BSC_SEM_V

NC-33 Physical Chem+ Inorganic Chemistry -XIII (CGPA)

Time: One Hour   Max. Marks: 40

Instructions

- Attempt all 40 questions

1 Heteronuclear metal carbonyl is-
(A)$[Cr(CO)_5]$ (B)$[Mn_2(CO)_{10}]$ (C)$[MnRe(CO)_{10}]$ (D)$[Co_2(CO)_8]$

2 Ni in $Ni(CO)_4$ undergoes-
(A)SP hybridisation   (B)SP^2 hybridisation   (C)SP^3 hybridisation   (D)dSP^2 hybridisation

3 Metal-Metal bonds present in $Fe_3(CO)_{12}$ is-
(A)1   (B)2   (C)3   (D)4

4 The carbonyl groups present in bridge structure of $Co_2(CO)_8$ is-
(A)1 bridge and 7 terminals   (B)2 bridge and 6 terminals   (C)3 bridge and 5 terminals   (D)4 bridge and 4 terminals
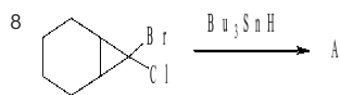
5 Ionic organometallic compound is-
(A)NaC_6H_5 (B)$(CH_3)_4Si$ (C)Al_2Me_6 (D)None of the above

6 Compounds formed by less electropositive metal is -
(A)Ionic organometallic   (B)Covalent organometallic   (C)Electron deficient organometallic   (D)Transition metal organometallic

7 Organolithium compounds react with alkylnitriles gives-
(A)Aldehydes   (B)Ketones   (C)Alcohols   (D)Acids

8

In above reaction 'A' is-

(A)

(B)

(C)

(D)None of the Above

9 Transition metal organometallic compounds formed due to-
(A)Interaction between P-orbital of Organic ligand and p or d-orbital of metal   (B)Symmetry property of d-orbital   (C)Both A and B   (D)None of the above
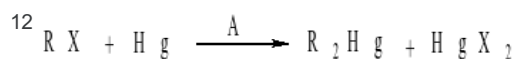
10 ------ is used in the production of linear higher olefins.
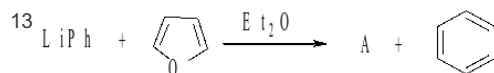(A)Trialkylaluminium   (B)Trialkyltin halide   (C)Alkyllithium   (D)Dialkylmercury

11

Association of R_3SnX molecule exist due to-
(A)Halogen bridges   (B)Alkyl bridges   (C)Tin bridges   (D)All of the above

12 $$RX + Hg \xrightarrow{A} R_2Hg + HgX_2$$

In the above reaction 'A' is -
(A)Na/Hg   (B)K/Hg   (C)Zn/Hg   (D)$HgCl_2$

13 $$LiPh + \text{(furan)} \xrightarrow{Et_2O} A + \text{(benzene)}$$

In above reaction 'A' is -

(A)

(B)

(C)

(D)All of the above

14 The selection rule for diatomic rigid rotator is-
(A)$\Delta J = 0$ (B)$\Delta J = \pm 1$ (C)$\Delta J = \pm 2$ (D)$\Delta J = \pm 3$

15 By using Distribution law we can determine -
(A)Solubility of solute   (B)Association of solute   (C)Dissociation of solute   (D)All of the above

16 For the study of the distribution law the two solvents should be -
(A)Volatile   (B)Reacting with each other   (C)Miscible   (D)Non-miscible

17 $K_D = C_1/C_2 (1-x)$ is used for -
(A)Dissociation of solute   (B)Association of solute   (C)Energy of solute   (D)None of these

18 If solute 'A' is dimerized in one of the solvent then following expression is applicable-
(A)$K_D = C_1/C_2$ (B)$K_D = C_1/\sqrt[2]{C_2}$ (C)$K_D = C_1/\sqrt[3]{C_2}$ (D)$K_D = C_1/C_2{}^2$

19 Third order reaction means -

(A) Sum of powers in rate law equation is three

(B) Three molecules changes their concentration during reaction.

(C) Both A and B.

(D) None of the above.

20 The reaction in which formed product also reacts to give back the reactants is called-

(A) Consecutive reaction.

(B) Opposing reaction.

(C) Parallel reaction.

(D) Reaction mechanism.

21 The moment of Inertia for diatomic Rigid Rotor is-

(A) $I = \mu r^2$.

(B) $I = \mu^2 r$.

(C) $I = \mu r$.

(D) $I = \mu^2 r^2$.

22 Vibrational spectra appears in-

(A) X-ray.

(B) Gamma ray.

(C) Microwave region.

(D) IR region.

23 The modification of distribution law for Association of solute in one of the solvent is -

(A) $K_D = C_1/\sqrt{C_2}$

(B) $K_D = C_1/C_2$

(C) $K_D = C_1/C_2 \ X \ (1-x)$

(D) Both B and C

24 The Henry's law equation is-

(A) $K = C \ X \ P$

(B) $C = K.P$

(C) $P = C \ X \ K$

(D) $C = K\sqrt{P}$

25 The more efficient solvent extraction method is-

(A) Single extraction.

(B) Multiple extraction.

(C) Double extraction.

(D) None of these

26 $\Pi \rightarrow \Pi^*$ Transition occurs in molecule having-

(A) Π - electrons

(B) Lone pair of electron.

(C) σ – electrons.

(D) Both A and B.

27 The electronic spectra is obtained when molecule is exposed to-

(A) Microwave radiation.

(B) IR radiation.

(C) UV and visible radiation.

(D) γ - rays

28 The relation between Bond energy and force constant is -

(A) $B.E \propto K$

(B) $B.E \propto 1/K$.

(C) 0

(D) $B.E \propto 1/\sqrt{K}$

29 Frank-Condon Principle is -

(A) An electronic transition takes place so rapidly.

(B) During electronic transition bond length not changes appreciably

(C) Both A and B.

(D) None of these.

30 The lines having longer wavelength (shorter frequency) than that of incident light are called-

(A) Stokes lines.

(B) Antistoke's lines.

(C) Rayleigh lines.

(D) X- Rays.

31 If υ_i is frequency of incident light υ_s is frequency of scattered light then Raman shift ($\Delta\upsilon$) is-

(A) $\Delta\upsilon = \upsilon_i - \upsilon_s$

(B) $\Delta\upsilon = \upsilon_i + \upsilon_s$

(C) $\Delta\upsilon = \upsilon_i / \upsilon_s$

(D) $\Delta\upsilon = \upsilon_s/\upsilon_i$

32 Raman shift ($\Delta\upsilon$) is zero in case of-

(A) Stokes lines.

(B) Antistokes lines.

(C) Rayleigh lines.

(D) Both A and B.

33 Nernst Distribution law is valid at-

(A) Constant temperature.

(B) Low Concentration.

(C) Dissolved solute remains in its molecular state.

(D) All of above.

34 Selection rule for simple Harmonic oscillator is -

(A) $\Delta V = \pm 1$

(B) $\Delta V = \pm 2$

(C) $\Delta V = 0 ,\pm 1$

(D) $\Delta V = 0 ,\pm 2$

35 Energy equation for diatomic molecule as a Rigid rotator in cm^{-1} is-

(A) $\varepsilon_J = BJ(J+1)$

(B) $\varepsilon_J = BJ^2(J+1)$

(C) $\varepsilon_J = BJ(J+1)^2$

(D) $\varepsilon_J = BJ(J+ n)$

36 Spacing distance between Rotational Spectra of rigid rotor is-

(A) 1B

(B) 2B

(C) 3B

(D) 4B

37 Unit of Third order reaction is-

(A) S^{-1}

(B) $Mol \ l^{-1} \ S^{-1}$

(C) $Mol^2 \ l^{-2} \ S^{-1}$

(D) $Mol^{-2} \ l^2 \ S^{-1}$

38 Hydrogen-chlorine reaction is an example of -

(A) Thermal reaction.

(B) Photo chemical reaction.

(C) Chain reaction.

(D) Both B and C.

39 The consecutive reaction means-

(A) Final product is formed through more path to give two or more products.

(B) The final product reacts to give back the reactants.

(C) Final product is formed through one or more intermediate steps.

(D) None of these.

40 If B is rotational constant of diatomic molecule and B' is rotational constant of their isotope then-

(A) B' > B

(B) B > B'

(C) B' = B

(D) Both B and C