Engineering Chemistry

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Q.1 Which one is correct (in order of increasing bond length)

(i) $O_2^+ < O_2 < O_2^{2-} < O_2^-$ ☐ (ii) $O_2 < O_2^- < O^{2+} < O^{2-}$ ☐

(iii) $O_2^+ > O_2^{2-} > O_2^- > O_2$ ☐ (iv) $O_2 > O_2^- > O > O^{2-}$ ☐

Q.2 Which one is possesses largest bond angle?

(i) NH_3 ☐ (ii) PH_3 ☐ (iii) $As H_3$ ☐ (iv) SbH_3

Q. 3 Indicate the type of hybridization of each carbon atom in the following compounds.

(i) $H_3C - CH_3$ (ii) $CH_2 = C = CH$

(iii) $H_3 \cdot C - C \equiv C - CH_3$ (iv) $CH_3 - C \equiv N$

Q. 4 Which of followings is not nucleophile

(i) H_2O ☐ (ii) BF_3 ☐ (iii) NH_3 ☐ (iv) OH^-

Q. 5 State of hybridization of methyl carbocation is ----- .

Q. 6 Ordinary Infra-red region is

(i) $667^{cm^{-1}}$ — $4000^{cm^{-1}}$ ☐ (ii) $600^{cm^{-1}}$ — $3000^{cm^{-1}}$ ☐

(iii) 557 — $2000^{cm^{-1}}$ ☐ (iv) $700^{cm^{-1}}$ — $8000^{cm^{-1}}$ ☐

Q. 7 What is the shape of graph of Arrhenious equation.

(i)  (ii) (iii) (iv)

Q. 8 Which type of Crystals form a helix ----- .

Q.9. What are the laws of light absorption

(i) Beer's Lambert Law (2) Jobs law

(3) Nerst Law (4) Molar method

Q.10 – Hydrolysis of an ester by NaOH is an example of ---------- .

Q.11. Write down the name of apparatus by which Calorific value of fuel is find out

(i) Bomb Calorimeter ☐ (ii) Colourimeteric ☐

(iii) pH-meter (vi) Spectrophotometer.

Q.12 what are the repeating Unit's of Nylon-6

(i) Isobutene ☐ (ii) Isoprene ☐

(iii) Ethylene glycol (iv) ε-Amino Caproic acid.

Q.13 The process of heating raw rubber with ------ in order to cross-link the chain and stiff is known as ------ .

Q.14 In water system phase diagram, the degree of freedom at triple point is three (True/false)

Q.15 Tertiary alkyl free radicals are more stable than allyl free radicals (True/false)

Q.16 Why benzyl Carbocation is more stable than Ethyl Carbocation ---- .....

Q.17 Tetragonal crystal system has the following unit cell dimensions.

(a) $a = b = c$ & $\alpha = \beta = \gamma = 90°$ (b) $a = b \neq c$ and $\alpha = \beta = \gamma = 90°$

(c) $a \neq b \neq c$ & $\alpha = \beta = \gamma = 90°$ (d) $a = b \neq c$ and $\alpha = \beta = 90°$, $\gamma = 120°$

Q.18 The number of tetrahedral voids in the unit cell of a face centred cubic lattice of similar atoms is

(a) 4 (b) 6

(c) 8 (d) 10

Q.19 The intermetallic compound LiAg crystallizes in cubic Lattice in which both lithium and silver have Coordination number of eight. The crystal class is

(a) Simple cube (b) Body-centred cube

(c) Face-centred cube (d) None of these.

Q.20 Total number of atom present in a unit cell is

(a) 3 ☐ (b) 4 ☐

(c) 5 ☐ (d) 6 ☐

Q.21 The number of molecules present in 100 gm of a FCC crystal are (density of crystal = 10.0 gm/cm^3 and cell edge of crystal = 100 pm)

(a) 3×10^{25} ☐ (b) 4×10^{25} ☐

(c) 1×10^{25} ☐ (d) 2×10^{25} ☐

Q.22 How much will potential of a hydrogen electrode change when its solution initially at pH = 0 is neutralized to pH = 7

(a) Increase by .0591 V ☐ (b) decrease by .0591 V

(c) Increase by .413 V (d) decrease by .413 V

Q.23 Which among the following carbocations is most stable.

(a)  ☐ (b) $C_6H_5-\overset{\oplus}{C}H_2$ ☐

(c) $C_6H_5\overset{+}{C}H-C_6H_5$ ☐ (d) $H_3C-\overset{\oplus}{C}(CH_3)-CH_3$ ☐

Q.24 Which of the following carbon free radical is most stable.

(a) Vinyl carbon free radical (b) Benzyl carbon free radical resonance

(c) Tertiary carbon free radical (d) Secondary carbon free radical

Q.25 Most Unstable Carbanion among the following is

(a) $H_5C_6-\overset{\ominus}{C}H_2$ ☐ (b) $F_3C-\ddot{C}H_2$ ☐

(c) $:H_2\bar{C}-CH=CHO$ (d) $:\bar{C}_6H_5$

Q.26 The optically active tartaric acid is named as D-(+)- tartaric acid because it has a positive

(a) Optical rotation and is derived from D-glucose

(b) pH in organic solvent

(c) Optical rotation and is derived from D-(+)- glyceraldehydes.

(d) Optical rotation only when substituted deuterium.

Q.27 A solution of (+)-2-chloro-2-phenylethane in toluene racemises ~~slow~~ slowly in the presence of small amount of $SbCl_5$, due to the formation of

(a) Carbanion (b) carbene (c) Free-radical (d) Carbocation

Q. 28 The correct order of stability of carbocation is/ are:

(a) Benzyl cation > Diphenyl Methyl cation > Triphenyl methyl cation

(b) Benzyl cation > Diphenyl methyl cation > Triphenyl methyl cation

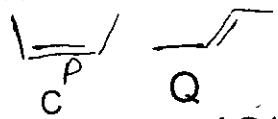
(c) 3^0 carbocation > 1^0 benzyl cation > 2^0 carbocation

(d) 1^0 Allyl cation > 1^0 carbocation > vinyl cation

Q. 29 Resonance structures of a molecule should have:

(a) Identical arrangement of atoms (b) Nearly the same energy content

(c) The same number of paired electrons (d) Identical Bonding

Q. 30  Which is/ are correct statement?

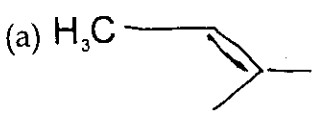
(a) P is cis - and Q is trans -

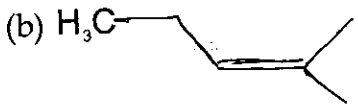
(b) P is Z and Q is E

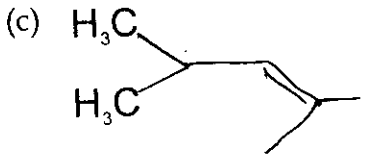
(c) P is R and Q is S

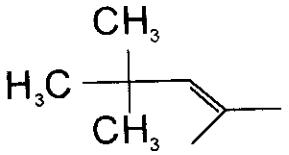
(d) P and Q are same structure

Q. 31 Which of the following will show hyperconjugation:

(a) 

(b) 

(c) 

(d) 

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