Chemistry

1. Which one of the following heterocyclic compound is not aromatic ?
   a) Pyridine b) Pyrrole c) Furan* d) Piperidine

2. Pyridine has a delocalised π-molecular orbital containing
   a) 4πe b)6πe* c)8πe d)12πe

3. Pyrrole is less basic than pyridine because the lone pair of electrons of N-atom in pyrrole
   a) is part of the delocalised π-molecular orbital*
   b) is not part of the delocalised π-molecular orbital
   c) resides in sp^2 hybrid orbital
   d) resides in sp hybrid orbital

4. Which of the following reagent reacts with pyrrole to give 2-formylpyrrole ?
   a)HCOOH b)$CHCl_3$/KOH* c)H_2O_2 d)$(CH_3CO)_2O/SnCl_4$

5. Quinoline undergoes nucleophlilic substitution on heating with NaNH2 to give
   a)2-aminoqunoline* b) 4-aminoqunoline c) 3-aminoqunoline d) 8-aminoqunoline

6. Reaction of furfural with NaOH gives
   a)Furoin
   b)Furoic acid
   c)Furfuryl alcohol and sodium salt of furane2-carboxylic acid*
   d)No reaction

7. Porphin consist the
   a)3 pyrrole ring b) 4 pyrrole ring* c) 5 pyrrole ring d) 6 pyrrole ring

8. On nitration with nitric acid and acetic anhydride quinoline gives the major product of
   a)5-nitroquinoline b) 8-nitroquinoline c) 3-nitroquinoline* d) 2-nitroquinoline

9. A nucleoside on hydrolysis gives
   a)an aldopentose and orthophosphoric acid
   b) an aldopentose and a heterocyclic base*
   c) an aldopentose, orthophosphoric acid and a heterocyclic base
   d) orthophosphoric acid and a heterocyclic base

10. Which reagent is used for Edman degradation for N-terminal group analysis of peptides
    a)Phenyl isothiocyanate*
    b)Di-*t*-butyl dicarbonate
    c)Dicyclohexyl carbodiimide
    d)Benzyl chloroformate

11. A protein is said to have following groups
    I. $-NH_2$ **II.-COOH** **III.-CONH-**
    a)I, II b)I, III c)II, III d)I, II, III*

12. The helix structure of protein is stabilised by
    a)peptide bonds b)hydrogen bonds* c)disulphide bonds d)van der Waals forces

13. The functional unit repeated in a protein molecule is
    a)an ester linkage
    b)an ether linkage
    c)a peptide linkage*
    d)a secondary amine linkage

14. The sugar unit present in the nucleotides of RNA is
    a)D-ribulose b)L-ribulose c)D-ribose* d)L-ribose

15. How many base pairs are present in each full turn of the DNA double helix
    a)4 b)6 c)8 d)10*

16. A sulpha drug which is used in the treatment of bacillary dysentery is
    a)sulphathiazole b)sulphadiazine c)sulphaguanidine* d)sulphamezathine

17. An example of non-narcotic analgesic is
    a)ketoprofen* b)cocaine c)morphine d)pethidine
18. The drug which is antipyretic as well as analgesic is
    a)chloropromazine hydrochloride b)p-acetamidophenol* c)chloroquin d)penicillin

19. Which of the fowwing is a hypnotic drug?
    A) salol b)luminal* c)piperazine d)novalgin

20. An anticonvulsant drug is
    a)reserpine b)nicotinic acid c)barbiturate* d)prontosil

21. Chloramine – T is
    a) An antiseptic* b) Disinfectant c) Analgesics d) Antimalarial

22. Aspirin is
    a) An antiseptic b) Analgesic* c) Antibiotic d) Hypnotic
23. Malachite green is
    a) An acidic dye b) A basic dye* c) Ingran dye d) Vat dye

24. From which temperature range anthracene oil is obtained during fractional distillation of coal tar
    a)upto 200^{o}C b) 200-250^{o}C c)250-300^{o}C d) 300-350^{o}C*

25. α-decalone on reaction with vinylmagnesium bromide in THF, followed by protonolysis gives
    a)1-vinyl-1-decalol* b)1-vinyldecalene c) 2-vinyl-1-decalol d)None of these

26. methyl magnesium bromide on reaction with PCl_3 gives
    a)trimethylphosphine* b)H_3PO_3 c)$POCl_3$ d) None of these

27. Grignard reagents on reaction with cadmium chloride in ether gives
a)Organocadmium compound b)$MgCl_2$ c)Alkyl chloride d)Both A and B*

