JEE Main 2023 8 April Shift 2 Chemistry Question Paper

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

General Instructions

Read the following instructions very carefully and strictly follow them:

(A) The Duration of test is 3 Hours. (B) This Question paper consists of 90 Questions. (C) There are three parts in the question paper consisting of Physics, Chemistry and Mathematics having 30 questions in each part of equal weightage.. (D) 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.. (E) (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.

Question 1: The statement/s which are true about antagonists from the following is/are:

A. They bind to the receptor site.

B. Get transferred inside the cell for their action.

C. Inhibit the natural communication of the body.

D. Mimic the natural messenger.

Choose the correct answer from the options given below:

(1) A and B

(2) A and C

(3) A, C and D

(4) B only

Question 2: The correct reaction profile diagram for a positive catalyst reaction is:

Choose the correct answer from the options given below:

Question 3: Given below are two statements: One is labeled as Assertion A, and the other is labeled as Reason R.

Assertion A: Sodium is about 30 times as abundant as potassium in the oceans.

Reason R: Potassium is bigger in size than sodium.

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

(1) Both A and R are true, but R is NOT the correct explanation of A.

(2) A is true, but R is false.

(3) A is false, but R is true.

(4) Both A and R are true, and R is the correct explanation of A.

Question 4: Which of these reactions is not a part of the breakdown of ozone in the stratosphere?

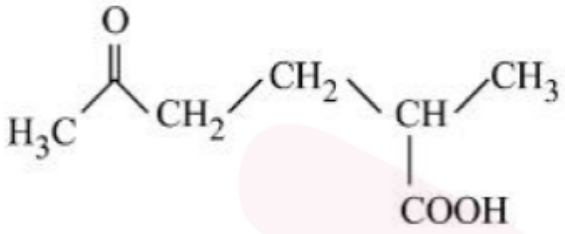
(1) $CF_2Cl_2(g) \xrightarrow{uv} Cl(g) + CF_2Cl(g)$

(2) $Cl(g) + O_3(g) \rightarrow ClO(g) + O_2(g)$

(3) $2\ ClO(g) \rightarrow ClO_2(g) + Cl(g)$

(4) $ClO(g) + O(g) \rightarrow Cl(g) + O_2(g)$

Question 5: The correct IUPAC nomenclature for the following compound is:



(1) 2 Methyl 5 oxohexanoic acid

(2) 2 Formyl 5 methylhexan 6 oic acid

(3) 5 Formyl 2 methylhexanoic acid

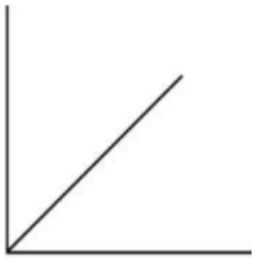
(4) 5 Methyl 2 oxohexan 6 oic acid

Question 6: Henry Moseley studied characteristic X-ray spectra of elements. The graph which represents his observation correctly is:

Given: ν = frequency of X-ray emitted

Z = atomic number

(1)



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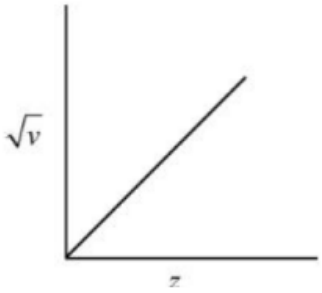

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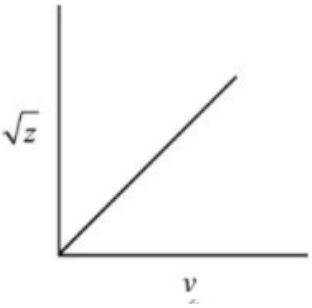

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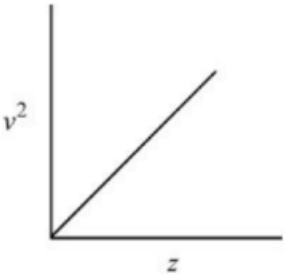


7. Match List I with List II.

List I (Coordination Complex)	List II (Number of Unpaired Electrons)
A. $[Cr(CN)_6]^{3-}$	I. 0
B. $[Fe(H_2O)_6]^{2+}$	II. 3
C. $[Co(NH_3)_6]^{3+}$	III. 2
D. $[Ni(NH_3)_6]^{2+}$	IV. 4

Choose the correct answer from the options given below:

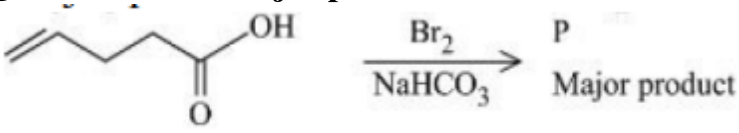
(1) $A - II, B - IV, C - I, D - III$

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

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

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

Question 8: The major product 'P' formed in the following reaction is:



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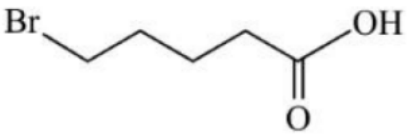

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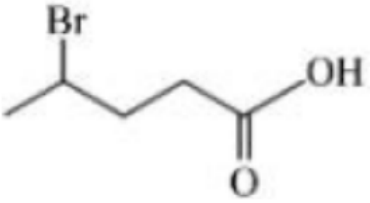

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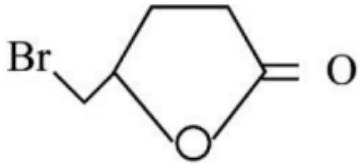

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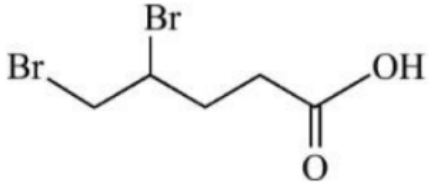


Question 9: For a good quality cement, the ratio of lime to the total of the oxides of Si, Al, and Fe should be as close as to:

(1) 2

(2) 1

(3) 3

(4) 4

Question 10: Match List I with List II.

List I (Natural Amino Acid)	List II (One Letter Code)
A. Glutamic acid	I. Q
B. Glutamine	II. W
C. Tyrosine	III. E
D. Tryptophan	IV. Y

Choose the correct answer from the options given below:

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

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

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

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

Question 11: Which of the following have the same number of significant figures?

(A) 0.00253

(B) 1.0003

(C) 15.0

(D) 163

Choose the correct answer from the options given below:

(1) B and C only

(2) A, B and C only

(3) A, C and D only

(4) C and D only

Question 12: Given below are two statements:

Statement I: Methyl orange is a weak acid.

Statement II: The benzenoid form of methyl orange is more intense/deeply coloured than the quinonoid form.

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 incorrect

(2) Both Statement I and Statement II are correct

(3) Statement I is correct but Statement II is incorrect

(4) Statement I is incorrect but Statement II is correct

Question 13: The descending order of acidity for the following carboxylic acids is –

A. CH_3COOH

B. $F_3C–COOH$

C. $ClCH_2–COOH$

D. $BrCH_2–COOH$

Choose the correct answer from the options given below:

(1) D > B > A > E > C

(2) B > D > C > E > A

(3) E > D > B > A > C

(4) B > C > D > E > A

Question 14: In the Hall-Héroult process, the following is used for reducing Al_2O_3:

(1) Magnesium

(2) Graphite

(3) Na_3AlF_6

(4) CaF_2

Question 15: Arrange the following gases in increasing order of van der Waals constant a:

A. Ar

B. CH_4

C. H_2O

D. C_6H_6

Choose the correct answer from the options given below:

(1) A, B, C and D

(2) B, C, D and A

(3) C, D, B and A

(4) D, C, B and A

Question 16: Given below are two statements:

Statement I: In redox titration, the indicators used are sensitive to change in pH of the solution.

Statement II: In acid-base titration, the indicators used are sensitive to change in oxidation potential.

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 incorrect

(2) Statement I is incorrect but Statement II is correct

(3) Statement I is correct but Statement II is incorrect

(4) Both Statement I and Statement II are correct

Question 17: Which of the following can reduce decomposition of H_2O_2 on exposure to light?

