

1. The dimensional formula for impulse is
 - a. $M^1L^1T^{-1}$
 - b. $M^1L^1T^{-2}$
 - c. $M^1L^2T^{-1}$
 - d. $M^1L^1T^{-2}$
2. The velocity-time plot for a particle moving with constant acceleration is
 - a. A straight line with zero slope
 - b. A straight line with negative slope
 - c. A straight line with positive slope
 - d. Not a straight line at all
3. The horizontal component of a vector A making an angle of 45° with the positive direction of x-axis is
 - a. $A/(2^{1/2})$
 - b. $-A/(2^{1/2})$
 - c. $A/2$
 - d. $-A/2$
4. The angle between the vectors $A = 3i$ and $B = 4j$ is
 - a. 0°
 - b. 30°
 - c. 45°
 - d. 90°
5. The initial position of a particle going through rectilinear motion is $r_i = 3i + 4j$ and the final position is $r_f = 3i - 4j$. Which one of the following is true about the particle.
 - a. The particle is moving along positive x-direction
 - b. The particle is moving along negative x-direction
 - c. The particle is moving along positive y-direction
 - d. The particle is moving along negative y-direction
6. A truck of mass 3000 Kg is brought to rest from a speed of 30 m.s^{-1} by a constant force of 6000N. How much time does the truck take to come to rest?
 - a. 20 seconds
 - b. 16 seconds
 - c. 8 seconds
 - d. 4 seconds
7. For a particle in a uniform circular motion, velocity and acceleration have
 - a. Constant magnitude but varying direction
 - b. Varying magnitude and varying direction
 - c. Constant magnitude and non-varying direction
 - d. Varying magnitude but non-varying direction
8. The SI unit of Power is
 - a. J
 - b. J.s
 - c. J.s^{-1}
 - d. J.s^{-2}
9. If under the influence of a force of 20N, the velocity of a body of mass 10 Kg varies from 10 ms^{-1} to 20 ms^{-1} , what is the work done by the force on the body
 - a. 500 J

- b. 1000 J
- c. 1500 J
- d. 2000 J

10. A conservative force of 10N makes a body of mass 2 Kg move around a closed path. The net work done by the force on the body is
- a. 0 J
 - b. 5 J
 - c. 10 J
 - d. 20 J
11. For a body in equilibrium, which one of the following is true
- a. The vector sum of all the forces acting on the body is zero
 - b. The vector sum of all the torques that act on the body measured about any possible point must be zero
 - c. Both (a) and (b) above are true
 - d. Neither (a) nor (b) above is true
12. The gravitational potential energy of a two particle system consisting of two particles each of mass 1Kg separated by a distance of 1m is
- a. G
 - b. -G
 - c. 2G
 - d. -2G
13. Kepler's law of periods states that the square of the period of any planet is
- a. Directly proportional to the square of the semi-major axis
 - b. Inversely proportional to the square of the semi-major axis
 - c. Directly proportional to the cube of the semi-major axis
 - d. Inversely proportional to the cube of the semi-major axis
14. For a constant-volume process, if heat is removed during the process, then
- a. the internal energy of the system increases
 - b. the internal energy of the system decreases
 - c. the internal energy of the system does not vary
 - d. the volume of the system changes
15. Free expansion is an adiabatic process in which
- a. No work is done on the system
 - b. No work is done by the system
 - c. Both (a) and (b) above are true
 - d. Work is done on the system
16. For a charged particle located inside a shell of uniform charge, which one of the following is true
- a. No force is exerted on the particle
 - b. The particle experiences a force directed towards the centre of the shell
 - c. The particle experiences a force directed outwards the centre of the shell
 - d. Nothing conclusive can be said

17. An electron is placed at the mid point on the line joining two protons. The magnitude of the resultant force experienced by the electron due to the two protons is
- 0 N
 - $1/2$ N
 - 1 N
 - 2 N
18. The potential energy of an electric dipole placed in an electric field is greatest when the angle between the electric dipole moment and the electric field is
- 0°
 - 90°
 - 120°
 - 180°
19. The electric field at a point due to an infinite line of charge with uniform linear charge density at point which is at a perpendicular distance r from the line charge is
- along a direction perpendicular to the line of charge and directly proportional to the linear charge density
 - along a direction parallel to the line of charge and directly proportional to the linear charge density
 - along a direction perpendicular to the line of charge and inversely proportional to the linear charge density
 - along a direction parallel to the line of charge and inversely proportional to the linear charge density
20. One Volt of potential is equivalent to
- 1 JC
 - 1 JC^{-1}
 - 1 NC
 - 1 NC^{-1}
21. The electric potential due to an electric dipole with electric dipole moment p at an arbitrary point distant r from the centre of the electric dipole is
- directly proportional to p and inversely proportional to r
 - directly proportional to r and inversely proportional to p
 - directly proportional to p and inversely proportional to r^2
 - directly proportional to r^2 and inversely proportional to p
22. The current density J
- is directly proportional to the drift velocity
 - is inversely proportional to the drift velocity
 - does not depend on the drift velocity
 - is always having direction opposite to that of the drift velocity
23. The SI unit of resistivity is
- ohm. m^{-1}
 - ohm. m^{-2}

