

SUBJECT : **CHEMISTRY**
PAPER NAME : **INORGANIC CHEMISTRY-III**
PAPER NO. : **CHEM/VI/CC/16**
SEMESTER : **VI**

A. Multiple Choice Questions (25)

1. Which of the following is not an organometallic compound?
(a) $(\text{CH}_3)_2\text{Zn}$
(b) R_3Al
(c) $\text{K}_3[\text{Fe}(\text{CN})_6]$
(d) $\text{C}_2\text{H}_5\text{O}^\text{Na}$
2. in $\text{Fe}_2(\text{CO})_9$, the number of bridging carbonyl groups is
(a) one
(b) two
(c) three
(d) four
3. synergic bonding is also known as
(a) π - backbonding
(b) β - backbonding
(c) α - backbonding
(d) μ - bonding
4. $\text{Ni}(\text{CO})_4$ is
(a) square planer
(b) tetrahedral
(c) pyramidal
(d) octahedral
5. An organometallic compound which is commercially applied as stabilizer in polyvinyl chloride is
(a) Grignard reagent
(b) borosilicates
(c) alkyl lithium
(d) organo-tin
6. in haemoglobin iron(Fe) is coordinated by four N- atoms and is in the form of a
(a) high spin $\text{Fe}(\text{III})$
(b) low spin $\text{Fe}(\text{III})$
(c) high spin $\text{Fe}(\text{II})$
(d) low spin $\text{Fe}(\text{II})$

7. The malnutrition in children is mainly due to the deficiency of
- (a) Na^+ ion
 - (b) K^+ ion
 - (c) Mg^{++} ions
 - (d) Ca^{++} ions
8. hydrolysis of trialkyl chloro silane gives
- (a) $\text{R}_3\text{Si-O-Si R}_3$
 - (b) cyclic (ring) silicone
 - (c) cross linked silicone
 - (d) none of the above
9. silicones are
- (a) toxic
 - (b) non-toxic
 - (c) not good insulators
 - (d) thermally less stable
10. in biological systems , the metal ions involved in electron transport are
- (a) Na^+ and K^+
 - (b) Zn^{2+} and Mg^{2+}
 - (c) Ca^{2+} and Mg^{2+}
 - (d) Cu^{2+} and Fe^{2+}
11. the magnetic moment of Co^{2+} in square planer complex is
- (a) 1.73 BM
 - (b) 3.87 BM
 - (c) 4.87 BM
 - (d) 5.87 BM
12. lanthanides form complexes with
- (a) monodentate ligands
 - (b) bidentate ligands
 - (c) chelating agents
 - (d) simple anions
13. pairs of elements which become identical in size as a result of lanthanide contraction are
- (a) Zn-Hf
 - (b) Nb- Ta
 - (c) Mo-W
 - (d) all of these
14. what factors make the separation of lanthanides a formidable task?
- (a) similarity in ionic size

- (b) constant charge of +2
 - (c) same charge to radius ratio
 - (d) all the above
15. all the lanthanides and actinides
- (a) show +3 oxidation states
 - (b) are radioactive
 - (c) coloured ions
 - (d) ions are diamagnetic
16. Basic source of magnetism _____.
- (a) Charged particles alone
 - (b) Movement of charged particles
 - (c) Magnetic dipoles
 - (d) Magnetic domains
17. Magnetic permeability has units as
- (a) Wb / m²
 - (b) Wb / A.m
 - (c) A / m
 - (d) Tesla / m
18. The the temperature at which an antiferromagnetic material begins to be converted into a paramagnetic material is known as
- (a) Curie temperature
 - (b) Neel temperature
 - (c) Weiss temperature
 - (d) ferromagnetic temperature
19. the metals such as iron , nickel, cobalt and their alloys are
- (a) ferromagnetic
 - (b) ferrimagnetic
 - (c) antiferromagnetic
 - (d) diamagnetic
20. according to Curries law the susceptibility of paramagnetic
- (a) materials is inversely proportional to their temperature.
 - (b) materials is directly proportional to their temperature
 - (c) materials is equql to their temperature
 - (d) materials is less than to their temperature
- 21., total number of vibrations in allyl bromide, CH₂ = CHCH₂Br are
- (a) 18
 - (b) 21

- (c) 14
 - (d) 16
22. the vibrations without a centre of symmetry are, active
- (a) infrared but inactive in Raman
 - (b) in Raman but inactive in IR
 - (c) raman and IR
 - (d) None
23. intensity of of Raman scattering is proportional to the
- (a) number of scattering species
 - (b) concentration of the sample
 - (c) Both (a) and (b)
 - (d) number of absorbing species
24. Raman spectra is often hampered by
- (a) fluorescence
 - (b) phosphorescence
 - (c) Infrared
 - (d) All
25. vibrational stretching frequency of diatomic molecule depends on
- (a) force constant
 - (b) masses of two atoms
 - (c) Both (a) and (b)
 - (d) None

Answer key

A. Multiple Choice Questions

- 1. (d)
- 2. (c)
- 3. (a)
- 4. (b)
- 5. (d)
- 6. (b)
- 7. (d)
- 8. (a)
- 9. (b)
- 10. (d)
- 11. (a)

12. (c)
13. (d)
14. (d)
15. (a)
16. (b)
17. (b)
18. (b)
19. (a)
20. (a)
21. (b)
22. (a)
23. (c)
24. (a)
25. (c)

B. Fill up the Blanks (15)

1. Grignard reagent can be synthesised by alkyl or aryl halides with magnesium in dry solvent ether.
2. The geometry of chromium hexacarbonyl $\text{Cr}(\text{CO})_6$ is.....
3. The structure of $\text{Co}_2(\text{CO})_8$ molecule in solution has bridging carbonyl groups.
4. The primary function of the enzyme, carbonic anhydrase in animal is to interconvert carbon dioxide and to maintain acid base balance.
5. Myoglobin contains a porphyrin ring with a/an..... at its centre.
6. Oxygen is more likely to bind to a haemoglobin bound to one oxygen than to an unbound haemoglobin. This is referred to as..... binding.
7. The richest source of rare earths is.....
8. All the actinides are whereas all lanthanides except Pm are not.
9. The magnetic moment of $[\text{MnF}_6]^{4-}$ is
10. Paramagnetic compounds (and atoms) are to magnetic fields
11. The magnetic domains of materials are aligned in the same direction
12. The corrected form of the Curries law is known as..... Law.
13. The exciting radiation must be to get sharp Raman lines
14. Raman spectra is due to the of light by the vibrating molecule.
15. Number of vibrational degrees of freedom for CO_2 is

Answer key

B. Fill up the Blanks

1. Refluxing
2. octahedral
3. no
4. bicarbonate

5. Iron
6. cooperative
7. monozite
8. radioactive
9. 5.91 BM
10. attracted
11. ferromagnetic
12. Curries Weiss
13. monochromatic.
14. scattering
15. 4