

JEE Main 2023 April 11 Shift-2 Chemistry Question Paper

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

Read the following instructions very carefully and strictly follow them:

1. The Duration of test is 3 Hours.
2. This paper consists of 90 Questions.
3. There are three parts in the 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 carries 4 marks for correct answer and –1 mark for wrong answer..
 5. (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 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

1: The magnetic moment is measured in Bohr Magnetron (BM). Spin only magnetic moment of Fe in $[Fe(H_2O)_6]^{3+}$ and $[Fe(CN)_6]^{3-}$ complexes respectively is:

- (1) 3.87 B.M. and 1.732 B.M.
 - (2) 6.92 B.M. in both
 - (3) 5.92 B.M. and 1.732 B.M.
 - (4) 4.89 B.M. and 6.92 B.M.
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2: Which one of the following pairs is an example of polar molecular solids?

- (1) $SO_2(s), CO_2(s)$
 - (2) $SO_2(s), NH_3(s)$
 - (3) $MgO(s), SO_2(s)$
 - (4) $HCl(s), AlN(s)$
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3: Match List I with List II

	List I Complex		List II Colour
A.	$Mg(NH_4)PO_4$	I.	Brown
B.	$K_3[Co(NO_2)_6]$	II.	White
C.	$MnO(OH)_2$	III.	Yellow
D.	$Fe_4[Fe(CN)_6]_3$	IV.	blue

Choose the correct answer from the options Provided that 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 – II, B – III, C – I, D – IV

4: A solution is prepared by adding 2 g of "X" to 1 mole of water. Mass percent of "X" in the solution is ----.

- (1) 5%
- (2) 20%
- (3) 2%
- (4) 10%

5: If Ni^{2+} is replaced by Pt^{2+} in the complex $[\text{NiCl}_2\text{Br}_2]^{2-}$, which of the following properties are expected to get changed?

- A. Geometry
- B. Geometrical isomerism
- C. Optical isomerism
- D. Magnetic properties

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

6: Provided that below are two statements :

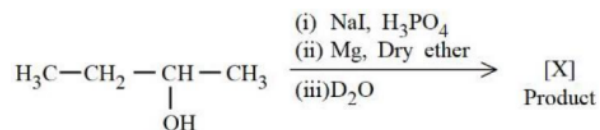
Statement I: In the metallurgy process, sulphide ore is converted to oxide before reduction.

Statement II: Oxide ores in general are easier to reduce.

In the light of the above statements, choose the most appropriate answer from the options
Provided that 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

7: Product [X] formed in the above reaction is:



- (1) $\text{CH}_3 - \text{CH}_2 - \text{CH}(\text{D}) - \text{CH}_3$
(2) $\text{CH}_3 - \text{CH}_2 - \text{CH} = \text{CH}_2$
(3) $\text{CH}_3 - \text{CH} = \text{CH} - \text{CH}_3$
(4) $\text{CH}_3 - \text{CH}_2 - \text{C}(\text{OH})(\text{H}) - \text{CH}_3$
-

8: Provided that below are two statements :

Statement I : Ethene at 333 to 343 K and 6-7 atm pressure in the presence of AlEt_3 and TiCl_4 undergoes addition polymerization to give LDP.

Statement II : Caprolactam at 533-543 K in H_2O through step growth polymerizes to give Nylon 6.

In the light of the above statements, choose the correct answer from the options Provided that 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
-

9: For a chemical reaction $\text{A} + \text{B} \rightarrow \text{Product}$, the order is 1 with respect to A and B.

Rate $\text{molL}^{-1}\text{S}^{-1}$	[A] molL^{-1}	[B] molL^{-1}
0.10	20	0.5
0.40	x	0.5
0.80	40	Y

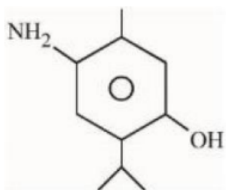
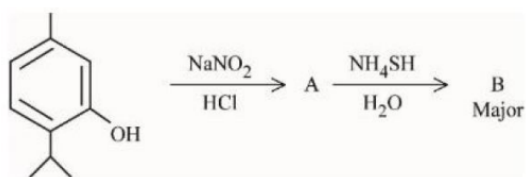
What is the value of x and y?

- (1) 80 and 2
- (2) 40 and 4
- (3) 80 and 4
- (4) 160 and 4

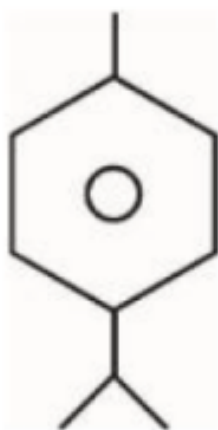
10: Which of the following compounds is an example of Freon?