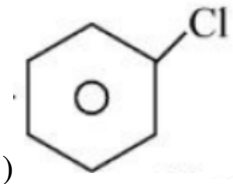
(1) Dust

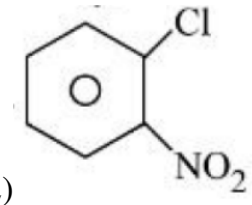
(2) Urea

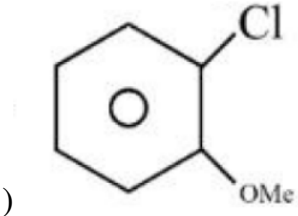
(3) Glass containers

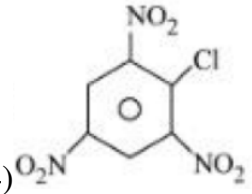
(4) Alkali

Question 18: The correct order of reactivity of the following haloarenes towards nucleophilic substitution with aqueous NaOH is:

(1) 

(2) 

(3) 

(4) 

Choose the correct answer from the options given below:

(1) D > B > A > C

(2) A > B > D > C

(3) C > A > D > B

(4) D > C > B > A

Question 19: A compound 'X' when treated with phthalic anhydride in the presence of concentrated H_2SO_4, yields 'Y'. 'Y' is used as an acid-base indicator. 'X' and 'Y' are respectively:

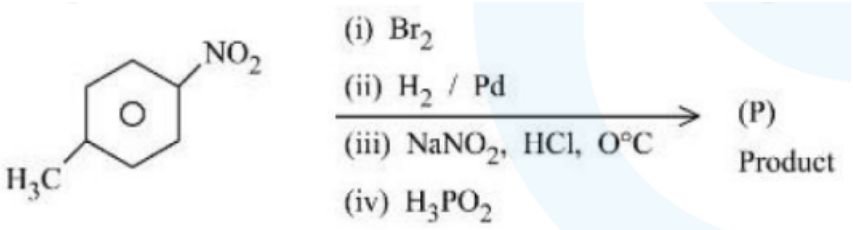
(1) Anisole, methyl orange

(2) Toluidine, Phenolphthalein

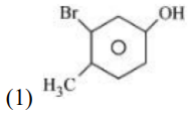
(3) Carbolic acid, Phenolphthalein

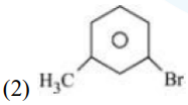
(4) Salicylaldehyde, Phenolphthalein

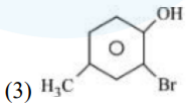
Question 20: The product (P) formed from the following multistep reaction is:

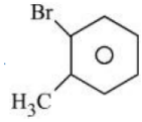


Choose the correct answer from the options given below:

(1) 

(2) 

(3) 

(4) 

Question 21: The observed magnetic moment of the complex $[Mn(NCS)_6]^4$ is 6.06 BM. The numerical value of x is:

Question 22: For the complete combustion of ethane,

$$C_2H_4(g) + 3O_2(g) \rightarrow 2CO_2(g) + 2H_2O(l),$$

the amount of heat produced as measured in a bomb calorimeter is 1406 kJ mol^1 at 300 K. The minimum value of $T\Delta S$ needed to reach equilibrium is:

Question 23: The solubility product of $BaSO_4$ is 1×10^{-10} at 298 K. The solubility of $BaSO_4$ in 0.1 M K_2SO_4(aq) is $x \times 10^{-9}$ g L^1. Calculate the value of x.

Question 24: The number of atomic orbitals from the following having 5 radial nodes is: 7s, 7p, 6s, 6p, 8d.

Question 25: The number of incorrect statements from the following is:

1. The electrical work that a reaction can perform at constant pressure and temperature is equal to the reaction Gibbs energy.

2. E°_{cell} is dependent on the pressure.

3. $\frac{dE^{\circ}_{\text{cell}}}{dT} = \frac{\Delta S^{\circ}}{nF}$.

4. A cell is operating reversibly if the cell potential is exactly balanced by an opposing source of potential difference.

Question 26: The coagulating value of the electrolytes $AlCl_3$ and NaCl for As_2S_3 are 0.09 and 50.04, respectively. The coagulating power of $AlCl_3$ is x times the coagulating power of NaCl. The value of x is:

Question 27: If the boiling points of two solvents X and Y (having the same molecular weights) are in the ratio 2:1, and their enthalpy of vaporizations are in the ratio 1:2, then the boiling point elevation constant of X is m times the boiling point elevation constant of Y. The value of m is:

Question 28: The number of species from the following carrying a single lone pair on the central atom Xenon is:

Given species: XeF_5^+, XeO_3, XeO_2F_2, XeF_5, XeO_3F_2, $XeOF_4$, XeF_4.

Question 29: The ratio of sigma and pi bonds present in pyrophosphoric acid is:

Question 30: The sum of oxidation states of the metals in $Fe(CO)_5$, VO^{2+}, and WO_3 is:
