

## Nature and Composition of Substances

- In known elements, the maximum number is of :  
(a) metals (b) non-metals  
(c) metalloids (d) none of above
- The law of constant proportions was enunciated by :  
(a) Dalton (b) Berthelot  
(c) Avogadro (d) Proust
- Bar is a unit of :  
(a) pressure (b) force  
(c) energy (d) frequency
- Antimony is :  
(a) metal (b) non metal  
(c) metalloid (d) none of these
- The M.K.S. system was first introduced by :  
(a) Archimedes (b) Eienstein  
(c) Newton (d) Giorgi
- An alloy is :  
(a) a compound  
(b) an allotropic form  
(c) an isomer (d) a mixture
- Diamond is :  
(a) an element (b) a compound  
(c) a mixture (d) a liquid
- The most abundant metal in earth crust is :  
(a) iron (b) magnesium  
(c) calcium (d) aluminium
- The father of modern chemistry is :  
(a) Priestley (b) Lavoisier  
(c) Dalton (d) Mendeleeff
- The mass of one atom of hydrogen is approximately :  
(a) 1g (b) 1.5g  
(c)  $1.6 \times 10^{-24}$ g (d)  $3.3 \times 10^{-24}$ g
- 1amu is equal to :  
(a) 1.00758 g (b) 0.000549 g  
(c)  $1.66 \times 10^{-24}$ g (d)  $6.02 \times 10^{-23}$ g
- Consider the following elements :  
1. Copper 2. Gold  
3. Platinum 4. Silver  
Which of the following elements exists free in nature?  
(a) 1 and 2 (b) 2 and 3  
(c) 1, 2 and 4 (d) 3 and 4

## Atomic Structure

- The absolute value of charge on electron was determined by  
(a) J.J. Thomson (b) R.A. Millikan  
(c) Rutherford (d) Chadwick
- Cathode rays have :  
(a) mass only  
(b) charge only  
(c) no mass and no charge  
(d) mass and charge both
- Rutherford's  $\alpha$ -scattering experiment related to the size of the :  
(a) nucleus (b) atom  
(c) electron (d) neutron
- The discovery of neutron became very late because :  
(a) it is present in nucleus  
(b) it is a fundamental particle  
(c) it does not move  
(d) it does not carry any charge
- The maximum number of electrons on a principal shell is :  
(a)  $n^2$  (b)  $n$   
(c)  $2n^2$  (d)  $3n^2$
- Which of the properties of the element is a whole number?  
(a) atomic mass  
(b) atomic number  
(c) atomic radius  
(d) atomic volume
- Atomic size is of the order of :  
(a)  $10^{-8}$ cm (b)  $10^{-10}$ cm  
(c)  $10^{-13}$ cm (d)  $10^{-6}$ cm
- Which of the following atom contains the least number of neutrons :  
(a)  $^{235}\text{U}_{92}$  (b)  $^{238}\text{U}_{92}$   
(c)  $^{239}\text{U}_{93}$  (d)  $^{240}\text{Np}_{93}$
- Positive ions are formed from neutral atoms by loss of :  
(a) neutrons  
(b) protons  
(c) nuclear charge  
(d) electrons
- The particle with 13 protons and 10 electrons is :  
(a) Al-atom  
(b)  $\text{Al}^{3+}$  ion

- (c) nitrogen isotope  
(d) none of these

## Radioactivity

- The  $\alpha$ -particle are :  
(a) high energy electrons  
(b) positively charged hydrogen ions  
(c) high energy X-ray radiations  
(d) double positively charged helium nuclei
- The isotope used for dating archalological finding is :  
(a)  $^1\text{H}_1$  (b)  $^{18}\text{O}_8$   
(c)  $^{14}\text{C}_6$  (d)  $^{235}\text{U}_{92}$
- A device used for the measurement of radioactivity is :  
(a) mass spectrometer  
(b) cyclotron  
(c) nuclear reactor  
(d) G.M. counter
- In nuclear reactors the speed of neutrons is slowed down by :  
(a) heavy water  
(b) ordinary water  
(c) zinc rods  
(d) molten caustic soda
- Group displacement law was given by :  
(a) Bacquerel  
(b) Rutherford  
(c) Mendeleaf  
(d) Soddy and Fajan
- A particle which is similar to electron is :  
(a) positron  
(b) beta particle  
(c) photon  
(d) mason
- Which of the following is a radioactive element?  
(a) Sulphur (b) Polonium  
(c) Tellurium (d) Selenium
- One curie of activity is equivalent to :  
(a)  $3.7 \times 10^{17}$  disintegration per second  
(b)  $3.7 \times 10^{10}$  disintegration per second

