COMPLETE NOTES

11TH PHYSICS FULL BOOK NOTES - MCQS WITH KEY

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MEASUREMENTS

Each question has four possible answers, encircled the correct answer:

1. The study of physics deals with:

(a) Laws of motion **(b)** The structure of space and time

(c) Force present in the nature **(d)** All of the above

2. The science of physics based on:

(a) Hypothesis **(b)** Experiments and measurements

(c) Only definition **(d)** Fundamental quantities

3. The branch of physics "wave mechanics" introduced by:

(a) Einstien **(b)** Max Planck

(c) De-broglie **(d)** Bohr

4. The branch of physics which deals with the nuclear particles such as neutrons, protons and nuclear structure is called:

(a) Particle physics **(b)** Solid state physics

(c) Plasma physics **(d)** Nuclear physics

5. The branch of physics which deals with the properties of gravitational field, electromagnetic field and nuclear field is called:

(a) Aerodynamics **(b)** Acorestics

(c) Hydrodynamics **(d)** Field theory

6. The idea that light is electromagnetic waves was introduced by:

(a) Crooks **(b)** Fermi

(c) Maxwell Planck **(d)** Newton

7. Laws of physics expressed in terms of:

(a) Base quantities **(b)** Derived quantities

(c) Both (a) & (b) **(d)** None of these

8. The study of nature is classified into:

(a) Five branches **(b)** Two branches

(c) Six branches **(d)** None of these

9. Engineering physics, Astrophysics, Bio-physics and Geophysics are:

(a) Branches of Chemistry **(b)** Branches of Physics

(c) Applied physics **(d)** None of these

10. ———— is area of physics:

(a) Chemical physics **(b)** Astrophysics

(c) Mechanics **(d)** None of these

11. The study of physics involves investigating such things as:

(a) Structure of space and time

(b) Laws of motion

(c) The interaction between different particles

(d) All of the above

12. Physist started believing that every thing about physics has been discovered by the end of:

(a) 20^{th} Century **(b)** 19^{th} Century

(c) 15^{th} Century **(d)** None of these

13. The overlapping of physics and other fields gave birth to:

(a) Areas of physics **(b)** Areas of science

(c) Interdisciplinary areas of physics **(d)** All of these

14. The branch of physics which deals with the study of production, propagation and properties of sound waves is called:

(a) Heat and thermodynamics **(b)** Optics

(c) Mechanics **(d)** Acoustics

15. The branch of physics which deals with velocities approaches the velocity of light is called:

(a) Quantum physics **(b)** Wave mechanics

(c) Relativistic mechanics **(d)** None of these

16. Experimentation and practical verification was first introduced by:

(a) The Greek philosophers **(b)** The European scientists

(c) The Muslim scientists **(d)** None of these

17. Physics based on Newtonian mechanics is called:

(a) Astrophysics **(b)** Classical physics

(c) Modern physics **(d)** Meta physics

18. Pascal is famous for his work:

(a) Hydrostatics **(b)** Hydrodynamics

(c) Laws of gases **(d)** Behaviour of elastic bodies

19. System international (SI) was established in:

(a) 1960 **(b)** 1967

(c) 1971 **(d)** 1930

20. The basic quantity among the following is:

(a) Torque **(b)** Force

(c) Mass **(d)** Velocity

21. Which one of the scientist made some contribution to geometrical optics?

(a) Archimedes **(b)** Pythagoras

(c) Euclid **(d)** Plato

22. Which of the following is the derived quantity:

(a) Time **(b)** Area

(c) Length **(d)** Mass

23. Which of the following is a set of supplementary units:

(a) Radian and kilogram **(b)** Stcradian and time

(c) Mole and radian **(d)** Radian and steradian

24. The SI unit for measuring plane angle is:

(a) Radian **(b)** Steradian

(c) Both (a) & (b) **(d)** None of these

25. The present standard metre is defined as:

(a) The distance between two points on an alloy bar

(b) The length of mean solar day

(c) The length equal to 165076373 wavelength of krypton at 86 atm

(d) The distance travel by the light in vacuum during a time of $\frac{1}{299792458}$ second