- c. ohm. m
- d. ohm. m²

24. A particle moving in a magnetic field B with a velocity v experiences maximum force if the angle between v and B is
- a. 0°
 - b. 90°
 - c. 120°
 - d. 180°
25. The magnitude of torque experienced by an electric dipole having electric dipole moment p in an electric field E is
- a. $p \cdot E$
 - b. $p \times E$
 - c. $p \cdot (p \times E)$
 - d. None of the above
26. For a straight wire carrying current i , the magnetic field at a distance r from the wire is
- a. directly proportional to i and inversely proportional to r
 - b. directly proportional to r and inversely proportional to i
 - c. directly proportional to i as well as r
 - d. inversely proportional to i as well as r
27. Weber is the SI unit of which of the following physical quantities
- a. Electric Flux
 - b. Magnetic Flux
 - c. Electric Field
 - d. Magnetic Field
28. The inductance per unit length of a long solenoid of cross-sectional area A is
- a. directly proportional to A
 - b. directly proportional to A^2
 - c. inversely proportional A
 - d. inversely proportional A^2
29. Which of the following phenomena establish the particle nature of light
- a. Reflection
 - b. Refraction
 - c. Photoelectric effect
 - d. None of the above
30. Which of the following is not present in a deuterium nucleus
- a. Electron
 - b. proton
 - c. neutron
 - d. None of the above
31. An element has an atomic mass 19 and atomic number 9. Its ion will be represented by:

- (a) M^+
- (b) M^{2+}
- (c) M^-
- (d) M^{2-}

32. $1/4^{\text{th}}$ of a radioactive element is left after two hours. The half life period of the element is:

- (a) 30 minutes
- (b) 1 hour
- (c) 2 hours
- (d) 4 hours

33. Which of the pairs below are isobars?

- (a) ${}_6\text{C}^{13}, {}_7\text{N}^{13}$
- (b) ${}_6\text{C}^{13}, {}_7\text{N}^{14}$
- (c) ${}_8\text{O}^{16}, {}_8\text{O}^{18}$
- (d) ${}_1\text{H}^1, {}_1\text{D}^2$

34. Octet rule is not followed in which of the following compounds ?

- (a) F_2
- (b) NaCl
- (c) CaF_2
- (d) BF_3

35. Among the following pairs, the one representing a conjugate acid –base pair is:

- (a) $\text{CH}_3\text{COOH}, \text{CH}_3\text{COONa}$
- (b) $\text{NH}_2^-, \text{NH}_3$
- (c) $\text{NH}_3, \text{NH}_4\text{OH}$
- (d) $\text{SO}_2, \text{HSO}_4^-$

36. Which of the following species is an acid and also a conjugate base of another acid?

- (a) HSO_4^-
- (b) H_2SO_4
- (c) H_3O^+
- (d) OH^-

37. When iron is added to copper sulphate solution, copper is precipitated. The reaction involves:

- (a) Oxidation of Cu
- (b) Reduction of Cu^{2+}
- (c) Reduction of Fe^{2+}
- (d) Reduction of Cu and oxidation of Fe^{2+}

38. Dialysis can separate

- (a) Glucose from fructose
- (b) Glucose from sucrose
- (c) Fructose from NaCl
- (d) Glucose from protein

39. A compound formed from elements A and B crystallizes in cubic structure where A atoms occupy the corners of the cube and B atom centre of the cube. The formula of the compound is:

- (a) AB
- (b) AB₂
- (c) A₂B
- (d) AB₄

40. Which of the following acts as a buffer?

- a. CH₃COOH + CH₃COONa
- b. NaOH + Na₂SO₄
- c. H₂SO₄ + (NH₄)₂SO₄
- d. NaCl + HCl

41. Which group of elements among the following belong to the same period?

- (a) Li, Na, K
- (b) Li, Mg, Ca
- (c) Cu, Ni, Zn
- (d) Cl, Br, I

42. Identify the correct order of size of the iodine species:

- (a) I > I⁺ > I⁻
- (b) I > I⁻ > I⁺
- (c) I⁺ > I⁻ > I
- (d) I⁻ > I > I⁺

43. The ionization energy of nitrogen is more than that of oxygen because:

- (a) Of the extra stability of half-filled subshells in nitrogen
- (b) Of the smaller size of nitrogen atom
- (c) Nitrogen atom contains lesser number of electrons
- (d) Oxygen is more electronegative

44. Assertion (A): When CO₂ is continuously bubbled through lime water a precipitate is formed which later dissolves.

Reason (R): CaCO₃ is initially formed which reacts further to form Ca(HCO₃)₂.