- (c)  $3.7 \times 10^{14}$  disintegration per second  
 (d)  $3.7 \times 10^3$  disintegration per second
31. When the nucleus of uranium is bombarded with neutrons, it breaks up into two nuclei of nearly equal mass. This process is called :  
 (a) nuclear fission  
 (b) nuclear fusion  
 (c) physical change  
 (d) artificial radioactivity
32. A radioactive substance emits :  
 (a) alpha particle  
 (b) beta particle  
 (c) gamma particle  
 (d) all of the three

### Chemical Bonding

33. Example of covalent bond is :  
 (a) KCl (b) BaO  
 (c)  $\text{CHCl}_3$  (d)  $\text{CaH}_2$
34. A bond formed by the transfer of electrons between atoms of the elements is called :  
 (a) Ionic bond  
 (b) Covalent bond  
 (c) Co-ordinate bond  
 (d) Hydrogen bond
35. The compound which has covalent bond is :  
 (a) CsCl (b) CaO  
 (c)  $\text{N}_2$  (d)  $\text{Na}_2\text{O}$
36. Which one has linear structure?  
 (a)  $\text{NO}_2$  (b)  $\text{CO}_2$   
 (c)  $\text{SO}_2$  (d)  $\text{SiO}_2$
37. The compound which contains ionic bond is :  
 (a)  $\text{CH}_4$  (b)  $\text{CHCl}_3$   
 (c) NaCl (d)  $\text{O}_2$
38. Strongest bond is :  
 (a)  $\text{C} = \text{C}$  (b)  $\text{C} = \text{C}$   
 (c)  $\text{C} \equiv \text{C}$   
 (d) all are equally strong
39. The octet rule is not valid for which one of the following molecule :  
 (a)  $\text{CO}_2$  (b)  $\text{H}_2\text{S}$   
 (c)  $\text{NH}_3$  (d)  $\text{BF}_3$
40. What are the types of bonds present in  $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$ ?  
 (a) Electrovalent and covalent  
 (b) Electrovalent and co-ordinate  
 (c) Electrovalent, covalent, co-ordinate and hydrogen bond  
 (d) Covalent and co-ordinate covalent
41. NaCl has :  
 (a) covalent bond  
 (b) ionic bond

- (c) co-ordinate bond  
 (d) none of these
42. Which one has hydrogen bonding?  
 (a) HCl (b) HBr  
 (c) HF (d) HI

### Oxidation and Reduction

43. The brown ring complex compound is formulated as  $[\text{Fe}(\text{H}_2\text{O})_5(\text{NO})\text{SO}_4]$  the oxidation state of iron is :  
 (a) 1 (b) 2  
 (c) 3 (d) Zero
44. A reducing agent is a substance which can :  
 (a) Accept electrons  
 (b) Donate electrons  
 (c) Accept protons  
 (d) Donate protons
45. The oxidation number of chlorine in  $\text{HOCl}$  is :  
 (a) -1 (b) Zero (c) +1 (d) +2
46. The oxidation of two Cl atoms in bleaching powder  $\text{Ca}(\text{OCl})_2$  is :  
 (a) -1, -1 (b) +1, -1  
 (c) +1, +1 (d) 0, -1
47. Oxidation state of C in oxalic acid ( $\text{H}_2\text{C}_2\text{O}_4$ ) is :  
 (a) +4 (b) +2  
 (c) +3 (d) +1
48. In the reaction;  
 $\text{Zn} + \text{H}_2\text{SO}_4 \rightarrow \text{ZnSO}_4 + \text{H}_2$ ,  
 Zn undergoes :  
 (a) Oxidation (b) Reduction  
 (c) Simple dissolution  
 (d) Double decomposition
49. Oxidation number of fluorine in  $\text{F}_2\text{O}$  is :  
 (a) +1 (b) +2 (c) -1 (d) -2
50. What is the oxidation number of sulphur in  $\text{SO}_4^{2-}$  ion :  
 (a) -2 (b) +2 (c) +6 (d) 8
51. The oxidation number of nitrogen is  $\text{NO}_3^-$  is :  
 (a) -1 (b) +2 (c) +3 (d) +5
52. The conversion of  $\text{Fe}^{2+}$  to  $\text{Fe}^{3+}$  is :  
 (a) Oxidation (b) Reduction  
 (c) Ionisation  
 (d) Nuclear reaction