28. Organocadmium compounds on reaction with acid chlorides
a) $CdCl_2$ b)Ketone c)Aldehyde d) Both A and B*

29. Imino acid among the compounds is
a)Serine b)Proline* c)Tyrosine d)Lysine

30. On heating with conc. HNO_3, proteins give yellow colour. The test is called a)Oxidizing test b)Xanthoproteic test* c)Hoppe's test d)Acid base test

31. What happens when conc. H_2SO_4 is treated with sugar ?
a)Oxidation b)Reduction c)Dehydration* d)Hydrolysis

32. Zeiler-Natta catalyst is
a)$K[PtCL_3(C_2H_4)]$ b)$[(Ph_3P)_3RhCl]$ C)$Al_2(C_2H_5)_6 + TiCl_4$* d)$Fe(C_5H_5)_2$

33. Percentage of ionic character of HCl is
a) 71% (b) 12% c)* 17% (d) none of these

34. The frequency of UV radiation is greater than
a) microwaves (b) infra-red c) * both A and B (d) none of these

35. Reduced mass is calculated using……..mean of individual component mass.
(a) arithmetic (b) geometric (c)* harmonic (d) none of these

36. The set of allowed electronic transition
(a) $^3\Sigma \rightarrow {}^3\Delta$ (b) $^4\Sigma \rightarrow {}^2\Pi$ (c) $^3\Sigma \rightarrow {}^2\Delta$ (d)* $^3\Sigma \rightarrow {}^3\Pi$

37. The maximum value of vibrational quantum number is given by $v_{\max}$
a) * $\frac{1}{2x_e} - 1$ (b) $\frac{1}{2x_e} + 1$
(c) $\frac{1}{x_e} - \frac{1}{2}$ (d) $\frac{1}{x_e} + \frac{1}{2}$

38. Which one is not responsible for spectral peak broadening?
(a) collision broadening (b) Doppler broadening
(c) Heisenberg uncertainty (d)* none of these

39. Frequency of absorption for transition from $2 \rightarrow 3$ energy level will be
(a) 4B (b)* 6B
(c) 8B (d) 2B

40. Raman spectrum occurs due to change of
(a) dipole (b)* quadruple
(c) octadruple (d) hexadruple

41. Depression of freezing point is measured using
(a) Landsberger's method (b) Dynamic method
(c) Cottrell's method (d)* Rast's method

42. Chemical potential of water in dilute aqueous solution of sucrose is …….to that of pure water
(a)* less than (b) greater than
(c) equal to (d) not predictable

43. Benzoic acid lowers the freezing point of benzene to a lesser extent than naphthalene because of
(a) dissociation (b)* association
(c) change in conformation (d) enolisation

44. A temperature independent concentration unit is
(a) Molarity (b) Normality
(c)* mole fraction (d) volume strength

45. The angle between electric and magnetic vector in plane polarize light beam is
(a) 0 (b) π
(c)* $\frac{\pi}{2}$ (d) 2π

46. In the expression for specific rotation, $[\alpha] = \frac{\alpha}{lC}$, the unit if length is
(a) μm (b) mm
(c) cm (d)* dm

47. Difference between the incident and scattered frequency in Raman spectrum is called
(a) Stokes line (b)* Raman frequency
(c) Anti-Stokes line (d) none of these

48. Source of UV light
(a) Tungsten Lamp (b)* Deuterium Lamp
(c) Xenon Lamp (d) Ni-Cr Lamp

49. An example of the species having quadruple bond –
(a) $Mn_2(CO)_{10}$ (b) $Cr_2O_7^{2-}$ (c) $Re_2Cl_8^{2-*}$ (d) $Os_2Cl_8^{2-}$

50. Which stamen is incorrect about $[Ti(H_2O)_6]^{3+}$

(a) it is diamagnetic*

(b) considering only *d*-orbitals, crystal field theory is consistent with a ground state electronic configuration of $t_{2g}^1e_g^0$

