

**R.R.Mehta College of Science and C.L.Parikh College of Commerce Palanpur**

**Inorganic Chemistry**

**M.Sc.-II MCQ (501)**

- 1 Which metal complex ion is expected to be subject to a Jahn-Teller distortion?  
a.  $[\text{Cr}(\text{OH}_2)_6]^{3+}$  b.  $[\text{Cr}(\text{NH}_3)_6]^{2+}$  c.  $[\text{Cr}(\text{CN})_6]^{3-}$  d.  $[\text{Cr}(\text{bpy})_3]^{2+}$
- 2 Which of the following complex ions is tetrahedral?  
a.  $[\text{PdCl}_4]^{2-}$  b.  $[\text{PtCl}_4]^{2-}$  c.  $[\text{NiCl}_4]^{2-}$  d.  $[\text{AuCl}_4]^-$
3. Which series correctly places the ligands in order of increasing nephelauxetic effect?  
a.  $\text{F}^- < \text{Cl}^- < \text{I}^-$  b.  $\text{I}^- < \text{Cl}^- < \text{F}^-$  c.  $\text{en} < \text{NH}_3 < \text{H}_2\text{O}$  d.  $\text{I}^- < \text{Br}^- < [\text{CN}]^-$
4. For which pair of complexes is the order of values of  $\Delta_{\text{oct}}$  correct?  
a.  $[\text{Rh}(\text{NH}_3)_6]^{3+} > [\text{Co}(\text{NH}_3)_6]^{3+}$  b.  $[\text{Fe}(\text{CN})_6]^{4-} > [\text{Fe}(\text{CN})_6]^{3-}$   
c.  $[\text{Cr}(\text{OH}_2)_6]^{2+} > [\text{Cr}(\text{OH}_2)_6]^{3+}$  d.  $[\text{CrF}_6]^{3-} > [\text{Cr}(\text{CN})_6]^{3-}$
5.  $d^1$  electron configuration corresponds to which of the following terms?  
a.  $^2D$  b.  $^1D$  c.  $^2P$  d.  $^3P$
6. How many microstates are possible for a  $p^1$  configuration, including both weak and strong field limits?  
a. 15 b. 9 c. 6 d. 45
7. Which of the following corresponds to the Laporte selection rule?  
a.  $\Delta l = 0, +1$  or  $-1$  b.  $\Delta n = 0, +1$  or  $-1$  c.  $\Delta n = +1$  or  $-1$  d.  $\Delta l = +1$  or  $-1$
8. Which one is not a borane?  
a.  $\text{B}_5\text{H}_9$  b.  $\text{B}_5\text{H}_{10}$  c.  $\text{B}_5\text{H}_{11}$  d.  $\text{B}_6\text{H}_{10}$
9. Number of lone pair (s) in  $\text{XeOF}_4$  is  
a. 0 b. 1 c. 2 d. 3
10. The compound that undergoes oxidative addition reaction in presence of  $\text{H}_2$  is  
a.  $[\text{Mn}(\text{CO})_5]^-$  b.  $[(\eta^5\text{-C}_5\text{H}_5)\text{Mo}(\text{CO})]^-$  c.  $[\text{IrCl}(\text{CO})(\text{PPh}_3)_2]$  d.  $[(\eta^5\text{-C}_5\text{H}_5)_2\text{ReH}]$

11. The number of metal-metal bonds in  $\text{Ir}_4(\text{CO})_{12}$  is
- a.** 4      **b.** 6      **c.** 10      **d.** 12
12. Oxidation occurs very easily in case of
- a.**  $\eta^5\text{-(C}_5\text{H}_5)_2\text{Fe}$     **b.**  $\eta^5\text{-(C}_5\text{H}_5)_2\text{Co}$     **c.**  $\eta^5\text{-(C}_5\text{H}_5)_2\text{Ru}$     **d.**  $\eta^5\text{-(C}_5\text{H}_5)_2\text{Co}^+$
13. Structure of a carborane with formula,  $\text{C}_2\text{B}_4\text{H}_8$  is formally derived from
- a.** Closo-borane    **b.** Nido-borane    **c.** Arachno-borane    **d.** Conjuncto-borane
14.  $\text{Co}_4(\text{CO})_{12}$  adopts the
- a.** *closo*-structure    **b.** *nido*-structure    **c.** *arachno*-structure    **d.** *hypho*-structure
15. According to Wade's rule, anion  $\text{C}_2\text{B}_9\text{H}_{12}$  adopts
- a.** *nido*-structure    **b.** *closo*-structure    **c.** *arachno*-structure    **d.** *hypho*-structure
16. The total valence electron count and the structure type adopted by the complex  $[\text{Fe}_5(\text{CO})_{15}\text{C}]$  respectively are
- a.** 74 and nido    **b.** 60 and closo    **c.** 84 and arachno    **d.** 62 and nido
17. The numbers of skeletal electrons present in the compounds  $\text{C}_2\text{B}_3\text{H}_5$ ,  $\text{C}_2\text{B}_4\text{H}_6$ , and  $\text{B}_5\text{H}_9$  respectively are,
- a.** 10, 12 and 12    **b.** 12, 14 and 14    **c.** 10, 12 and 14    **d.** 12, 14 and 12
18. The STYX code of  $\text{B}_4\text{H}_{10}$  is:
- a.** 4120      **b.** 4220      **c.** 4012      **d.** 3203
19. Using Wade's rules predict the structure type of  $[\text{C}_2\text{B}_5\text{H}_7]$ .
- a.** nido      **b.** closo      **c.** arachno    **d.** hypho
20. Which of the following options are correct for  $[\text{Fe}(\text{CN})_6]^{3-}$  complex?
- a.**  $d^2sp^3$  hybridization    **b.**  $d^2sp^3$  hybridization    **c.** paramagnetic    **d.** diamagnetic

21. The term symbol for ground state is  $^4F$  the unpaired electron for this term symbol is

- a. 2      b. 5      c. 4      d. 3

22. How many micro state are arising from  $d^2$  case?

- a. 15      b. 45      c. 52      d. 18

23. The term symbol of  $d^4$  high spin electronic configuration is

- a.  $^4F$       b.  $^5D$       c.  $^3F$       d.  $^4P$

24. Which one is not a borane?

- a.  $B_5H_9$       b.  $B_5H_{10}$       c.  $B_5H_{11}$       d.  $B_6H_{10}$

25. How many bonding and lone paired electron in  $XeF_2$ ?

- a. 2,3      b. 3,2      c. 2,6      d. 6,2

26. Which of the following is a linear molecule?

- a.  $H_2O$       b.  $BeCl_2$       c.  $SO_2$       d.  $CH_4$

27. Which of the following complexes does not obey the 18-electron rule?

- a.  $[Fe(CO)_5]$       b.  $[Mn(CO)_5]$       c.  $[Ni(CO)_4]$       d.  $[Cr(CO)_6]$

[ans:- 1.b 2.d 3.a 4.a 5.a 6. c 7. c 8. b 9. a 10. c 11. b 12. b 13. b 14. 15 . a 16. a 17. b

18. c 19. b 20. C 21 d 22 b 23 b 24 b 25 a 26 b 27 b ]