26. SI units of time was redefined in:

(a) 1900 **(b)** 1960

(c) 1967 **(d)** 1983

27. Physical quantities are divided into:

(a) Six categories **(b)** Three categories

(c) Two categories **(d)** None of these

28. The quantities which are defined in terms of other physical quantities are called:

(a) Derived quantities **(b)** Base quantities

(c) Both (a) & (b) **(d)** None of these

29. The basic units in system international (SI) units are:

(a) Three **(b)** Five

(c) Two **(d)** Seven

30. The fundamental quantities which form basic for M.K.S system are:

(a) Mass, work and time **(b)** Mass, acceleration & time

(c) Velocity, force and time **(d)** Mass, length and time

31. Supplementary units are:

(a) Five **(b)** Three

(c) Two **(d)** One

32. The SI units of solid angle is:

(a) Radian **(b)** Steradian

(c) Degree **(d)** None of these

33. The system international (SI) built up from:

(a) Derived units **(b)** Basic units

(c) Supplementary units **(d)** All of these

34. Metre is the basic unit of:

(a) Length **(b)** Mass

(c) Force **(d)** Velocity

35. The kilogram is the basic unit of:

(a) Length **(b)** Mass

(c) Weight **(d)** Time

36. One mile is equal to:

(a) 1.625 km **(b)** 1.609 km

(c) 1.325 km **(d)** 1.850 km

37. One inch is equal to:

(a) 1.32 cm **(b)** 25.4 cm

(c) 2.10 cm **(d)** 2.54 cm

38. One foot is equal to:

(a) 31.90 cm **(b)** 30.84 cm

(c) 30.48 cm **(d)** 84.30 cm

39. Number of nano second in a year is:

(a) 3.1536×10^{7} **(b)** 3.1536×10^{9}

(c) 3.1536×10^{16} **(d)** None of these

40. One year is equal to:

(a) 3.2×10^{7} sec **(b)** 2.25×10^{7} sec

(c) 3.35×10^{7} sec **(d)** All of these

41. Light year is the unit of:

(a) Light **(b)** Time

(c) Velocity **(d)** Distance

42. The SI unit of force is:

(a) Newton **(b)** Joule

(c) Dyne **(d)** Volt

43. The SI unit of work is:

(a) Newton **(b)** Joule

(c) Dyne **(d)** Volt

44. The SI unit of power is:

(a) Newton **(b)** Watt

(c) Dyne **(d)** Ampere

45. The SI unit of intensity of light is:

(a) Joule **(b)** Mole

(c) Kilomole **(d)** Candila

46. The SI unit of amount of substance is:

(a) Joule **(b)** Mole

(c) Volt **(d)** Ohm

47. The SI units of angular momentum is:

(a) kg m/s **(b)** kg m/s^2

(c) kg m^2/s **(d)** None of these

48. Time taken by light to reach from sun to earth is:

(a) 7 min 20 sec **(b)** 8 min 20 sec

(c) 9 min 20 sec **(d)** None of these

49. Time taken by light to reach from moon to earth is:

(a) 1 min 20 sec **(b)** 8 min 20 sec

(c) 2 min 20 sec **(d)** 3 min 20 sec

50. Number of seconds in a day is:

(a) 9000 sec **(b)** 86400 sec

(c) 43200 sec **(d)** 3600 sec

51. The unit of pressure in base units is:

(a) $kg/m\text{-}s^2$ **(b)** kg/ms

(c) $kg\ ms^2$ **(d)** None of these

52. Mean radius of the earth is:

(a) 6.4×10^9 mm **(b)** 6.4×10^3 mm

(c) 6.4×10^6 m **(d)** None of these

53. Solid angle subtended at the centre by a sphere of radius r is:

(a) 2π **(b)** 6π

(c) 6π **(d)** 4π

54. Steradian is defined by:

(a) $\frac{\text{Area of a strip}}{(\text{radius})^2}$ **(b)** $\frac{\text{Arc length}}{\text{radius}}$

