JEE Main 2023 6 April Shift 2 Chemsitry Question Paper

Time Allowed :3 Hours	Maximum Marks :300	Total Questions :90

General Instructions

Read the following instructions very carefully and strictly follow them:

1. The test is of 3 hours duration.
2. The question paper consists of 90 questions, out of which 75 are to attempted. The maximum marks are 300.
3. There are three parts in the question paper consisting of Physics, Chemistry and Mathematics having 30 questions in each part of equal weightage.
4. Each part (subject) has two sections.
   (i) Section-A: This section contains 20 multiple choice questions which have only one correct answer. Each question carries 4 marks for correct answer and –1 mark for wrong answer.
   (ii) Section-B: This section contains 10 questions. In Section-B, attempt any five questions out of 10. The answer to each of the questions is a numerical value. Each question carries 4 marks for correct answer and –1 mark for wrong answer. For Section-B, the answer should be rounded off to the nearest integer

CHEMISTRY

Section-A

61. Match List I with List II

List I (Natural Amino acid)	List II (One Letter Code)
(A) Arginine	(I) D
(B) Aspartic acid	(II) N
(C) Asparagine	(III) A
(D) Alanine	(IV) R

Choose the correct answer from the options given below:

(1) (A) – III, (B) – I, (C) – II (D) – IV

(2) (A) – IV, (B) – I, (C) – II (D) – III

(3) (A) – IV, (B) – I, (C) – III (D) – II

(4) (A) – I, (B) – III, (C) – IV (D) – II

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62. Formation of which complex, among the following, is not a confirmatory test of Pb^{2+} ions

(1) lead sulphate

(2) lead nitrate

(3) lead chromate

(4) lead iodide

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63. The volume of 0.02 M aqueous HBr required to neutralize 10.0 mL of 0.01 M aqueous $Ba(OH)_2$ is (Assume complete neutralization)

(1) 5.0 mL

(2) 10.0 mL

(3) 2.5 mL

(4) 7.5 mL

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64. Group–13 elements react with O_2 in amorphous form to form oxides of type M_2O_3 (M = element). Which among the following is the most basic oxide?

(1) Al_2O_3

(2) Tl_2O_3

(3) Ga_2O_3

(4) B_2O_3

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65. The IUPAC name of $K_3[Co(C_2O_4)_3]$ is

(1) Potassium tris(oxalate) cobalte(III)

(2) Potassium trioxalatocobalt(III)

(3) Potassium tris(oxalate)cobalt(III)

(4) Potassium trioxalatocobaltate(III)

66. If the radius of the first orbit of hydrogen atom is a_0, then de Broglie's wavelength of electron in 3rd orbit is:

(A) $\frac{\pi a_0}{6}$

(B) $\frac{\pi a_0}{3}$

(C) $6\pi a_0$

(D) $3\pi a_0$

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67. The group of chemicals used as pesticide is:

(A) Sodium chlorate, DDT, PAN

(B) DDT, Aldrin

(C) Aldrin, Sodium chlorate, Sodium arsenite

(D) Dieldrin, Sodium arsenite, Tetrachlorothene

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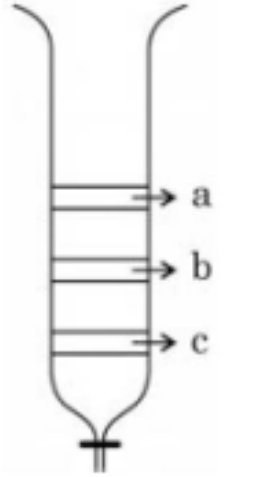
68. From the figure of column chromatography given below, identify incorrect statements.



(A) Compound 'c' is more polar than 'a' and 'b'

(B) Compound 'a' is least polar

(C) Compound 'b' comes out of the column before 'c' and after 'a'

(D) Compound 'a' spends more time in the column

Choose the correct answer from the options given below:

(1) A, B and D only

(2) A, B and C only

(3) B and D only

(4) B, C and D only

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69. Ion having highest hydration enthalpy among the given alkaline earth metal ions is:

(1) Be^{2+}

(2) Ba^{2+}

(3) Ca^{2+}

(4) Sr^{2+}

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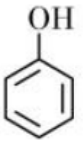
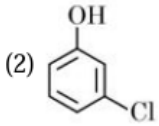
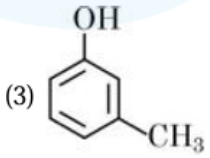
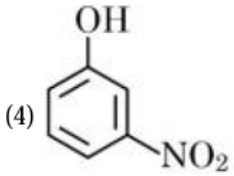
70. The strongest acid from the following is:

(1) 

(2) 

(3) 

(4) 

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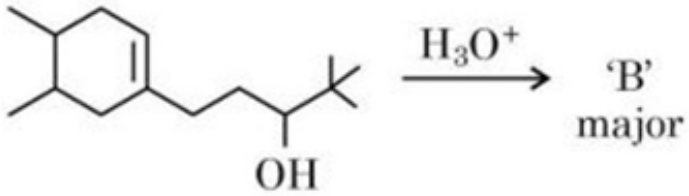
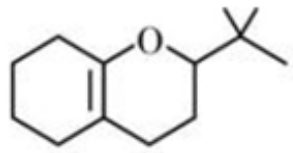
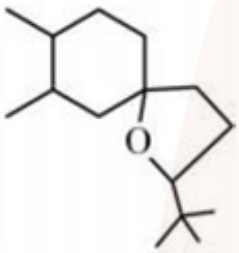
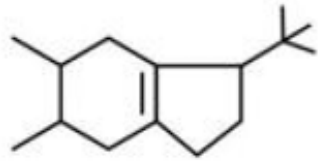
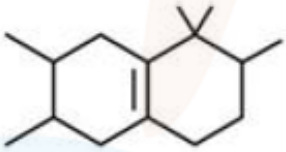
71. In the following reaction, 'B' is



(1) 

(2) 

(3) 

(4) 

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72. Structures of $BeCl_2$ in solid state, vapour phase and at very high temperature respectively are:

(1) Polymeric, Dimeric, Monomeric

(2) Dimeric, Polymeric, Monomeric

(3) Monomeric, Dimeric, Polymeric

(4) Polymeric, Monomeric, Dimeric

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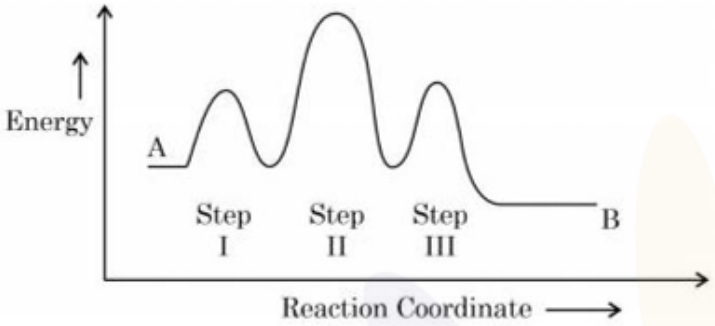
73. Consider the following reaction that goes from A to B in three steps as shown below:



Choose the correct option

	Number of intermediates	Number of Activated complex	Rate determining step
(1)	2	3	II
(2)	3	2	II
(3)	2	3	III
(4)	2	3	I

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74. The product, which is not obtained during the electrolysis of brine solution is:

(1) HCl

(2) NaOH

(3) Cl_2

(4) H_2

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75. Which one of the following elements will remain as liquid inside pure boiling water?

(1) Li

(2) Ga

(3) Cs

(4) Br

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76. Given below are two statements: one is labelled as "Assertion A" and the other is labelled as "Reason R"

Assertion A: In the complex $Ni(CO)_4$ and $Fe(CO)_5$, the metals have zero oxidation state.

Reason R: Low oxidation states are found when a complex has ligands capable of π-donor character in addition to the σ-bonding.

In the light of the above statement, choose the most appropriate answer from the options given below.

(1) A is not correct but R is correct.

(2) A is correct but R is not correct.

(3) Both A and R are correct and R is the correct explanation of A.

(4) Both A and R are correct but R is NOT the correct explanation of A.

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77. Given below are two statements:

Statement I: Morphine is a narcotic analgesic. It helps in relieving pain without producing sleep.

Statement II: Morphine and its derivatives are obtained from opium poppy.

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.