(c) solution containing $[Ti(H_2O)_6]^{3+}$ are acidic

(d) solution of the ion are coloured

51. Which of the following is a soft acid, according to Pearson's concept of hard and soft acids?

(a) Ag^{+*} (b) I^{7+} (c) Sr^{2+} (d) Al^{3+}

52. In anhydrous H_2SO_4, molar conductivity of a solution of $KHSO_4$ is about ____ that of HNO_3

(a) equal (b) half* (c) double (d) triple

53. Why KOH is much more soluble in liquid ammonia containing water than in pure liquid ammonia

(a) formation of ammoniated metal cation

(b) complex formation

(c) ammonolysis

(d) strong H-bonding between OH^- and H_2O *

54. If Li_3N is added to liquid ammonia the acidity will-

(a) Increase (b) Decrease* (c) Unaffected (d) First decrease, then increase

55. $CoCl_4^{2-}$ is –

(a) more strongly coloured than $[Co(H_2O)_6]^{2+}$

(b) less strongly coloured than $[Co(H_2O)_6]^{2+}$

(c) (a) is correct and it is due to d-p mixing*

(d) (b) is correct and it is due to d-p mixing

56. The zero magnetic moment of octahedral K_2NiF_6 is due to –

(a) low spin d^6 Ni(IV) complex*

(b) low spin d^8 Ni(II) complex

(c) high spin d^8 Ni(II) complex

(d) high spin d^6 Ni(IV) complex

57. Arrange the metal complexes in order of increasing hydration energy –

(i) $[Mn(H_2O)_6]^{2+}$ (ii) $[V(H_2O)_6]^{2+}$ (iii) $[Ni(H_2O)_6]^{2+}$ (iv) $[Ti(H_2O)_6]^{2+}$

(a) (iv) < (iii) < (ii) < (i)

(b) (iv) < (i) < (ii) < (iii)

(c) (iv) < (iii) < (ii) < (i)

(d) (i) < (iv) < (ii) < (iii)*

58. Which of the following metal fragment d^n-ML_n is isolobal with CH_2?

(a) d^7-ML_5 (b) d^9-ML_3 (c) d^8-ML_4* (d) d^5-ML_6

59. NiX_4^{2-}, CoX_4^{2-} and MnX_4^{2-} where X is a halogen –

(a) coloured (b) colured due to L →MCT* (c) colourless (d) coloured due to M →LCT

60. Carbonylate anions one formed by the action of

(a) Lewis acid such as AlCl3 on CO and carbonyl halide

(b) halogen on $Fe(CO)_5$

(c) alkali on simple carbonyl*

(d) by reduction of carbonyls with alkali metals, alkali metal amalgams or borohydrides

61. Which statement is incorrect?

(a) $Zn(OH)_2$ is insoluble in water

(b) $Zn(NH)_2$ is insoluble in water

(c) alkali metal salts of $Zn(OH)_4^{2-}$ are soluble in water

(d) alkali metal salts of $Zn(NH_2)_4^{2-}$ are insoluble in water*

62. Which of the following reactions of $(NPCl_2)_3$ would fail to work?

(a) reaction of Me_2NH to give NMe_2 for Cl substitution with second substitution taking place at the same P atom as the first*

(b) reaction of water to exchangs OH for Cl

(c)) reaction of NaF to give F for Cl substitution with second substitution taking place at the same P atom as the first

(d) reaction with C_5H_5Li to eliminate LiCl

63. Which of the following will act as an acid in liquid NH_3 according to solvent system concept?

(a) Urea* (b) KNH_2 (c) PbNH (d) none of these

64. The crystal field splitting energy for octahedral (Δ_o) and tetrahedral (Δ_t) complexes is related as –

(a) $\Delta_t \approx 4/9\ \Delta_o$* (b) $\Delta_t \approx 1/2\ \Delta_o$ (c) $\Delta_o \approx 1/2\ \Delta_t$ (d) $\Delta_o \approx 4/9\ \Delta_t$

65. Which of the following ions has zero crystal field stabilization energy in octahedral field?

(a) Cr^{3+} (high spin)

(b) Co^{2+} (low spin)

(c) Fe^{3+} (low spin)

(d) Fe^{3+} (high spin)*

66. Which among the following will be paramagnetic?

(a) $Cr(CO)_6$ (b) $Fe(CO)_5$ (c) $Fe_2(CO)_9$ (d) $V(CO)_6$*

67.Which one of the following complex does not obey the 18-electron rule?