### Acids, Bases and Salt

53. The acid used in eye wash is :  
 (a) Oxalic acid (b) Nitric acid  
 (c) Boric acid (d) None of these
54. Uric acid is present in :  
 (a) Soda water  
 (b) Rancid butter  
 (c) Sour milk  
 (d) Urine of mammals

55. The increasing order of acid strength of HCl, HI, HBr, HF is :  
 (a)  $\text{HCl} < \text{HI} < \text{HBr} < \text{HF}$   
 (b)  $\text{HI} < \text{HCl} < \text{HBr} < \text{HF}$   
 (c)  $\text{HF} < \text{HCl} < \text{HBr} < \text{HI}$   
 (d) None of these
56. Red litmus paper is changed into blue in solution of :  
 (a) Base (b) Acid  
 (c) Salt (d) None of these
57. The pH value of wine is :  
 (a) 6.5 (b) 2.8  
 (c) 8.5 (d) 7.0
58. pH value of neutral solution is :  
 (a) 8 (b) 5  
 (c) 7 (d) 13
59. Which is not a Lewis base :  
 (a)  $\text{H}_2\text{O}$  (b)  $\text{NH}_3$   
 (c)  $\text{CO}_2$  (d)  $\text{BF}_3$
60. pH value of alkaline solution is :  
 (a)  $< 7$  (b) 7  
 (c)  $> 7$  (d) None of these
61. The acid used in lead storage battery is :  
 (a) Oxalic acid (b)  $\text{HNO}_3$   
 (c)  $\text{H}_2\text{SO}_4$  (d) HCl
62. Water solution based is called :  
 (a) Acid (b) Salt  
 (c) Alkali (d) None of these
63. The pH value of milk is :  
 (a) 2.4 (b) 3.8  
 (c) 6.6 (d) 8.0

### Properties of Gases

64. The pressure  $p$  exerted by a mixture of three gases having partial pressures  $p_1$ ,  $p_2$  and  $p$  is given by :  
 (a)  $p = p_1 + p_2 - p_3$   
 (b)  $p = \sqrt{p_1 + p_2 + p_3}$   
 (c)  $p = p_1 - p_2 + p_3$   
 (d)  $p = p_1 + p_2 + p_3$
65. Which one of the following is not the value of R :  
 (a)  $1.99 \text{ cal K}^{-1} \text{ mol}^{-1}$   
 (b)  $0.0821 \text{ litre}^{-1} \text{ atm K}^{-1} \text{ mol}^{-1}$   
 (c)  $9.8 \text{ kcal K}^{-1} \text{ mol}^{-1}$   
 (d)  $8.3 \text{ JK}^{-1} \text{ mol}^{-1}$
66. Absolute zero is the temperature where all gases are expected to have :  
 (a) Difference volumes  
 (b) Same volume  
 (c) Zero volume  
 (d) None of these
67. 4.4g of  $\text{CO}_2$  contains how many litre of  $\text{CO}_2$  at STP :  
 (a) 2.4 litre  
 (b) 2.24 litre  
 (c) 44 litre (d) 22.4 litre

68. 300 ml of a gas at  $27^{\circ}\text{C}$  is cooled to  $3^{\circ}\text{C}$  at constant pressure the final volume is :  
 (a) 540 ml (b) 135 ml  
 (c) 270 ml (d) 350 ml
69. The density of the gas is equal to :  
 (a)  $np$  (b)  $MP/RT$   
 (c)  $P/RT$  (d)  $M/V$
70. The ratio of rate of diffusion of oxygen and hydrogen is :  
 (a) 1 : 4 (b) 1 : 1  
 (c) 1 : 2 (d) 2 : 1
71. van der Waal's equation explains the behaviour of :  
 (a) Ideal gas  
 (b) Real gases  
 (c) Mixture of gases  
 (d) Diatomic gases
72. Which one law is not related to gas laws :  
 (a) Boyle's law  
 (b) Charle's law  
 (c) Gay-Lusac's law  
 (d) Faraday's law
73. At constant pressure the volume of a definite mass of a gas is directly proportional to the .....  
 (a) Temperature  
 (b) Density  
 (c) Both  
 (d) None of these

