

140/2014

- Which among the following set of quantum numbers is **not** allowed for the values of (n, l, m, s) ?
 (A) (2, 1, 1, 2) (B) (1, 0, 1, +1/2)
 (C) (2, 1, 1, +1/2) (D) (4, 3, -1, -1/2)
- The effective nuclear charge in the electron in He atom is :
 (A) 2 (B) 1.7 (C) 1.15 (D) 1.65
- The electron configuration of Fe^{2+} is :
 (A) $[\text{Ar}] 3d^5 4s^1$ (B) $[\text{Ar}] 3d^6 4s^0$ (C) $[\text{Ar}] 3d^4 4s^2$ (D) $[\text{Ar}] 3d^5 4s^0$
- The radius ratio between 0.025 and 0.414 favours the coordination number of :
 (A) 8 (B) 4 (C) 6 (D) 3
- sp^3 hybridization results in _____ arrangement of hybrid orbitals.
 (A) triangular (B) pyramidal (C) tetrahedral (D) linear
- The shape of NH_3 is :
 (A) angular (B) pyramidal (C) tetrahedral (D) linear
- Ethene has _____ sigmas bonds and _____ pi bonds.
 (A) 1, 1 (B) 4, 1 (C) 6, 0 (D) 5, 1
- Which among the following is the artificial radioactive series ?
 (A) Uranium Series (B) Actinium Series
 (C) Neptunium Series (D) Thorium Series

9. The splitting of spectral lines in an electric field is called :
(A) Zeeman effect (B) Photoelectric effect
(C) Stark effect (D) Thomson effect
10. Which among the following is paramagnetic ?
(A) CO (B) NO (C) O^{2-} (D) O^{2+}
11. Which among the following can form intramolecular hydrogen bonding ?
(A) benzoic acid (B) water (C) o-nitrophenol (D) p-nitrophenol
12. Photoelectric effect demonstrates the _____ nature of light.
(A) wave (B) particle
(C) both particle and wave (D) neither particle nor wave
13. In a reversible reaction, the reaction rate of the backward reaction is :
(A) Positive (B) Negative
(C) Zero (D) Can be positive or negative
14. Hydrolysis of ethyl acetate in presence of excess of water is a _____ order reaction.
(A) zero (B) first (C) pseudo first (D) second
15. The rate of a chemical reaction doubles for every $10^{\circ}C$ rise in temperature. If the temperature is increased by $60^{\circ}C$, the rate of the reaction increases by about :
(A) 10 times (B) 128 times (C) 32 times (D) 64 times
16. Quantum yield of the reaction $2HBr \rightarrow H_2 + Br_2$ is :
(A) 1 (B) 2 (C) 0.5 (D) 4
17. Emission of light as a result of chemical reaction is :
(A) fluorescence (B) phosphorescence
(C) chemiluminescence (D) photosensitization

18. Substances which reduce the quantum yield of photochemical reactions are called :
(A) photo inhibitors (B) photo initiators (C) catalysis (D) photo sensitizers
19. Which of the following is a correct notation for an orbital with $n=4$ and $l=2$?
(A) 4p (B) 4f (C) 4d (D) 4s
20. Na^+ is isoelectronic with :
(A) K^+ (B) Al^{3+} (C) Ca^{2+} (D) Cl^-
21. Which of the following hybridization tends to give maximum electro negativity for an atom ?
(A) sp^2 (B) sp
(C) sp^3 (D) All have the same effect
22. Which of the following is a p-block element ?
(A) Rb (B) Cs (C) Sr (D) Sb
23. The hybridization of chlorine in ClF_3 is :
(A) sp^3 (B) sp^3d (C) dsp^3 (D) None of these
24. Which of the following is unstable according to M.O. theory ?
(A) He_2^+ (B) C_2 (C) He_2 (D) O_2^-
25. A molecule having all the bond angles equal to 90° is :
(A) PCl_5 (B) CH_4 (C) SF_6 (D) BeCl_2
26. The hybridization of carbon CO_2 is :
(A) sp (B) sp^2 (C) sp^3 (D) sp^3d

27. Which of the following and ${}_{14}\text{Si}^{30}$ are isotones ?
 (A) ${}_{15}\text{P}^{32}$ (B) ${}_{13}\text{Al}^{29}$ (C) ${}_{16}\text{S}^{31}$ (D) ${}_{16}\text{S}^{33}$
28. The stable end product of Uranium series is :
 (A) ${}_{83}\text{Bi}^{209}$ (B) ${}_{82}\text{Pb}^{206}$ (C) ${}_{82}\text{Pb}^{207}$ (D) ${}_{82}\text{Pb}^{209}$
29. Which of the following nuclide is a fissile material ?
 (A) ${}_{92}\text{U}^{238}$ (B) ${}_{90}\text{Th}^{232}$ (C) ${}_{91}\text{Pa}^{231}$ (D) ${}_{92}\text{U}^{235}$
30. The nuclear fuel used in the Nagasaki Bomb was :
 (A) ${}_{92}\text{U}^{233}$ (B) ${}_{94}\text{Pu}^{239}$ (C) ${}_{92}\text{U}^{235}$ (D) ${}_{92}\text{U}^{238}$
31. The electrochemical equivalent (z) of an element is related to its equivalent mass (E) by the equation :
 (A) $E = z$ (B) $E = 96500z$ (C) $z = 96500E$ (D) $z/E = 96500$
32. The unit of molar conductance is :
 (A) $\text{Ohm}^{-1} \text{ cm mol}^{-1}$ (B) $\text{Ohm}^{-1} \text{ cm}^3 \text{ mol}^{-1}$
 (C) $\text{Ohm}^{-1} \text{ cm}^2 \text{ mol}^{-1}$ (D) $\text{Ohm}^{-1} \text{ cm}^{-1} \text{ mol}^{-1}$
33. Which of the following particles is the best projectile in bombardment reactions ?
 (A) ${}_1\text{H}^2$ (B) ${}_2\text{He}^4$ (C) ${}_0\text{n}^1$ (D) ${}_1\text{H}^1$
34. The isotope used for the treatment of Thyroid disorders is :
 (A) I^{132} (B) Sr^{90} (C) I^{131} (D) Co^{60}
35. Which of the following is **not** a chelating ligand ?
 (A) EDTA (B) Ethylene diammine (C) Oxalate (D) Ammonia

36. Vitamin B₁₂ is a coordination compound of :
(A) Mg (B) CO (C) Fe (D) Zn
37. Inter system crossing is essential for :
(A) Phosphorescence (B) Fluorescence
(C) Photosensitization (D) Chemiluminescence
38. Smoke is an example of :
(A) an emulsion (B) a gel (C) a solid aerosol (D) a liquid aerosol
39. How many significant figures are present in the number 0.0038 ?
(A) 5 (B) 4 (C) 2 (D) 1
40. A weighing balance is accurate to the nearest milligram. Which is the correct numerical representation for the weight of the substrate ?
(A) 2.0 g (B) 2.00 g (C) 2.000 g (D) 2.0000 g
41. The term used to express precision :
(A) Standard deviation (B) Relative error
(C) Molality (D) Molarity
42. Closeness to the measured value to the correct value is called as :
(A) Precision (B) Accuracy (C) Standard factor (D) Quotient
43. In the titration of NaOH against oxalic acid, the indicator used is :
(A) Phenolphthalein (B) Methyl orange
(C) KMnO₄ (D) Iodine
44. The external indicator used in dichrometry titration is :
(A) Potassium ferrocyanide (B) Potassium ferricyanide
(C) N-phenyl anthranilic acid (D) KMnO₄

