65. Given below are two statements:
Statement I: High spin complexes have high values of Δ_o.

Statement II: Low spin complexes are formed when Δ_o is high.

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

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66. Choose the correct sets with respective observations:
(1) $CuSO_4$ (acidified with acetic acid) + $K_2Fe(CN)_6$ (neutralized with NaOH) $\rightarrow$ Blue precipitate

(2) $2CuSO_4 + K_2Fe(CN)_6 \rightarrow$ Blue precipitate

(3) $4FeCl_3 + 3K_4Fe(CN)_6 \rightarrow \frac{1}{2}K_4Fe(CN)_6$

(4) $37Cl_2 + 2KFe(CN)_6 \rightarrow 6KC1$

In the light of the above options, choose the correct set:

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

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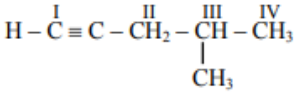
68. Consider the following compound (X):



(X)

The most stable and least stable carbon radicals, respectively, produced by homolytic cleavage of corresponding C - H bond are:

(1) I, IV (2) III, II (3) II, IV (4) I, III

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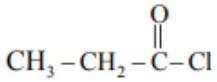
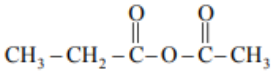
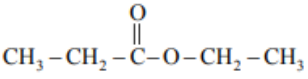
69. Consider the following molecules:



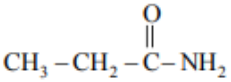
(p)



(q)



(r)



(s)

The order of rate of hydrolysis is:

(1) $r > q > p > s$ (2) $q > p > r > s$
(3) $p > r > q > s$ (4) $p > q > r > s$

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70. A molecule with the formula AX_2Y_2 has all it's elements from p-block. Element A is rarest, monotomic, non-radioactive from its group and has the lowest ionization energy value among X and Y. Elements X and Y have first and second highest electronegativity values respectively among all the known elements. The shape of the molecule is:

(1) Square pyramidal
(2) Octahedral
(3) Planar
(4) Tetrahedral

Chemistry

SECTION-B

71. A transition metal (M) among Mn, Cr, Co, and Fe has the highest standard electrode potential M^n/M^{n+1}. It forms a metal complex of the type $[M\text{CN}]^{n+}$. The number of electrons present in the e-orbital of the complex is .....
(1) 6 (2) 5 (3) 4 (4) 3

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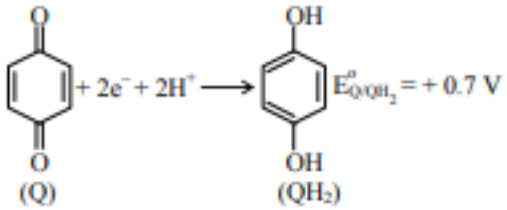
72. Consider the following electrochemical cell at standard condition.

$$\text{Au(s)} \text{ — } \text{QH}_2 \text{ — } \text{QH}_X(0.01M) \text{ — } \text{Ag(1M)} \text{ — } \text{Ag(s)} \;\; E_{\text{cell}} = +0.4V$$

The couple QH/Q represents quinhydrone electrode, the half cell reaction is given below:

$$\text{QH}_2 \rightarrow \text{Q} + 2e^- + 2H^+ \; E^\circ_{\text{QH/Q}} = +0.7V$$



$$\left[\text{Given}: E^\circ_{Ag^+/Ag} = +0.8\text{V and } \frac{2.303RT}{F} = 0.06\text{V}\right]$$

The pK_b value of the ammonium halide salt (NH_4X) used here is _____. (nearest integer)

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

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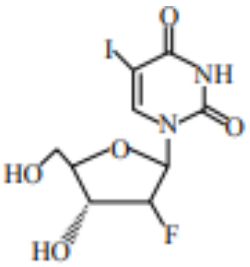
73. 0.1 mol of the following given antiviral compound (P) will weigh .....x 10^{-1} g.



(P)

(Given : molar mass in g mol^{-1} H: 1, C : 12, N : 14, O : 16, F : 19, I : 127)

(1) 372 (2) 450 (3) 500 (4) 350

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74. Consider the following equilibrium,

$$CO(g) + H_2(g) \rightleftharpoons CH_3OH(g)$$

0.1 mol of CO along with a catalyst is present in a 2 dm^3 flask maintained at 500 K. Hydrogen is introduced into the flask until the pressure is 5 bar and 0.04 mol of CH_3OH is formed. The K_p is ..... x 10^7 (nearest integer).

Given: $R = 0.08\,dm^3\,bar\,K^{-1}\,mol^{-1}$

Assume only methanol is formed as the product and the system follows ideal gas behavior.
(1) 74 (2) 67 (3) 54 (4) 85

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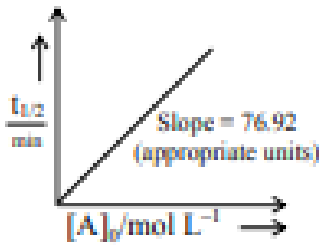
75. For the reaction $A \rightarrow$ products,



The concentration of A at 10 minutes is _____

× 10^{-1} mol L^{-1} (nearest integer).

The reaction was started with 2.5 mol L^{-1} of A.

(1) 2435 (2) 2000 (3) 1000 (4) 3000
