

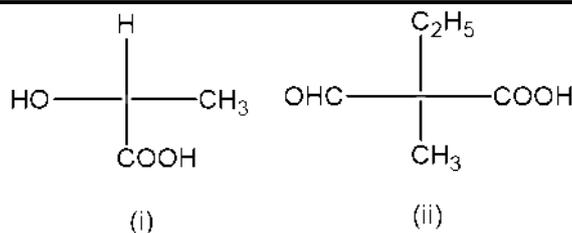
Mock Question Bank Chemistry (BSC-102)

CBCGS-H Semester I

- 1) The correct order of hybridisation of the central atom in the following species $\text{NH}_3, \text{PCl}_5$ and BCl_3 is (2 M)
- $\text{dsp}^2, \text{sp}^3\text{d}^2, \text{sp}^3$
 - $\text{sp}^3, \text{sp}^3\text{d}, \text{sp}^2$
 - $\text{d}^2\text{sp}^3, \text{sp}^3, \text{dsp}^2$
 - $\text{sp}^3, \text{sp}^2, \text{sp}$
- 2) When EDTA solution is added to Mg^{+2} ion solution, then which of the following statement is not true? (1M)
- four coordinate sites of Mg^{+2} are occupied by EDTA and remaining sites are occupied by water molecules
 - All six coordinate sites of Mg^{+2} are occupied
 - Chelate complex is formed between Mg^{+2} and EDTA
 - Nature of $[\text{Mg}^{+2} - \text{EDTA}]$ is stable.
- 3) The value of energy for which Schrodinger steady equation can be solved is called (1M)
- Eigen function
 - Eigen values
 - eigen vectors
 - Operators
- 4) Select the correct statement about O^{2+} and O^{2-} (2M)
- O^{2+} and O^{2-} both are paramagnetic and bond order of O^{2+} is greater than O^{2-}
 - O^{2+} and O^{2-} both are diamagnetic and bond order of O^{2+} is smaller than O^{2-}
 - O^{2+} is diamagnetic and O^{2-} is paramagnetic and bond order of O^{2+} is greater than O^{2-}
 - O^{2+} is paramagnetic and O^{2-} is diamagnetic and bond order of O^{2+} is greater than O^{2-}
- 5) Crystal field stabilisation energy of d^4 configuration in strong ligand field is__ (2M)
- $-0.8 \Delta_o$ or $-8 Dq$
 - $-0.6 \Delta_o$ or $-6Dq$
 - $-1.6\Delta_o$ or $-16 Dq$
 - $-2.0 \Delta_o$ or $-20 Dq$
- 6) Identify the molecules in which permanent dipole is present? (1M)
- | | |
|-----------------------------|----------------------------|
| a) HCl, H_2 | c) HCl, HF |
| b) N_2, O_2 | d) HF, B_2 |

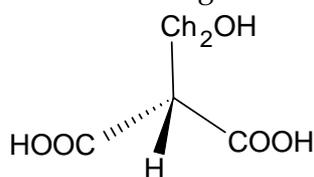
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- 7) Number of radial nodes present in 2p orbital is **(1M)**
a) 1 b) 3 c) 0 d) 5
- 8) The Chromaplate or thin layer chromatography plate is made up of **(1M)**
a) Glass b) wood c) fibre d) metal
- 9) Retardation factor is the ratio of ----- **(2 M)**
a) Distance moved by substance from base line to distance moved by the solvent from the base line
b) Distance moved by solvent from base line to distance moved by the substance from the base line
c) Distance moved by substance from top line to distance moved by the solvent from the top line
d) Distance moved by solvent from top line to distance moved by the substance from the top line
- 10) In reverse phase of HPLC there is **(1M)**
a) Non polar solvent / polar column
b) Polar solvent / non polar column
c) Non polar solvent / non polar column
d) All of the above
- 11) The eluting power of mobile phase is dependent of **(1M)**
a) Polarity of stationary phase
b) Nature of sample compound
c) Overall polarity
d) All of the above
- 12) For the separation of which of the following substances Gas-Solid chromatography is being used? **(1M)**
a) Thermally stable organic components
b) Volatile Organic components
c) Thermally stable inorganic components
d) Low molecular weight gaseous species
- 13) Transmittance of 0.01 M KMnO_4 solution is 60 % in 1 cm path length cell, its transmittance in 5 cm path length cell using same instrument will be _____ **(2M)**
a) decrease b) zero c) same d) increase

- 14) Which of the following material is commonly used for the packed column in gas chromatography? **(1M)**
 a) glass b) metal c) Diatomaceous earth d) stainless steel
- 15) Name the method which is significant in separating the components of the sample which cannot be separated by single solvent **(1M)**
 a) Isocratic elution b) Gradient elution c) Both d) None of the above
16. Corrosion of metals involves **(1M)**
 (a) Physical reactions (b) Chemical reactions (c) electric reactions (d) None
17. Which of the following factors play vital role in corrosion process **(1M)**
 (a) Temperature (b) Solute concentration
 (c) Both Temp and Solute concentration (d) Galvanising
18. Passivity is due to **(1M)**
 (a) Higher EMF (b) Lower EMF (c) Oxide film (d) Metal film
19. Passivity is not reason for inertness of the following **(1M)**
 (a) Au (b) Al (c) Ti (d) Ni
20. When Pt and Co are electrically connected, which one gets corroded **(1M)**
 (a) Pt (b) Co (c) None (d) Can't decide
21. Which of the following can be used for cathodic protection: **(1M)**
 (a) Al (b) Cd (c) Cu (d) Either
- 22) The sign of ΔG predicts whether the formation of the products in a reaction is favoured. If the value is positive, the formation of the products in a reaction is **(1M)**
 a) Favoured c) Favoured only at high temperature
 b) Not Favoured d) Favoured only at low temperature
- 23) Select the incorrect statement about the adsorption theory from the following option. **(1M)**
 a) The surface of the solid catalyst possess some isolated active centres having residual affinity
 b) Due to these centres, the molecules of the gaseous reactants get adsorbed in unimolecular thick layer
 c) The adsorbed reactants get activated and then react
 d) The energy required for activation is more than that required for uncatalyzed reaction
- 24) The main emissions of a car engine are nitrogen gas, carbon dioxide and water vapor. Which one of these mostly benign emissions is believed to contribute to global warming? **(1M)**



- a) S and S b) S and R c) R and S d) R and R

34) Which symmetry element makes the following molecule achiral? (1M)



- a) Plane of Symmetry c) Alternating Axis of Symmetry
b) Centre of Symmetry d) Axis of symmetry

35) H₂O molecule is irradiated with IR radiation, which of the following out of the plane vibrations will takes place? (1M)

- a) Twisting and rocking b) Rocking and Scissoring
c) Twisting and Wagging d) Wagging and rocking
- 36) Which of the following absorbance law is related to thickness of medium (1M)
- a) Beers Lambert law b) only Beers law
c) only Lamberts law d) Lambert Beers law

37) Source of light used in infrared region is (1M)

- a) Nichrome Wire b) Mercury arc
c) Nernst Glower d) **All of the above**

38) Which of the following detectors are used in IR spectroscopy? (1M)

- a) Bolometers, Photomultiplier tube
b) Thermistors, bolometers
c) Photovoltaic cells, Photomultiplier tube
d) Photomultiplier tube, phototubes