45. The unit for concentration which is independent of temperature :
(A) Molarity (B) Molality (C) Normality (D) Indicator
46. The substance used to prepare a solution of known concentration is :
(A) Primary standard (B) Indicator (C) Buffer (D) Analyte
47. Pick out the odd one :
(A) Astronomy (B) Astrology (C) Phrenology (D) Acupuncture
48. A hypothesis, if passes all challenging tests, is promoted to :
(A) Scientific hypothesis (B) Null hypothesis
(C) Theory (D) Auxiliary hypothesis
49. The best known scientific method is :
(A) Positivism (B) Empiricism (C) Induction (D) Deduction
50. Which of the following statements about radio activity is not correct ?
(A) It is a nuclear property
(B) It does not involve any rearrangement of electrons
(C) It is not affected by the presence of other elements
(D) The rate is affected by change of temperature or pressure
51. Radioactive disintegration differs from a chemical change in being :
(A) An exothermic change (B) A spontaneous process
(C) A nuclear process (D) A first order reaction
52. β -rays :
(A) Have greater ionizing power than alpha rays
(B) Possess greater penetrating power than gamma rays
(C) Are rejected when light falls on active metals
(D) Carry charge opposite in sign but equal in magnitude than a proton

53. Alpha rays consist of a stream of :
 (A) H^+ (B) He^{2+} (C) Only electrons (D) Only neutrons
54. Unit of radioactivity :
 (A) Rad (B) Grey (C) Becquerel (D) Curie
55. When passing through a magnetic field, the largest deflection is experienced by :
 (A) α -rays (B) β -rays (C) γ -rays (D) All equal
56. With the passage of time, the rate of radioactive disintegration :
 (A) Increases (B) Decreases
 (C) Remains same (D) May increase or decrease
57. In the reaction ${}_4Be^9 + X \rightarrow {}_5B^9 + \gamma$, X is :
 (A) Protons (B) Deuterons (C) Positron (D) Neutrons
58. Which of the following projectiles is the best for bombarding the articles ?
 (A) α -particles (B) protons (C) deuterons (D) neutrons
59. Which of the radioactive series has Bismuth as end product ?
 (A) $4n$ (B) $4n + 1$ (C) $4n + 2$ (D) $4n + 3$
60. The lowest lattice energy among the following crystals is :
 (A) NaCl (B) KCl (C) RbCl (D) CsCl
61. The Born exponent of Ag^+ ion type is :
 (A) 5 (B) 7 (C) 9 (D) 10
62. The correct order of decreasing polarisability of the ions is :
 (A) Cl, Br, F, I (B) Cl, I, Br, F (C) Br, F, I, Cl (D) I, Br, Cl, F

63. Which of the following has the highest ionization energy ?
(A) $\text{Na} \rightarrow \text{Na}^+ + e$ (B) $\text{Al} \rightarrow \text{Al}^+ + e$ (C) $\text{Al}^+ \rightarrow \text{Al}^{2+} + e$ (D) $\text{Al}^{2+} \rightarrow \text{Al}^{3+} + e$
64. The magnitude of lattice energy of a solid increases if the ions are :
(A) Large (B) Small (C) Equal size (D) No effect
65. Born-Haber cycle is used to determine :
(A) Electronegativity (B) Entropy
(C) Lattice energy (D) All the above
66. Paracetamol is a :
(A) Hypnotic (B) Anti pyretics
(C) Anti depressants (D) Tranquillisers
67. The maximum electron capacity of any orbital is :
(A) 2 (B) 3 (C) 8 (D) 6
68. Which among the following has the highest ionization energy ?
(A) Boron (B) Carbon (C) Nitrogen (D) Oxygen
69. The function of the atom bomb is based on :
(A) natural radioactivity (B) nuclear fission and chain reactions
(C) spontaneous chemical reactions (D) nuclear fusion
70. With dilution, the molar conductance of an electrolytic solution :
(A) decreases (B) increases
(C) remains unchanged (D) decreases or increases
71. Bauxite is an ore of :
(A) Copper (B) Aluminium (C) Zinc (D) Titanium

