Paper Code – 3123

B. Sc. Semester-I (New Course)
July-Septermber-2021
CHEMISTRY

કુલ સમય :– : ૬૦ મીનીટ **કુલ પ્રશ્નો : ૫૦** **વિદ્યાર્થીએ ટીક કરવાના પ્રશ્નો : ૩૫**

નોંધ : વિદ્યાર્થીએ માત્ર ૩૫ પ્રશ્નો જ ટીક કરવાના રહેશે. જો વધારે ટીક કરેલ હશે તો પ્રથમ ૩૫ પ્રશ્નો જ ગણતરીમાં લેવામાં આવશે.

1. Who introduced the concept of hybridization?
   a) Pauling b) London c) Sidgwick d) Alexander
2. The phenomenon of forming completely new atomic orbitals by intermixing them is known as _____
   a) Allocation b) Hybridization c) Chemical bond formation d) Electron configuration
3. The orbitals that are resulted from sp hybridization have _____% s-character and _____% p-character.
   a) 25, 75 b) 75, 25 c) 20, 80 d) 50, 50
4. What type of hybridization does a BCl_3 molecule undergo?
   a) sp b) sp^2 c) sp^3 d) sp^3d
5. What is the bond angle of H-C-H in methane molecule?
   a) 104.5° b) 109.5° c) 108° d) 120°
6. What do you think is the number of sigma bonds in an ethene molecule?
   a) 6 b) 7 c) 4 d) 5
7. Mention the types of orbitals that undergo hybridization in order to get octahedral geometry?
   a) s-orbital only b) s-orbital and p-orbital c) s-orbital, p-orbital, and d-orbital d) d-orbital and p-orbital
8. What is the geometry of PCl_5 molecule?
   a) Square pyramidal b) V-shape c) Trigonal bipyramidal d) Tetrahedral
9. What's the bond order of Oxygen molecule?
   a) 3 b) 2 c) 1 d) 0
10. What do you think is the relationship between bond order and bond length?
    a) Directly proportional b) Inversely proportional c) No relation d) Cannot predict
11. What is the electronic configuration of hydrogen molecule?
    a) $\sigma 1s^2$ b) $\sigma 1s^1$ c) $\sigma 1s$ d) $\sigma^* 1s$
12. Which of the following molecule doesn't exist?
    a) O_2 b) H_2 c) He_2 d) N_2
13. Which of the following is true regarding nitrogen molecule.
    a) Diamagnetic b) Paramagnetic c) Bond order is 2 d) Total number of electrons in the molecule is 13
14. The lanthanoid elements belong to which of the following group?
    a) s-blockp-block c) d-block d) f-block
15. What is the general electronic configuration of the lanthanides?
    a) $(n-2)f^{1-14}\ (n-1)d^{1-10}\ ns^2$ b) $(n-2)f^{1-14}\ (n-1)d^{1-2}\ ns^2$
    c) $(n-2)f^{1-14}\ (n-1)d^{0-1}\ ns^2$ d) $(n-2)f^{1-14}\ (n-1)d^{0}\ ns^2$
16. What is the most common oxidation state of lanthanides?
    a) +2 b) +4 c) +6 d) +3
17. Which of the following is the correct order of arrangement of the first five lanthanides according to atomic number?
    a) La, Ce, Pr, Nd, Pm b) La, Pr, Ce, Pm, Nd c) La, Pr, Ce, Nd, Pm d) La, Ce, Pr, Pm, Nd
18. Which is the last element of lanthanides?
    a) Ytterbium b) Lutetium c) Thulium d) Erbium
19. Which of the following is a temporary effect brought into play at the requirement of attacking reagent?
    a) Inductive effect b) Mesomeric effect c) Electromeric effect d) Inductomeric effect
20. When the complete transfer of π-electrons take place away from the atom at the requirement of attacking agent, it is called _____
    a) (-E) effect b) (+E) effect c) (-I) effect d) (+I) effect
21. The positively charged and electron deficient compounds which have a tendency to form a bond by accepting the electron pair are known as _____
    a) Electrophiles b) Nucleophiles c) Homophiles d) All of the mentioned
22. Which of the following is an incorrect statement about the nucleophiles?
    a) They are electron rich b) They possess an empty orbital to receive the electron pair
    c) They attack electron deficient centres d) Examples are: OH^-, NH_3, H_2O etc
23. Which of the following molecule will show highest dipole moment?
    a) CH_3Cl b) CH_3Br c) CH_3F d) CH_3I
24. Arrange the following groups in the order of decreasing (+I) effect.
    a) $C_6H_5O^- > COO^- > CR_3 > CHR_2 > H$ b) $C_6H_5O^- > H > CR_3 > CHR_2 > COO^-$
    c) $CR_3 > C_6H_5O^- > H > COO^- > CHR_2$ d) $C_6H_5O^- > COO^- > CHR_2 > CR_3 > H$

