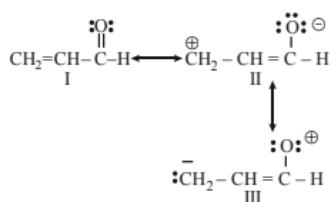


JEE Mains - 27 Jan (Shift 2) Chemistry Question Paper with Solutions

Total Time Allowed : 180 minutes	Maximum Marks : 300	Total Questions : 90	Questions to be answered : 90
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Question 1: The order of relative stability of the contributing structures is:



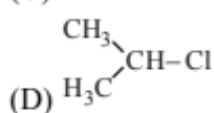
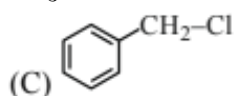
Options:

- (1) I > II > III
- (2) II > I > III
- (3) I = II = III
- (4) III > II > I

Question 2: Which among the following halide(s) will not show S_N1 reaction:

Options:

- (A) $\text{H}_2\text{C} = \text{CH} - \text{CH}_2\text{Cl}$
- (B) $\text{CH}_3 - \text{CH} = \text{CH} - \text{Cl}$



Choose the most appropriate answer from the options given below:

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

Question 3: Which of the following statements is not correct about rusting of iron?

Options:

- (1) Coating of iron surface by tin prevents rusting, even if the tin coating is peeled off.
 - (2) When pH lies above 9 or 10, rusting of iron does not take place.
 - (3) Dissolved acidic oxides SO_2 , NO_2 in water act as catalyst in the process of rusting.
 - (4) Rusting of iron is envisaged as setting up of electrochemical cell on the surface of iron object.
-

Question 4: Given below are two statements:

Statement (I): In the Lanthanides, the formation of Ce^{4+} is favored by its noble gas configuration.

Statement (II): Ce^{4+} is a strong oxidant reverting to the common +3 state.

Choose the correct option:

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

Question 5: Choose the correct option having all the elements with d^{10} electronic configuration from the following:

Options:

- (1) Zn, Co^{2+} , Ni, Fe^{2+} , Cr
 - (2) Cu, Zn, Ag, Cd
 - (3) Pd, Ni, Fe^{2+} , Cr
 - (4) Ni, Zn, Fe^{2+} , Cu
-

Question 6: Phenolic group can be identified by a positive:

Options:

- (1) Phthalein dye test
 - (2) Lucas test
 - (3) Tollen's test
 - (4) Carbylamine test
-

Question 7: The molecular formula of second homologue in the homologous series of mono carboxylic acids is:

Options:

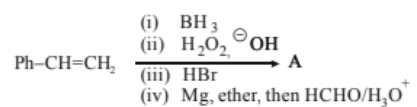
- (1) $\text{C}_3\text{H}_6\text{O}_2$
 - (2) $\text{C}_2\text{H}_4\text{O}_2$
 - (3) CH_2O
 - (4) $\text{C}_2\text{H}_2\text{O}_2$
-

Question 8: The technique used for purification of steam volatile water immiscible substance is:

Options:

- (1) Fractional distillation
 - (2) Fractional distillation under reduced pressure
 - (3) Distillation
 - (4) Steam distillation
-

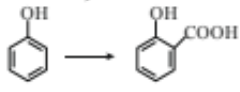
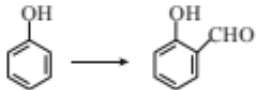
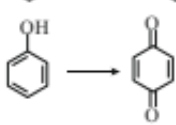
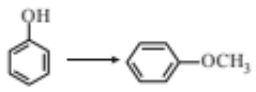
Question 9: The final product A, formed in the following reaction sequence is:



Options:

- (1) $\text{Ph}-\text{CH}_2-\text{CH}_2-\text{CH}_3$
 - (2) $\text{Ph}-\text{CH}-\text{CH}_3$ (with CH_3 substituent on the CH carbon)
 - (3) $\text{Ph}-\text{CH}-\text{CH}_3$ (with CH_2OH substituent on the CH carbon)
 - (4) $\text{Ph}-\text{CH}_2-\text{CH}_2-\text{CH}_2-\text{OH}$
-

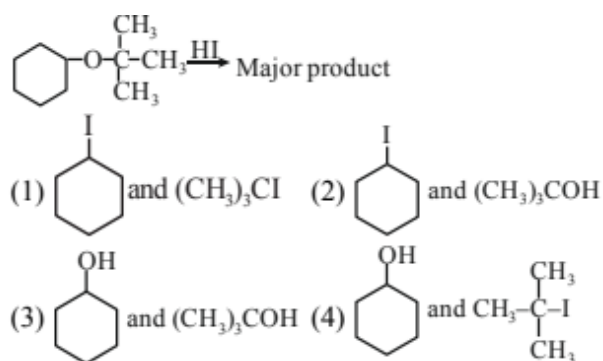
Question 10: Match List-I with List-II.