72. The electron affinity of group 18 elements is :
(A) zero (B) larger than halogens
(C) larger than alkali metals (D) larger in the period of elements
73. The most electronegative element is :
(A) oxygen (B) nitrogen (C) chlorine (D) fluorine
74. The coordination number of cobalt in $[\text{Co}(\text{en})_2\text{Cl}_2]^+$ is :
(A) 3 (B) 4 (C) 5 (D) 6
75. Born-Haber cycle is used to calculate :
(A) refractive index (B) density (C) R_f Value (D) lattice energy
76. Sulphide ions are concentrated by :
(A) leaching (B) froth floatation
(C) liquation (D) magnetic separation
77. Fructose is a :
(A) aldopentose (B) ketohexose (C) aldohexose (D) ketopentose
78. Number of elements in the 4th period of the periodic table is :
(A) 8 (B) 10 (C) 18 (D) 32
79. The most stable form of cyclohexane is :
(A) chair (B) half chair (C) boat (D) twist boat
80. Identify the spectra that corresponds to the frequency 690 cm^{-1} :
(A) Microwave (B) NMR (C) IR (D) UV

81. Which among the following state functions is an extensive property of the system ?
(A) temperature (B) volume (C) viscosity (D) refractive index
82. The photon of wavelength 400 nm corresponds to :
(A) $20,000 \text{ cm}^{-1}$ (B) $25,000 \text{ cm}^{-1}$ (C) $50,000 \text{ cm}^{-1}$ (D) $40,000 \text{ cm}^{-1}$
83. The reagent used for the identification of nickel ion in qualitative analysis is :
(A) Potassium ferrocyanide (B) DMG
(C) EDTA (D) Nessler's reagent
84. The shift of an absorption band to the longer wavelength region is called :
(A) blue shift (B) red shift (C) yellow shift (D) none of these
85. The catalyst used for Friedal Crafts reaction is :
(A) Anhydrous AlCl_3 (B) AlCl_3
(C) FeCl_3 (D) ZnCl_3
86. The element with highest electron affinity among halogens is :
(A) F (B) Cl (C) Br (D) I
87. Boiling point of water is much higher than the expected value. This is due to _____.
(A) Intra molecular hydrogen bonding
(B) Inter molecular hydrogen bonding
(C) Both (A) and (B)
(D) Covalent bonding
88. Conduction due to the direct flow of electrons is known as :
(A) ionic conduction (B) electrolytic conduction
(C) electronic conduction (D) molecular conduction

89. The quantum number 's' denotes :
 (A) principal energy level (B) degeneracy of orbitals
 (C) number of nodes (D) spin orientation of an electron
90. The compounds H_2O and H_2O_2 can be used to illustrate the law of :
 (A) constant proportion (B) reciprocal proportion
 (C) multiple proportion (D) gaseous volumes
91. The first transition series begins with :
 (A) titanium (B) scandium (C) vanadium (D) manganese
92. A triangular arrangement of atoms arises due to :
 (A) sp hybridization (B) sp^2 hybridisation
 (C) sp^3 hybridisation (D) sp^3d hybridization
93. The critical temperature T_c is related to Vanderwaal's constant by the relation :
 (A) $T_c = 3b$ (B) $T_c = a/27b^2$ (C) $T_c = 8a/27Rb$ (D) $T_c = 2b$
94. Give the number of modes of vibrations possible for CO_2 :
 (A) 1 (B) 2 (C) 3 (D) 4
95. The hydrolysis of sodium acetate results in a solution which is :
 (A) acidic (B) basic (C) neutral (D) cannot predict
96. Ostwald dilution law is applicable to :
 (A) weak electrolytes (B) both weak and strong electrolytes
 (C) strong electrolytes (D) none of these

97. The potential of saturated calomel electrode at 25° C is :
(A) 0 V (B) 0.3335 V (C) 0.2422 V (D) 1 V
98. NaCl belongs to the crystal system :
(A) hexagonal (B) cubic (C) monoclinic (D) triclinic
99. IR spectra of solid samples are usually taken by mixing the sample with :
(A) TMS (B) Benzene (C) KBr (D) Water
100. Crystalline solids are characterised by :
(A) long range order (B) sharp melting point
(C) anisotropy (D) all the above

- o o o -