(a) $Fe_3(CO)_{12}$ (b) $Co_4(CO)_{12}$ (c) $Co_3(CO)_{10}^-$ (d) $Co_6(CO)_{14}^{4-*}$

68. Which of the following product is obtained on mixing, $PtCl_4$ in ethanol in the presence of KCl –

(a) Zeise's salt* (b) $PtCl_2.C_2H_4$ (c) $PtCl_2(C_2H_4)_2$ (d) K_2PtCl_4

69. The N-atom in pyridine is
a)sp^2 hybridised * b) sp hybridised c) sp^3 hybridised d) cannot be predicted

70. Fischer indole synthesis involves
a)[2,3] sigmatropic shift
b) [3,3] sigmatropic shift*
c) [3,2] sigmatropic shift
d) [2,2] sigmatropic shift

71. Rapid interconversion of α-D-glucose and β-D-glucose in solution is known as
a)asymmetric induction b)mutarotation*
c)racemisation d)fluxional isomerisation

72. Among the following, a sugar that is not a disaccharide is
a)Lactose b)Galactose* c)Sucrose d)Maltose

73. In the Molisch's test ofcarbohyrates, the organic compound that is used as the reagent is
a)α-napthol* b)β-napthol c)sodium citrate d)sodium potassium tartrate

74. When d-arabinose is subjected to Kiliani-Fischer synthesis, the major final product formed is
a)D-glucose* b)D-fructose c)D-mannose d)D-erythrose

75. In the molecule of D-fructofuranose, the anomeric carbon is ?
a)C-1 b)C-2* c)C-5 d)C-6

76. Biurate test is performed for the detection of
a)sugars b)fats c)proteins* d)saturated oils

77. Whish one of the following amino acids possesses two chiral centres?
a)Leucine b)Isoleucine c)Threonine d)Both B and C*

78. The most abundant protein present in mammalian body is
a)Hemoglobin b)Keratin c)Collagen* d)Insulin

79. The metal ion which forms a blue-violet coloured complex with a protein in presence of alkali a)Cu^{2+}* b)Zn^{2+} c)Co^{2+} d)Fe^{3+}

80. Reduced mass is calculated using……..mean of individual component mass

(a) arithmetic (b) geometric
(c)* harmonic (d) none of thes

81. The set of allowed electronic transition

(a) $^3\Sigma \rightarrow {}^3\Delta$ (b) $^4\Sigma \rightarrow {}^2\Pi$

(c) $^3\Sigma \rightarrow {}^2\Delta$ (d)* $^3\Sigma \rightarrow {}^3\Pi$

82. The term symbol of ground state nitrogen atom is

(a) $^4P_{\frac{3}{2}}$ (b) $^3P_0$

(c)* $^4S_{\frac{3}{2}}$ (d) $^3P_{\frac{1}{2}}$

83. The O—H starching frequency is 3600 cm^{-1}. The second overtone band appears at approximately

(a) 926 μm (b)* 926 nm

(c) 1.08×10^4 nm (d) 1.08×10^4 Hz

84. Thermocouples are used as detector in

(a) UV-vis (b)* IR

(c) NFR (d) NMR

85. The unit of molar extinction co-efficient is

(a) $M\,cm$ (b) $M\,cm^{-1}$

(c) $M^{-1}\,cm$ (d)* $M^{-1}\,cm^{-1}$

86. Change of configuration is origin of

(a) UV-vis spectroscopy (b)* IR spectroscopy

(c) NMR spectroscopy (d) none of these

87. If the molecule has a ……. then Raman active vibrations are IR-inactive, and vice versa.

(a) chiral center

(b) improper axis of symmetry

(c)* inversion of symmetry

(d) plane of symmetry

88. Symmetric vibrations give rise to ……..Raman line; non-symmetrc ones are…….

(a) weak, intense (b) intense, intense

(c) weak, weak (d)* intense, weak

89. For a diatomic molecules, the spacing between two adjacent rotational Raman line is

(a) 2B (b)* 4B

(c) 6B (d) none of these

90. by decreasing the pressure the reaction will go to that direction where

a) volume is decreased

b)* volume is increased

c) heat absorbed

d) number of moles of specie decreased

Answer Ker

sl_no	ans
1	C
2	B
3	A
4	B
5	A
6	C
7	B
8	C
9	B
10	A
11	D
12	B
13	C
14	C
15	D
16	C
17	A
18	B
19	B
20	C
21	A
22	B
23	B
24	D
25	A
26	A
27	D
28	D
29	B
30	B
31	C
32	C
33	C
34	C
35	C
36	D
37	A
38	D
39	B
40	B
41	D
42	A
43	B
44	C
45	C
46	D
47	B
48	B
49	C
50	A
51	A
52	B
53	D
54	B
55	C
56	A
57	D
58	C
59	B
60	C
61	D
62	A
63	A
64	A
65	D
66	D
67	D
68	A
69	A
70	B
71	B
72	B
73	A
74	A
75	B
76	C
77	D
78	C
79	A
80	C
81	D
82	C
83	B
84	B
85	D
86	B
87	C
88	D
89	B
90	B