- (a) Both (A) and (R) are correct and (R) is the explanation of (A)
- (b) Both (A) and (R) are correct and (R) is not the explanation of (A)
- (c) (A) is true but (R) is false
- (d) (A) is false but (R) is true

45. In the reaction between H₂O₂ and H₂S:

- (a) H₂O₂ is oxidized
- (b) H₂S is reduced
- (c) H₂O₂ is the reduced
- (d) The reaction is an acid-base reaction

46. Which of the following pairs of substances on reaction will not produce H₂ gas?

- (a) Fe + H₂SO₄
- (b) Fe + steam
- (c) Cu + HCl

(d) $\text{Na} + \text{C}_2\text{H}_5\text{OH}$

47. Sodium metal cannot be stored in :

- (a) Benzene
- (b) Kerosene
- (c) Toluene
- (d) Ethanol

48. Which of the following elements has the smallest size ?

- (a) Na
- (b) Ca
- (c) Rb
- (d) Li

49. Which metal is protected by a layer of its own oxide ?

- (a) Al
- (b) Cu
- (c) Ag
- (d) Zn

50. Which of the following is not correctly matched?

- (a) A halogen which is liquid at room temperature : Bromine
- (b) The most electronegative element : Fluorine
- (c) The most abundant element in the earth's crust : Oxygen
- (d) Strongest oxidizing halogen : Chlorine

51. Select the molecule which has only one pi-bond:

- (a) $\text{CH}\equiv\text{CH}$
- (b) $\text{CH}_2=\text{CH}-\text{CHO}$
- (c) $\text{CH}_3\text{CH}=\text{CHCOOH}$
- (d) $\text{CH}_3\text{CH}=\text{CH}_2$

52. Among the given cations, the most stable carbonium ion is:

- (a) Sec-butyl
- (b) Ter-butyl
- (c) N-butyl
- (d) Isopropyl

53. Halogenation of alkanes is an example of :

- (a) Electrophilic substitution
- (b) Nucleophilic substitution
- (c) Free radical substitution
- (d) Oxidation

54. Liquid petroleum gas contains mainly:

- (a) CH_4
- (b) C_2H_6
- (c) C_2H_4
- (d) C_4H_{10}

55. The compound that decolourises Alk. KMnO_4 is:

- (a) C_3H_8
- (b) C_2H_5Cl
- (c) C_2H_4
- (d) CCl_4

56. A compound X on ozonolysis forms two molecules of HCHO. Identify the compound :

- (a) C_2H_4
- (b) C_3H_6
- (c) C_3H_4
- (d) C_6H_6

57. Identify the compound that forms the polymer PVC ?

- (a) $CH_2=CH_2$
- (b) $CH\equiv CH$
- (c) $CH_2=CHCl$
- (d) $ClCH=CHCl$

58. The compound with the highest boiling point is:

- (a) C_4H_8
- (b) CH_3Cl
- (c) CH_3Br
- (d) CH_3OH

59. Which of the following is known as Freon?

- (a) CCl_2F_2
- (b) $CHCl_3$
- (c) CH_2F_2
- (d) CF_4

60. The enzyme that converts both glucose and fructose into ethanol is:

- (a) Diastase
- (b) Invertase
- (c) Zymase
- (d) Maltase

61. The shallow water zone around the edge of a lake is termed as

- a. Littoral zone
- b. Limnetic zone
- c. Profundal zone
- d. Edge effect zone

62. In Batesian mimicry, the mimic is

- a. Offensive
- b. Defensive
- c. Defenceless
- d. None of the above

63. Interaction between two species, where both suffer adverse effects is known as

- a. Parasitism
- b. Predation

- c. Competition
 - d. All of the above
64. Photorespiration occur in
- a. Mitochondria
 - b. Chloroplast
 - c. Peroxisome
 - d. All of the above
65. In C_4 plants CO_2 fixation takes place in
- a. Mesophyll cells
 - b. Bundle-sheath cells
 - c. Both A & B
 - d. None of the above
66. Kranz anatomy is a specific feature of
- a. C_2 plants
 - b. C_3 plants
 - c. C_4 plants
 - d. All of the above
67. Secondary growth in dicotyledonous plants is due to the activity of
- a. Apical meristems
 - b. Lateral meristems
 - c. Xylem and phloem
 - d. Xylem and bark
68. In cucurbits vascular bundles are
- a. Collateral
 - b. Bicollateral
 - c. Concentric Amphicribral
 - d. Concentric Amphivasal
69. Apomictic seeds are produced by
- a. Syngamy
 - b. Double fertilization
 - c. Both A & B
 - d. None of the above
70. Endosperm nucleus is
- a. Haploid
 - b. Diploid
 - c. Triploid
 - d. Polyploid
71. Which of the following induces dormancy in seeds
- a. Auxins
 - b. Gibberellins
 - c. Ethylene
 - d. Abscisic acid
72. In 1900, Mendelian work was rediscovered by
- a. Hugo deVries

