

JEE Main 2023 April 6 Shift 1 Chemistry Question Paper

Total Time Allowed : 180 minutes	Maximum Marks : 300	Total Questions : 90	Questions to be answered : 90
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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. 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**

Question 1: 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

Question 2: 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
-

Question 3: 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
-

Question 4: Group-13 elements react with O₂ in amorphous form to form oxides of type M₂O₃ (M = element). Which among the following is the most basic oxide?

- (1) Al₂O₃
 - (2) Tl₂O₃
 - (3) Ga₂O₃
 - (4) B₂O₃
-

Question 5: The IUPAC name of K₃[Co(C₂O₄)₃] is -

- (1) Potassium tris(oxalate)cobaltate(III)
 - (2) Potassium trioxalatocobalt(III)
 - (3) Potassium tris(oxalato)cobaltate(III)
 - (4) Potassium tris(oxalate)cobalt(III)
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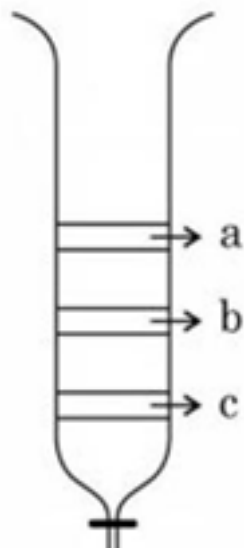
Question 6: If the radius of the first orbit of hydrogen atom is a₀, then de Broglie's wavelength of electron in 3rd orbit is

- (1) $\frac{\pi a_0}{6}$
 - (2) $\frac{\pi a_0}{3}$
 - (3) $6\pi a_0$
 - (4) $3\pi a_0$
-

Question 7: The group of chemicals used as pesticide is

- (1) Sodium chlorate, DDT, PAN
- (2) DDT, Aldrin
- (3) Aldrin, Sodium chlorate, Sodium arsinite
- (4) Dieldrin, Sodium arsinite, Tetrachloroethene

Question 8: 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.

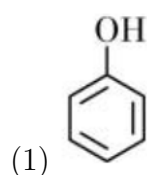
Choose the correct answer from the options given below:

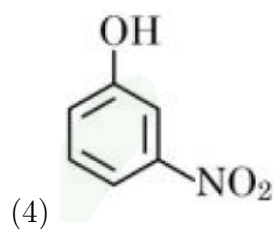
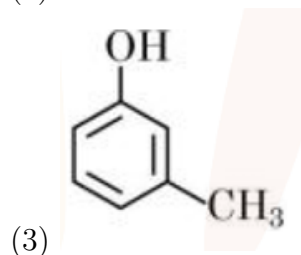
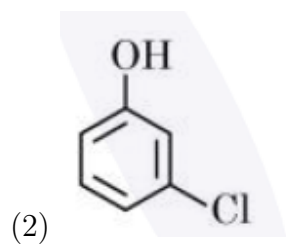
- (1) A, B and D only
- (2) A, B and C only
- (3) B and D only
- (4) B, C and D only

Question 9: Ion having highest hydration enthalpy among the given alkaline earth metal ions is:

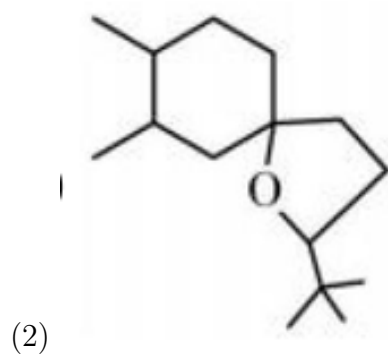
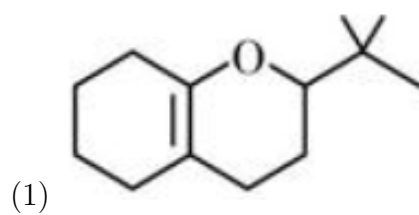
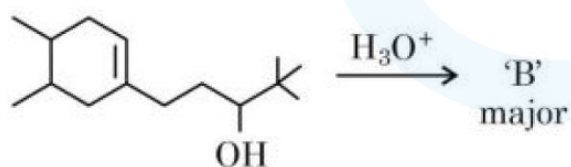
- (1) Be^{2+}
- (2) Ba^{2+}
- (3) Ca^{2+}
- (4) Sr^{2+}

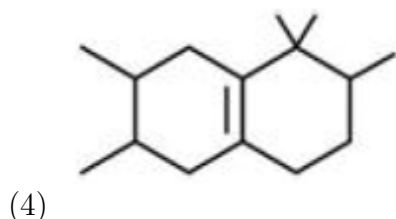
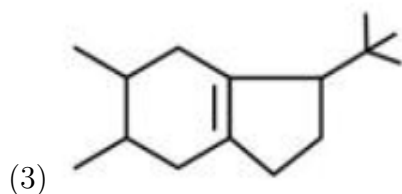
Question 10: The strongest acid from the following is