- (1) C_2F_4
- (2) C_2HF_3
- (3) $C_2Cl_2F_2$
- (4) $C_2H_2F_2$

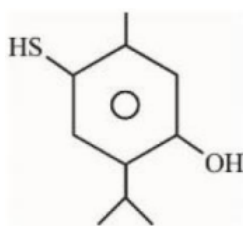
11: Compound 'B' is



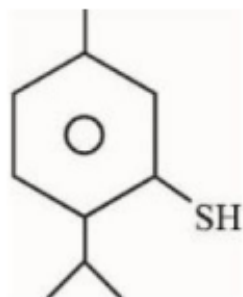
(1)



(2)



(3)



(4)

12: Provided that below are two statements, one is labelled as Assertion A and the other is labelled as Reason R.

Assertion A: $C(=[2]O)-C(-[6]Cl)$ can be subjected to Wolff-Kishner reduction to give $CH_2 - C(-[6]Cl)(-H)(-H)$

Reason R: Wolff-Kishner reduction is used to convert $C(=[2]O)$ into CH_2

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

- (1) Both A and R are true and R is the correct explanation of A
- (2) A is true but R is false
- (3) Both A and R are true but R is NOT the correct explanation of A
- (4) A is false but R is true

13: Provided that below are two statements, one is labelled as Assertion A and the other is labelled as Reason R.

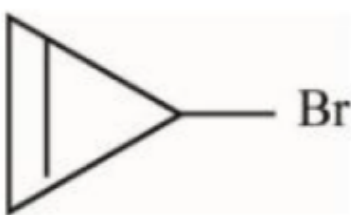
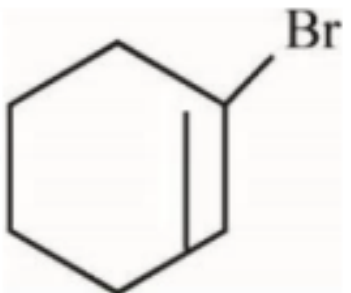
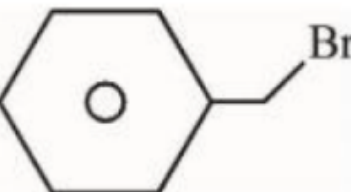
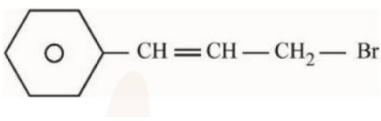
Assertion A : $[CoCl(NH_3)_5]^{2+}$ absorbs at lower wavelength of light wrt- $[CoCl(NH_3)_5(H_2O)]^{3+}$

Reason R : It is because the wavelength of the light absorbed depends on the oxidation state of the metal ion.

In the light of the above statements, choose the correct answer from the options Provided that 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) Both A and R are true and R is the correct explanation of A
- (4) A is false but R is true

14: Compound from the following that will not produce precipitate on reaction with AgNO_3 is:

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

15: Provided that below are two statements, one is labelled as Assertion A and the other is labelled as Reason R.

Assertion A : A solution of the product obtained by heating a mole of glycine with a mole of chlorine in presence of red phosphorous generates chiral carbon atom.

Reason R : A molecule with 2 chiral carbons is always optically active.

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

- (1) A is false but R is true
 - (2) Both A and R are true but R is NOT the correct explanation of A
 - (3) A is true but R is false
 - (4) Both A and R are true and R is the correct explanation of A
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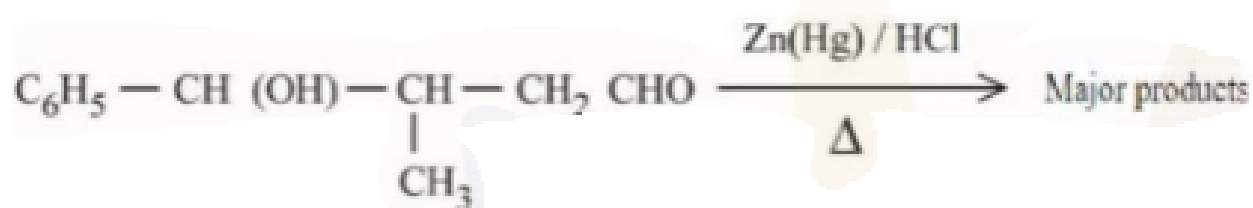
16: Alkali metal from the following with least melting point is:

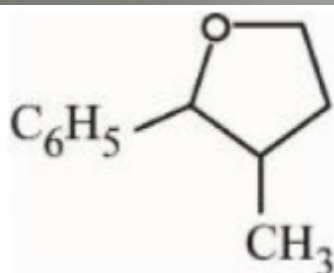
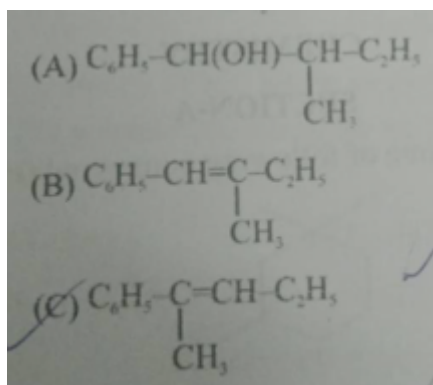
- (1) K
 - (2) Cs
 - (3) Rb
 - (4) Na
-

17: Which hydride among the following is less stable?

- (1) HF
 - (2) NH₃
 - (3) BeH₂
 - (4) LiH
-

18: The major product formed in the following reaction is





Choose the correct answer from the options Provided that below:

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

19: One mole of P_4 reacts with 8 moles SOCl_2 to give 4 moles of A, x mole of SO_2 and 2 moles of B. A, B and x respectively are

- (1) POCl_3 , S_2Cl_2 and 4
- (2) POCl_3 , S_2Cl_2 and 2
- (3) PCl_3 , S_2Cl_2 and 4
- (4) PCl_3 , S_2Cl_2 and 2

20: What weight of glucose must be dissolved in 100 g of water to lower the vapour pressure by 0.20 mmHg? (Assume dilute solution is being formed)

Provided that : Vapour pressure of pure water is 54.2 mmHg at room temperature.
Molar mass of glucose is 180g mol^{-1}

- (1) 2.59 g

- (2) 3.59 g
(3) 3.69 g
(4) 4.69 g
-

Section B

21: The total number of intensive properties from the following is

Mole, Volume, Molar heat capacity, Molarity, E° cell, Gibbs free energy change, Molar mass, Mole

22: The volume of hydrogen liberated at STP by treating 2.4 g of magnesium with excess of hydrochloric acid is $\text{.....} \times 10^{-2}$ L.

Provided that: Molar volume of gas is 22.4 L at STP. Molar mass of magnesium is 24 g mol⁻¹

23: The number of correct statements about modern adsorption theory of heterogeneous catalysis from the following is

- A. The catalyst is diffused over the surface of reactants.
 - B. Reactants are adsorbed on the surface of the catalyst.
 - C. Occurrence of chemical reaction on the catalyst's surface through formation of an intermediate.
 - D. It is a combination of intermediate compound formation theory and the old adsorption theory.
 - E. It explains the action of the catalyst as well as those of catalytic promoters and poisons.
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24: The number of correct statements from the following is

- A. For 1 s orbital, the probability density is maximum at the nucleus

- B. For 2 s orbital, the probability density first increases to maximum and then decreases sharply to zero.
- C. Boundary surface diagrams of the orbitals encloses a region of 100% probability of finding the electron.
- D. p and d-orbitals have 1 and 2 angular nodes respectively
- E. probability density of p-orbital is zero at the nucleus
-

25: The number of correct statements from the following is

- A. E_{cell} is an intensive parameter
- B. A negative E° means that the redox couple is a stronger reducing agent than the H^+/H_2 couple.
- C. The amount of electricity required for oxidation or reduction depends on the stoichiometry of the electrode reaction.
- D. The amount of chemical reaction which occurs at any electrode during electrolysis by a current is proportional to the quantity of electricity passed through the electrolyte.
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26: $\text{Mg}(\text{NO}_3)_2 \cdot \text{XH}_2\text{O}$ and $\text{Ba}(\text{NO}_3)_2 \cdot \text{YH}_2\text{O}$, represent formula of the crystalline forms of nitrate salts. Sum of X and Y is

27: The number of possible isomeric products formed when 3-chloro-1-butene reacts with HCl through carbocation formation is

28: 4.5 moles each of hydrogen and iodine is heated in a sealed ten litre vessel. At equilibrium, 3 moles of HI were found. The equilibrium constant for $\text{H}_2(\text{g}) + \text{I}_2(\text{g}) \rightleftharpoons 2\text{HI}(\text{g})$ is

29: Number of compounds from the following which will not produce orange red precipitate with Benedict solution is

Glucose, maltose, sucrose, ribose, 2-deoxyribose, amylose, lactose

30: The maximum number of lone pairs of electrons on the central atom from the following species is -----.

ClO_3^- , XeF_4 , SF_4 , and I_3^-