### Catalysis

74. The catalyst used in the Deacon's process for the manufacture of chlorine is :  
 (a) Pt (b)  $\text{CuCl}_2$   
 (c)  $\text{V}_2\text{O}_5$  (d) Fe
75. The substance which decreases the rate of a chemical reaction is called :  
 (a) Inhibitor (b) Poison  
 (c) Moderator  
 (d) Promoter
76. Enzyme catalysis is an example of :  
 (a) auto catalysts  
 (b) Heterogeneous catalysts  
 (c) Homogeneous catalysts  
 (d) Induced catalysts
77. Alcoholic fermentation is brought about the action of :  
 (a) Yeast (b)  $\text{CO}_2$   
 (c)  $\text{O}_2$  (d) CO
78. TEL minimise the knocking effect when mixed with petrol, it acts as :  
 (a) Positive catalyst  
 (b) Negative catalyst  
 (c) Auto catalyst  
 (d) Induced catalyst

79. The name catalysis was given by :  
 (a) Rutherford (b) Langmuir  
 (c) Graham (d) Berzelius
80. In the Ostwald's process for manufacture of  $\text{HNO}_3$  the catalyst used is :  
 (a) Fe (b) Pt  
 (c)  $\text{V}_2\text{O}_5$  (d) Mo
81. Glucose or fructose is converted into  $\text{C}_2\text{H}_5\text{OH}$  in the presence of :  
 (a) Invertase (b) Diastase  
 (c) Maltase  
 (d) Zymase
82. The temperature at which the catalytic activity of the catalyst is maximum, is called :  
 (a) Critical temperature  
 (b) Room temperature  
 (c) Absolute temperature  
 (d) Optimum temperature
83. The catalyst used in the hydrogenation of oils is :  
 (a)  $\text{V}_2\text{O}_5$  (b) Fe  
 (c) Ni (d) Pt

### Thermodynamics and Energetics

84. According to latest sign conventions, the correct expression representing the first law of thermodynamics is :  
 (a)  $\Delta U = q + w$   
 (b)  $\Delta U = \Delta H + pV$   
 (c)  $\Delta U = q - w$   
 (d) All the expressions are correct
85. Which one is true?  
 (a) 1 calorie > 1 erg > 1 joule  
 (b) 1 erg > 1 calorie > 1 joule  
 (c) 1 calorie > 1 joule > 1 erg  
 (d) 1 joule > 1 calorie > 1 erg
86. A gas expands isothermally and reversibly. The work done by the gas is :  
 (a) Zero  
 (b) Maximum  
 (c) Minimum  
 (d) Cannot be determined
87. The information not conveyed by thermodynamics is about :  
 (a) Spontaneity of a reaction  
 (b) Yields of the products formed  
 (c) Rates of reactions  
 (d) All the three above
88. In any natural process :  
 (a) The entropy of universe remains constant  
 (b) The entropy of universe tends towards maximum  
 (c) The entropy of universe towards minimum

- (d) Any of the above can happen
89. The standard heat of formation of diamond is :  
 (a) Same as that of graphite  
 (b) Greater than of graphite  
 (c) Less than that of graphite  
 (d) Taken as zero
90. In which of the following, the entropy decreases :  
 (a) Crystallisation of sucrose from solution  
 (b) Rusting of iron  
 (c) Melting of ice  
 (d) Vaporization of camphor
91. When ammonium chloride is dissolved in water, the solution becomes cold. The change is :  
 (a) Endothermic (b) Exothermic  
 (c) Supercooling (d) None of these
92. For an endothermic reaction to be spontaneous :  
 (a)  $\Delta S$  must be positive  
 (b)  $\Delta S$  must be negative  
 (c)  $\Delta S$  must be zero  
 (d)  $\Delta G$  must be positive
93. The ratio of  $\gamma$  for inert gases is :  
 (a) 1.33 (b) 1.66  
 (c) 2.13 (d) 1.99