25. Which of the following is an application of inductive effect?
    a) Bond length b) Dipole moment c) Strength of carboxylic acids d) All of the mentioned
26. Due to presence of C – X polar bond in alkyl halide, alkyl halides are _____
    a) More reactive than corresponding alkane b) Less reactive than corresponding alkane
    c) Equally reactive as corresponding alkane d) None of the mentioned
27. Which is not present in Grignard reagent?
    a) Methyl group b) Magnesium c) Halogen d) −COOH group
28. A covalent bond between two atoms may be broken in different ways depending upon _____
    a) Nature of given organic compound b) Nature of attacking reagent
    c) Reaction conditions d) All of the mentioned
29. The breaking of a covalent bond in such a way that each atom separates with one electron of the shared pair is called _____
    a) Homolytic fission b) Heterolytic fission c) Monolytic fission d) Morpholytic fission
30. Heterolytic fission takes place between two atoms of widely different _____
    a) Conductivity b) Viscosity c) Electronegativity d) All of the mentioned
31. Which of the following is intermediate organic species based on carbon formed by homolytic fission?
    a) Carbenes b) Carbo-cations c) Carbanions d) Free radicals
32. Work is a
    a) point function b) path function c) depends on the state d) none of the mentioned
33. A cyclic heat engine does 50kJ of work per cycle. If efficiency of engine is 75%, the heat rejected per cycle will be _____
    a) 60.6kJ b) 16.6kJ c) 66.6kJ d) 200kJ
34. Energy can neither be created nor destroyed, it can only be transferred from one form to another is a statement related to
    a) Second law of Thermodynamics b) First law of Thermodynamics
    c) Third law of Thermodynamics d) Zero law of Thermodynamics
35. Measure of disorder-ness is called _____
    a) pressure b) enthalpy c) entropy d) none of the mentioned
36. Entropy is a _____ function.
    a) state b) path c) point d) none of the mentioned
37. Entropy is an _____
    a) intensive property b) extensive property
    c) intensive & extensive property d) none of the mentioned
38. Thermodynamic entropy differs from statistical mechanics entropy by a constant _____
    a) Critical pressure b) Critical pressure & Boltzmann's constant c) Boltzmann's constant
    d) None of the mentioned
39. The Gibbs free energy is positive when a change in enthalpy and change in entropy are positive at _____
    a) high temperatures b) low temperature c) all temperatures d) only at 0 Kelvin
40. In the equation, $\Delta G = -2.303\ RT \log K$, what is K?
    a) change in temperature b) kelvin c) equilibrium constant d) change in enthalpy
41. Which of the following is not a strong acid?
    a) HCl b) HNO_3 c) CH_3COOH d) H_2SO_4
42. Which of the following is a self-indicator?
    a) a) HCl b) HNO_3 c) NaOH d) $KMnO_4$
43. The indicator used in the EDTA method is _____
    a) Benzene b) Phenopthalene c) Ethylene diamine d) Erichrome black T
44. EDTA v/s Ca^{2+} titration is a type of
    a) acid-base titration b) complexometric titration c) redox titration d) precipitation titration
45. Which of the following is a strong acid strong base titration?
    a) HCl v/s NaOH b) CH_3COOH v/s KOH c) CH_3COOH v/s NaOH d) HCl v/s NH_4OH
46. Which of the following is a titrant for redox titration?
    a) HCl b) $KMnO_4$ c) NaOH d) CH_3COOH
47. $AgNO_3$ is used as a titrant in
    a) acid-base titration b) Redox titration c) precipitation titration d) complexometric titration
48. Which of the following is not an indicator?
    a) phenolphthalein b) methyl orange c) EBT d) DDT
49. The end point for HCl v/s NaOH titration is around pH
    a) 8 b) 7 c) 10 d) 6
50. Which of the following is not an essential tool for titration reaction
    a) Burette b) Conical flask c) Pipette d) Test-tube