List – I (Reaction)	List – II (Reagent(s))
(A) 	(I) $\text{Na}_2\text{Cr}_2\text{O}_7, \text{H}_2\text{SO}_4$
(B) 	(II) (i) NaOH (ii) CH_3Cl
(C) 	(III) (i) $\text{NaOH}, \text{CHCl}_3$ (ii) NaOH (iii) HCl
(D) 	(IV) (i) NaOH (ii) CO_2 (iii) HCl

Correct Matching:

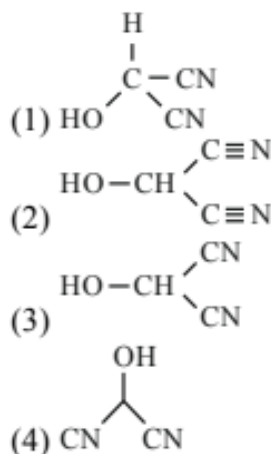
- (1) (A)-(IV), (B)-(I), (C)-(III), (D)-(II)
 (2) (A)-(II), (B)-(III), (C)-(I), (D)-(IV)
 (3) (A)-(II), (B)-(I), (C)-(III), (D)-(IV)
 (4) (A)-(IV), (B)-(III), (C)-(I), (D)-(II)

Question 11: Major product formed in the following reaction is a mixture of:



Question 12: The bond line formula of $\text{HOCH}(\text{CN})_2$ is:

Options:



Question 13 : Given below are two statements:

Statement (I) : Oxygen being the first member of group 16 exhibits only -2 oxidation state.

Statement (II) : Down the group 16, stability of +4 oxidation state decreases and +6 oxidation state increases.

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

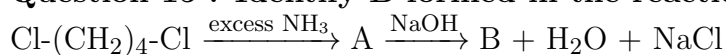
- (1) Statement I is correct but Statement II is incorrect
- (2) Both Statement I and Statement II are correct
- (3) Both Statement I and Statement II are incorrect
- (4) Statement I is incorrect but Statement II is correct

Question 14 : Identify from the following species in which d^2sp^3 hybridization is shown by central atom:

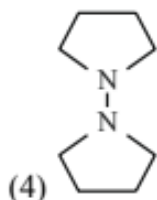
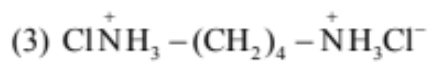
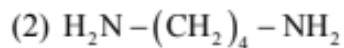
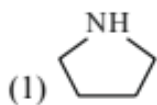
Options:

- (1) $[\text{Co}(\text{NH}_3)_6]^{3+}$
- (2) BrF_5
- (3) $[\text{PtCl}_4]^{2-}$
- (4) SF_6

Question 15 : Identify B formed in the reaction.



Options:



Question 16 : The quantity which changes with temperature is:

Options:

- (1) Molarity
- (2) Mass percentage
- (3) Molality
- (4) Mole fraction

Question 17 : Which structure of protein remains intact after coagulation of egg white on boiling?

Options:

- (1) Primary
- (2) Tertiary
- (3) Secondary
- (4) Quaternary

Question 18 : Which of the following cannot function as an oxidising agent?

Options:

- (1) N^{3-}
- (2) SO_4^{2-}
- (3) BrO_3^-
- (4) MnO_4^-

Question 19 : The incorrect statement regarding conformations of ethane is:

Options:

- (1) Ethane has an infinite number of conformations
 - (2) The dihedral angle in staggered conformation is 60°
 - (3) Eclipsed conformation is the most stable conformation
 - (4) The conformations of ethane are inter-convertible to one another
-

Question 20 : Identify the incorrect pair from the following:

Options:

- (1) Photography - AgBr
 - (2) Polythene preparation - TiCl_4 , $\text{Al}(\text{CH}_3)_3$
 - (3) Haber process - Iron
 - (4) Wacker process - PtCl_2
-

Question 21 : Total number of ions from the following with noble gas configuration is

Options:

Sr^{2+} ($Z = 38$), Cs^+ ($Z = 55$), La^{3+} ($Z = 57$), Pb^{2+} ($Z = 82$), Yb^{2+} ($Z = 70$) and Fe^{2+} ($Z = 26$)

Question 22 : The number of non-polar molecules from the following is

HF, H_2O , SO_2 , H_2 , CO_2 , CH_4 , NH_3 , HCl , CHCl_3 , BF_3

Question 23 : Time required for completion of 99.9% of a first-order reaction is _____ times of half life ($t_{1/2}$) of the reaction.

Question 24 : The spin-only magnetic moment value of square planar complex $[\text{Pt}(\text{NH}_3)_2\text{Cl}(\text{NH}_2\text{CH}_3)]\text{Cl}$ is _____ B.M. (Nearest integer)

Question 25 : For a certain thermochemical reaction $M \rightarrow N$ at $T = 400 \text{ K}$, $\Delta H^\circ = 77.2 \text{ kJ mol}^{-1}$, $\Delta S^\circ = 122 \text{ JK}^{-1}$, log equilibrium constant (log K) is _____ $\times 10^{-1}$.

Question 26: Volume of 3 M NaOH (formula weight 40 g mol^{-1}) which can be prepared from 84 g of NaOH is _____ $\times 10^{-1} \text{ dm}^3$.

Question 27 : 1 mole of PbS is oxidized by "X" moles of O_3 to get "Y" moles of O_2 . $X + Y =$ _____

Question 28 : The hydrogen electrode is dipped in a solution of $\text{pH} = 3$ at 25°C . The potential of the electrode will be - _____ $\times 10^{-2} \text{ V}$.

Question 29 : 9.3 g of aniline is subjected to reaction with excess of acetic anhydride to prepare acetanilide. The mass of acetanilide produced if the reaction is 100% completed is _____ $\times 10^{-1} \text{ g}$. (Given molar mass g mol^{-1} N : 14, O : 16, C : 12, H : 1)

Question 30 : Total number of compounds with Chiral carbon atoms from following is _____.