### Periodic Classification of Element

94. In modern periodic table, the group number is :  
 (a) 15 (b) 16  
 (c) 17 (d) 18
95. Which one is known as father of periodic table :  
 (a) Lavoisier (b) Rutherford  
 (c) Mendeleev (d) Bohr
96. Which of the following has the smallest size :  
 (a)  $\text{Mg}^{2+}$  (b)  $\text{Na}^+$   
 (c) F (d)  $\text{Al}^{3+}$
97. The highest metal is :  
 (a) Li (b) Mg (c) Ca (d) Na
98. Transition metal belong to :  
 (a) s-block (b) p-block  
 (c) d-block (d) f-block
99. Electron affinity of noble gases is :  
 (a) Almost zero (b) Low  
 (c) High (d) Very high
100. The long form of periodic table was developed by :  
 (a) Bohr  
 (b) Mendeleev  
 (c) Range and Werner  
 (d) Rutherford
101. Aluminum is diagonally related to :  
 (a) Li (b) Be (c) C (d) B

## □ ANSWERS

- |          |          |          |          |          |          |          |          |          |          |
|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| 1. (a)   | 2. (d)   | 3. (a)   | 4. (c)   | 5. (d)   | 6. (d)   | 7. (a)   | 8. (d)   | 9. (b)   | 10. (c)  |
| 11. (c)  | 12. (b)  | 13. (b)  | 14. (d)  | 15. (a)  | 16. (d)  | 17. (c)  | 18. (b)  | 19. (a)  | 20. (a)  |
| 21. (d)  | 22. (b)  | 23. (d)  | 24. (c)  | 25. (d)  | 26. (a)  | 27. (d)  | 28. (b)  | 29. (b)  | 30. (b)  |
| 31. (a)  | 32. (d)  | 33. (c)  | 34. (a)  | 35. (c)  | 36. (b)  | 37. (c)  | 38. (c)  | 39. (d)  | 40. (c)  |
| 41. (b)  | 42. (c)  | 43. (b)  | 44. (b)  | 45. (c)  | 46. (b)  | 47. (c)  | 48. (a)  | 49. (c)  | 50. (c)  |
| 51. (d)  | 52. (a)  | 53. (c)  | 54. (d)  | 55. (c)  | 56. (a)  | 57. (b)  | 58. (c)  | 59. (d)  | 60. (c)  |
| 61. (c)  | 62. (c)  | 63. (c)  | 64. (d)  | 65. (c)  | 66. (c)  | 67. (b)  | 68. (c)  | 69. (b)  | 70. (a)  |
| 71. (b)  | 72. (d)  | 73. (a)  | 74. (b)  | 75. (b)  | 76. (b)  | 77. (a)  | 78. (b)  | 79. (d)  | 80. (b)  |
| 81. (d)  | 82. (d)  | 83. (c)  | 84. (a)  | 85. (c)  | 86. (b)  | 87. (c)  | 88. (b)  | 89. (b)  | 90. (a)  |
| 91. (a)  | 92. (a)  | 93. (b)  | 94. (d)  | 95. (c)  | 96. (d)  | 97. (a)  | 98. (c)  | 99. (a)  | 100. (c) |
| 101. (b) | 102. (c) | 103. (b) | 104. (d) | 105. (b) | 106. (c) | 107. (a) | 108. (c) | 109. (d) | 110. (a) |
| 111. (b) | 112. (c) | 113. (c) | 114. (b) | 115. (a) | 116. (c) | 117. (d) | 118. (b) | 119. (a) | 120. (b) |
| 121. (a) | 122. (c) | 123. (a) | 124. (c) | 125. (b) | 126. (c) | 127. (b) | 128. (a) | 129. (b) | 130. (d) |
| 131. (d) | 132. (c) | 133. (d) | 134. (d) | 135. (b) | 136. (a) | 137. (d) | 138. (d) | 139. (b) | 140. (d) |
| 141. (a) | 142. (d) | 143. (a) | 144. (d) | 145. (a) | 146. (a) | 147. (a) | 148. (c) | 149. (b) | 150. (d) |
| 151. (c) | 152. (b) | 153. (a) | 154. (d) | 155. (a) | 156. (a) | 157. (d) | 158. (b) | 159. (b) | 160. (a) |
| 161. (c) | 162. (b) | 163. (d) | 164. (a) | 165. (c) | 166. (c) | 167. (c) | 168. (b) | 169. (d) | 170. (b) |
| 171. (a) | 172. (c) | 173. (d) | 174. (d) | 175. (b) | 176. (c) | 177. (d) | 178. (c) | 179. (c) | 180. (c) |
| 181. (a) | 182. (c) | 183. (a) | 184. (d) | 185. (c) | 186. (c) | 187. (c) |          |          |          |