Question 11: In the following reaction, 'B' is

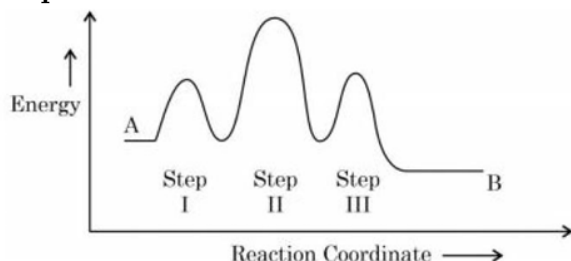




Question 12: Structures of BeCl_2 in solid state, vapour phase and at very high temperature respectively are:

- (1) Polymeric, Dimeric, Monomeric
- (2) Dimeric, Polymeric, Monomeric
- (3) Monomeric, Dimeric, Polymeric
- (4) Polymeric, Monomeric, Dimeric

Question 13: 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

Question 14: The product, which is not obtained during the electrolysis of brine solution is

- (1) HCl
- (2) NaOH
- (3) Cl_2
- (4) H_2

Question 15: Which one of the following elements will remain as liquid inside pure boiling water?

- (1) Li
- (2) Ga
- (3) Cs
- (4) Br

Question 16: 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

Question 17: Given below are two statements:

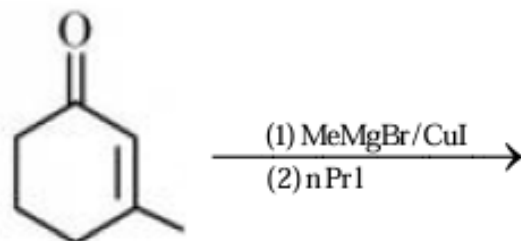
Statement I: Morphine is a narcotic analgesic. It helps in relieving pain without producing sleep.

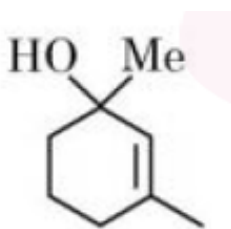
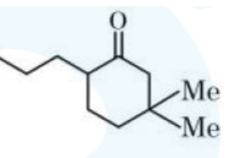
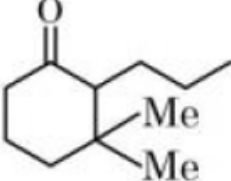
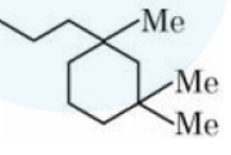
Statement II: Morphine and its derivatives are obtained from opium poppy.

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) Both statement I and statement II are true
- (3) Statement I is false but statement II is true
- (4) Both Statement I and Statement II are false

Question 18: Find out the major product from the following reaction.



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

Question 19: 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

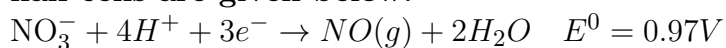
- (1) aqueous neutral
(2) aqueous acidic
(3) both aqueous acidic and neutral
(4) both aqueous acidic and faintly alkaline

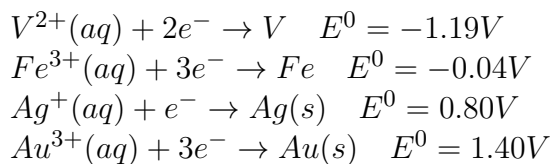
Question 20: Element not present in Nessler's reagent is

- (1) K
(2) N
(3) I
(4) Hg

Section B

Question 21: The standard reduction potentials at 298 K for the following half cells are given below:





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

Question 22: Number of crystal system from the following where body centred unit cell can be found, is _____

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

Question 23: 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

Question 24: Number of isomeric aromatic amines with molecular formula $C_8H_{11}N$, which can be synthesized by Gabriel Phthalimide synthesis is _____

Question 25: 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. $Al_2(SO_4)_3$

Question 26: 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, insecticide sprays, froth, soap lather

Question 27: In an ice crystal, each water molecule is hydrogen bonded to neighbouring molecules.

Question 28: Consider the following data

Heat of combustion of $\text{H}_2(\text{g}) = -241.8 \text{ kJ mol}^{-1}$

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

Heat of combustion of $\text{C}_2\text{H}_5\text{OH}(\text{l}) = -1234.7 \text{ kJ mol}^{-1}$

The heat of formation of $\text{C}_2\text{H}_5\text{OH}(\text{l})$ is (-) _____ kJ mol^{-1} (Nearest integer).

Question 29: The equilibrium composition for the reaction $\text{PCl}_3 + \text{Cl}_2 \rightleftharpoons \text{PCl}_5$ at 298 K is given below:

$\text{PCl}_3]_{eq} = 0.2 \text{ mol L}^{-1}$, $[\text{Cl}_2]_{eq} = 0.1 \text{ mol L}^{-1}$, $[\text{PCl}_5]_{eq} = 0.40 \text{ mol L}^{-1}$

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

Given: K_c for the reaction at 298 K is 20

Question 30: The number of species having a square planar shape from the following is _____

XeF_4 , SF_4 , SiF_4 , BrF_4^- , $[\text{Cu}(\text{NH}_3)_4]^{2+}$, $[\text{FeCl}_4]^{2-}$, $[\text{PtCl}_4]^{2-}$