- b. Carl Correns
 - c. Erich Tschermak
 - d. All of the above
73. Crossing of F₁ hybrids with either of their parents is termed as
- a. Test cross
 - b. Back cross
 - c. Reciprocal cross
 - d. All of the above
74. Which of the following DNA sequences is more stable
- a. GCGCGCGCGCGC
CGCGCGCGCGCG
 - b. TATATATATATA
ATATATATATAT
 - c. GCTAGCTAGCTA
CGATCGATCGAT
 - d. GCGCGCTATATA
CGCGCGATATAT
75. Distance between two genes is measured in terms of
- a. bp
 - b. kbp
 - c. cM
 - d. cm
76. Reverse transcriptase is
- a. DNA dependant RNA polymerase
 - b. DNA dependant DNA polymerase
 - c. RNA dependant RNA polymerase
 - d. RNA dependant DNA polymerase
77. Which of the following genetic code codes for the amino acid serine
- a. AGU
 - b. UCU
 - c. UCG
 - d. All of the above
78. The book '*Historia Plantarum*' was written by
- a. Aristotle
 - b. John Ray
 - c. Theophrastus
 - d. Hippocrates
79. Which of the following plant was genetically modified to produce the anticlotting protein 'Hirudin'
- a. *Brassica napus*
 - b. *Orizasativa*
 - c. *Pisumsativum*
 - d. *Mirabilis jalapa*
80. All of the following plants are monocotyledonous except

- a. Banana
 - b. Bamboo
 - c. Maize
 - d. Mango
81. Endoplasmic reticulum help in
- a. Transport of proteins
 - b. Synthesis of lipids
 - c. Detoxification of drugs
 - d. All of the above
82. Temperature coefficient, Q_{10} for an enzyme controlled reaction is
- a. 0.1
 - b. 0.5
 - c. 1.0
 - d. 2.0
83. Vasa recta is absent in
- a. Cortical nephrons
 - b. Juxtamedullary nephrons
 - c. Intermediate nephrons
 - d. None of the above
84. Cockroach, dragon fly and silver fish excrete metabolic nitrogenous wastes by
- a. Flame cells
 - b. Pronephric kidneys
 - c. Mesonephric kidneys
 - d. None of the above
85. Corpus callosum connect two halves of human
- a. Heart
 - b. Brain
 - c. Kidney
 - d. Lung
86. The δ -Cells of islets of Langerhans secrete
- a. Glucagon
 - b. Insulin
 - c. Somatostatin
 - d. Inhibin
87. Respiratory pigments are absent in
- a. Insects
 - b. Snails
 - c. Earthworms
 - d. Frogs
88. Respiratory quotient of glucose is
- a. 0.3
 - b. 0.7
 - c. 1.0
 - d. 1.7

89. Which of the following carry oxygenated blood in humans
- Pulmonary artery
 - Pulmonary vein
 - Both A & B
 - None of the above
90. The shape of RBCs in humans are
- Oval biconcave
 - Oval biconvex
 - Circular biconcave
 - Circular biconvex
91. The optimum pH for pancreatic amylase is
- 2
 - 4
 - 7
 - 8.5
92. Chief cells of gastric glands secrete
- HCl
 - Pepsinogen
 - Secretin
 - CCK
93. Ribosomes of eukaryotic cell organelles are
- 80 S
 - 70 S
 - 60 S
 - 50 S
94. Northern blotting is employed to blot
- RNA
 - DNA
 - Lipids
 - Proteins
95. Which of the following is a dominant genetic disorder
- Huntington's disease
 - Phenylketonuria
 - Haemophilia A/B
 - None of the above
96. Which of the following mammals are oviparous
- Platypus & Echidna
 - Platypus & Kangaroo
 - Bat & Echidna
 - Hedgehog & Kangaroo
97. Which of the following microscopes gives the best resolution
- Light microscope
 - Electron microscope
 - Dark field microscope

- d. Phase contrast microscope
98. Morphologically identical and reproductively isolated species are called
- Geographic species
 - Geographic races
 - Subspecies
 - Sibling species
99. Which of the following animal phylum is exclusively marine
- Porifera
 - Cnidaria
 - Echinodermata
 - All of the above
100. Scaly ant eater belong to class
- Reptilia
 - Mammalia
 - Acrania
 - Agnatha