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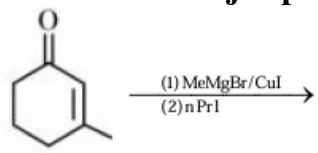
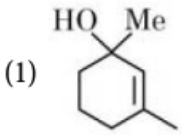
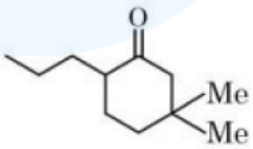
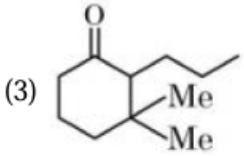
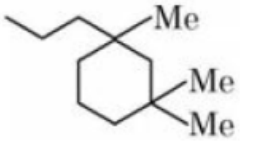
78. Find out the major product from the following reaction.



(1) 

(2) 

(3) 

(4) 

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79. During the reaction of permanganate with thiosulphate, the change in oxidation of manganese occurs by value of 3. Identify which of the below medium will favour the reaction.

(1) aqueous neutral

(2) aqueous acidic

(3) both aqueous acidic and neutral

(4) both aqueous acidic and faintly alkaline

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80. Element not present in Nessler's reagent is

(1) K

(2) N

(3) I

(4) Hg

Section-B

81. The standard reduction potentials at 298 K for the following half cells are given below:

NO_3^- + $4H^+$ + $3e^- \rightarrow$ NO(g) + $2H_2O$ $\quad E^0 = 0.97V$

V^{2+} + $2e^- \rightarrow$ V $\quad E^0 = -1.19V$

Fe^{3+} + $3e^- \rightarrow$ Fe $\quad E^0 = -0.04V$

Ag^+ + $e^- \rightarrow$ Ag(s) $\quad E^0 = 0.80V$

Au^{3+} + $3e^- \rightarrow$ Au(s) $\quad E^0 = 1.40V$

The number of metal(s) which will be oxidized by NO_3^- in aqueous solution is _____

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82. Number of crystal system from the following where body centred unit cell can be found is ____

Cubic, tetragonal, orthorhombic, hexagonal, rhombohedral, monoclinic, triclinic

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83. Among the following the number of compounds which will give positive iodoform reaction is ___

(a) 1-Phenylbutan-2-one

(b) 2-Methylbutan-2-ol

(c) 3-Methylbutan-2-ol

(d) 1-Phenylethanol

(e) 3,3-dimethylbutan-2-one

(f) 1-Phenylpropan-2-ol

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84. Number of isomeric aromatic amines with molecular formula $C_8H_{11}N$, which can be synthesized by Gabriel Phthalimide synthesis is_____

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85. Consider the following pairs of solution which will be isotonic at the same temperature. The number of pairs of solutions is/are_____

A. 1 M aq. NaCl and 2 M aq. Urea

B. 1 M aq. $CaCl_2$ and 1.5 M aq. KCl

C. 1.5 M aq. $AlCl_3$ and 2 M aq. Na_2SO_4

D. 2.5 M aq. KCl and 1 M aq. $Al_2(SO_4)_3$

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86. The number of colloidal systems from the following, which will have 'liquid' as the dispersion medium, is_____

Gem stones, paints, smoke, cheese, milk, hair cream, milk, insecticide sprays, froth, soap lather

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87. In an ice crystal, each water molecule is hydrogen bonded to_____ neighbouring molecules.

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88. Consider the following data:

Heat of combustion of H_2 (g) = -241.8 kJ mol^{-1}

Heat of combustion of C(s) = -393.5 kJ mol^{-1}

Heat of combustion of C_2H_5OH(l) = -1234.7 kJ mol^{-1}

The heat of formation of C_2H_5OH(l) is (-) _____ kJ mol^{-1} (Nearest integer).

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89. The equilibrium composition for the reaction $PCl_3 + Cl_2 \rightleftharpoons PCl_5$ at 298 K is given below:

l_3

= 0.2 mol L^{-1}, $[Cl_2]$ = 0.1 mol L^{-1}, $[PCl_5]$ = 0.40 mol L^{-1}

If 0.2 mol of Cl_2 is added at the same temperature, the equilibrium concentrations of PCl_5 is _____ $\times 10^{-2}$ mol L^{-1}.

90. The number of species having a square planar shape from the following is_____

XeF_4, SF_4, SiF_4, BF_4, BrF_4, $[Cu(NH_3)_4]^{2+}$, $[FeCl_4]^{2-}$, $[PtCl_4]^{2-}$