(c) $\frac{\text{Area}}{(\text{radius})^2}$ **(d)** None of these

55. The unit of thermodynamic temperature is:

(a) K **(b)** C°

(c) F° **(d)** None of these

56. One atto is:

(a) 10^{-20} **(b)** 10^{-16}

(c) 10^{-14} **(d)** 10^{-18}

57. One femto is:

(a) 10^{-16} **(b)** 10^{-12}

(c) 10^{-15} **(d)** 10^{-9}

58. One pico is:

(a) 10^{-10} **(b)** 10^{-12}

(c) 10^{-18} **(d)** 10^{-10}

59. The number of significant figures, with the increases accuracy of the measuring instruments:

(a) Decreases **(b)** Increases

(c) Remains unchanged **(d)** None of these

60. The number of significant figures, with the increases degree of approximation:

(a) Decreases **(b)** Increases

(c) Remains unchanged **(d)** None of these

61. The number of significant figure in 8.80×10^6 kg is:

(a) 1 **(b)** 5

(c) 3 **(d)** 6

62. The number 64.350 is rounded off as:

(a) 64.35 **(b)** 64.46

(c) 64.36 **(d)** 64.4

63. In scientific notation, the number 0.01 may be written as:

(a) 10^{-2} **(b)** 10^{-4}

(c) 10×10^{-4} **(d)** 1×10^{-4}

64. The number of significant figures in 0.809999 is:

(a) 2 **(b)** 5

(c) 3 **(d)** 4

65. If length = 0.233 m and width = 0.178 m, the most accurate area expressed space of significant figures is:

(a) 0.041 m^2 **(b)** 0.0415 m^2

(c) 0.041747 m^2 **(d)** None of these

66. The number 0.0001 in scientific notation is:

(a) 1×10^4 **(b)** 10^{-3}

(c) 10×10^4 **(d)** 10^{-4}

67. One mega is equal to:

(a) 10^6 **(b)** 10^{-6}

(c) 10^3 **(d)** 10^9

68. Significant figures in 0.000546 are:

(a) 3 **(b)** 4

(c) 5 **(d)** 1

69. The error in a certain measurement occurs due to:

(a) Negligence of a person **(b)** In appropriate technique

(c) Faulty apparatus **(d)** All of the above

70. The uncertainty may occur due to:

(a) Limitation of an instrument **(b)** Natural variance of the object

(c) Personal negligence **(d)** All of the above

71. Systematic error occurs due to:

(a) Instrument **(b)** Zero error of the instrument

(c) Both (a) & (b) **(d)** None of these

72. The least count of a unit meter rod is:

(a) 0.01 cm **(b)** 0.01 mm

(c) Cannot be zero **(d)** Can be zero

73. The significant figure in 0.0010 are:

(a) 4 **(b)** 3

(c) 2 **(d)** 1

74. A precise measurement is one which has:

(a) Less precision **(b)** Maximum precision

(c) Absolute precision **(d)** All of the above

75. Total fractional uncertainty in the period $T = 2\pi\sqrt{\frac{l}{g}}$ will be equal to:

(a) Sum of fractional uncertainty **(b)** Different of uncertainties

(c) Product of uncertainties in *l* and g **(d)** None of these

76. % uncertainty in the time period of a vibrating body is calculated by:

(a) Least count × Number of vibrations **(b)** Least count / Number of vibrations

(c) Number of vibrations / Least count **(d)** $\frac{\text{Least count}}{\text{Number of vibration}} \times 100$

77. Dimensional analysis helps in:

(a) Finding relation between quantities **(b)** To convert one unit into another

(c) To confirm the correct answer **(d)** All of the above

78. The dimension of force is:

(a) $[ML^2T^{-2}]$ **(b)** $[M^2L^{-2}T]$

(c) $[MLT^{-2}]$ **(d)** [MLT]

79. The dimension $[ML^2T^{-2}]$ belongs to:

(a) Pressure **(b)** Energy

(c) Momentum **(d)** Power

80. $[ML^{-1}T^0]$ is the dimension of:

(a) Surface density **(b)** Linear mass density

(c) Volume mass density **(d)** Weight density

81. The dimensions of weight are:

(a) $[LT^{-2}]$ **(b)** $[LT^{-1}]$

(c) $[MLT^{-2}]$ **(d)** $[ML^2T]$

82. The dimensions of power are:

(a) $[ML^2T^{-3}]$ **(b)** $[ML^2T^{-2}]$

(c) $[MLT^{-1}]$ **(d)** None of these

83. The dimension of density are:

(a) $[ML^{-2}]$ **(b)** $[M^2L^{-2}]$

(c) $[ML^{-3}]$ **(d)** None of these

84. The circumference of the earth was determined by:

(a) Ibn-al-Haitham **(b)** Bohr

(c) Chadwick **(d)** Al-Beruni

85. Hahn discovered uranium fission in:

(a) 1935 **(b)** 1939

(c) 1938 **(d)** 1940

86. Period of audible sound waves is:

(a) 4×10^{2} sec **(b)** 1×10^{-3} sec

(c) 8×10^{-1} sec **(d)** 1×10^{3} sec

87. Errors due to incorrect design of a device are called:

(a) Systematic error **(b)** Random error

(c) Physical error **(d)** None of these

88. The solution of the problem $\frac{6 \times 10^{-8}}{3 \times 10^{-2}} =$ is correct given by:

(a) 2×10^{-4} **(b)** 2×10^{-5}

(c) 2×10^{-10} **(d)** 2×10^{-6}

89. Which of the following is a correct relation:

(a) 1 metre = 10^{-3} centimeter **(b)** 1 decimetre = 10^{2} centimetre

(c) 1 millimetre = 10^{-4} metre **(d)** None of these

90. Density of air is 1.2 kg/m^3. It can be expressed in gm/cm^3 by:

(a) 1.2×10^{-6} **(b)** 12×10^{-4}

(c) 1.2×10^{6} **(c)** 12×10^{3}

91. The period of the earth is equal to:

(a) One solar day **(b)** One lunar day

(c) One astronomical day **(d)** None of these

92. One peta is equal to:

(a) 10^{-12} **(b)** 10^{15}

(c) 10^{-15} **(d)** 10^{9}

93. One exa is:

(a) 10^{18} **(b)** 10^{-15}

(c) 10^{15} **(d)** 10^{-12}

94. The diameter of the milky way is:

(a) 10^{25} m **(b)** 10^{20} m

(c) 10^{30} m **(d)** 10^{-30} m

95. The diameter of an atom is:

(a) 10^{-10} m **(b)** 10^{-12} m

(c) 10^{-5} m **(d)** 10^{-15} m

96. The diameter of a nucleus is:

(a) 10^{-12} m **(b)** 10^{-10} m

(c) 10^{-20} m **(d)** 10^{-15} m

97. Which one of the following scientists made some contributions to geometrical optics:

(a) Euclid **(b)** Plato

(c) Archimedes **(d)** None of these

98. The founder of mathematical physics is:

(a) Archimedes **(b)** Plato

(c) Euclid **(d)** Aristotle

99. The dimensions of $\left[\frac{1}{2}at^2\right]$ are that of:

(a) Velocity **(b)** Force

(c) Time **(d)** Length

100. Which one of the following Muslim Mathematision determined the earths circumference:

(a) Ibn-Sina **(b)** Al-Khawrizmi

(c) Al-Beruni **(d)** None of these

101. Symbolically solid angle is represented as:

(a) rad **(b)** Sr

(c) θ **(d)** Cd

102. 73.650 rounded off upto one decimal is:

(a) 73.6 **(b)** 73.7

(c) 74.00 **(d)** 73.65

103. $[LT^{-2}]$ is demensional formula for:

(a) Velocity **(b)** Force

(c) Acceleration **(d)** Momentum

104. The angle between two radii of a circle which cut off on the circumference an arc, equal in length to the radius, is:

(a) 57.3° **(b)** 3′

(c) 37.5° **(d)** None of these

105. Solid angle is ———— dimensional angle.

(a) 2 **(b)** 3

(c) Both (a), (b) **(d)** None of these

106. The error is constant for ———— error.

(a) Random **(b)** Systematic

(c) Both (a), (b) **(d)** All

107. For 0.0036 no. of significant digits:

(a) 4 **(b)** 3

(c) 2 **(d)** 1

108. For 2.450 no. of significant digits:

(a) 4 **(b)** 3

(c) 2 **(d)** 1

109. For 1.40×10^3, no. of significant digits:

(a) 3 **(b)** 4

(c) 2 **(d)** 1

110. Consider two lengths of (10 ± 0.1) cm out (20 ± 0.1) cm measured by a ruler, which is more accurate:

(a) 1^{st} **(b)** 2^{nd}

(c) Same **(d)** None

111. As $F = 6\pi\eta rv$. Dimensions of coefficient of viscosity η:

(a) $[ML^{-1}T^{-1}]$ **(b)** $[MLT^{-1}]$

(c) $[ML^{-2}T^{-1}]$ **(d)** [ML]

112. Dimensions of specific gravity:

(a) $[M^oL^oT^o]$ **(b)** [MLT]

(c) $[ML^{-1}T]$ **(d)** None

113. Dimensions of specific heat:

(a) $[L^2T^{-2}K]$ **(b)** $[L^2T^{-2}K^{-1}]$

(c) $[MLT^{-2}]$ **(d)** None

114. Dimensions of refractive index:

(a) [MLT] **(b)** $[M^oL^oT^o]$

(c) $[ML^{-1}T^{-2}]$ **(d)** None

115. The time of 30 vibrations of a simple pendulum recorded by a stopwatch accurate upto one both of a second, then uncertainty is:

(a) 0.3s **(b)** 0.003s

(c) 0.0003s **(d)** 0.03s

116. The %age uncertainty for V and I is 2% and 6% respectively. Hence total uncertainty in the value of $R = \frac{V}{I}$ is:

(a) 8% **(b)** $\frac{1}{3}$ %

(c) 4% **(d)** 3%

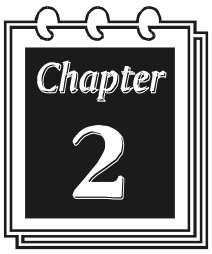
117. The energy of a photon of light of frequency f is given by hf, where h is the Planck constant. What are the base units of h?

(a) kg ms^{-1} **(b)** kg m^2s^{-1}

(c) kg m^2s^{-2} **(d)** kg m^2s^{-3}

ANSWERS

1.	(d)	**2.**	(d)	**3.**	(c)	**4.**	(d)
5.	(d)	**6.**	(c)	**7.**	(c)	**8.**	(b)
9.	(b)	**10.**	(c)	**11.**	(d)	**12.**	(b)
13.	(c)	**14.**	(d)	**15.**	(c)	**16.**	(c)
17.	(b)	**18.**	(b)	**19.**	(a)	**20.**	(c)
21.	(a)	**22.**	(b)	**23.**	(d)	**24.**	(a)
25.	(c)	**26.**	(c)	**27.**	(c)	**28.**	(a)
29.	(d)	**30.**	(d)	**31.**	(c)	**32.**	(b)
33.	(d)	**34.**	(a)	**35.**	(b)	**36.**	(b)
37.	(d)	**38.**	(c)	**39.**	(c)	**40.**	(a)
41.	(d)	**42.**	(a)	**43.**	(b)	**44.**	(b)
45.	(d)	**46.**	(b)	**47.**	(c)	**48.**	(b)
49.	(a)	**50.**	(b)	**51.**	(a)	**52.**	(c)
53.	(d)	**54.**	(a)	**55.**	(a)	**56.**	(d)
57.	(c)	**58.**	(b)	**59.**	(b)	**60.**	(a)
61.	(c)	**62.**	(d)	**63.**	(a)	**64.**	(c)
65.	(a)	**66.**	(d)	**67.**	(a)	**68.**	(a)
69.	(d)	**70.**	(d)	**71.**	(d)	**72.**	(c)
73.	(c)	**74.**	(a)	**75.**	(a)	**76.**	(d)
77.	(a)	**78.**	(c)	**79.**	(b)	**80.**	(b)
81.	(c)	**82.**	(a)	**83.**	(c)	**84.**	(d)
85.	(c)	**86.**	(b)	**87.**	(a)	**88.**	(d)
89.	(c)	**90.**	(b)	**91.**	(a)	**92.**	(b)
93.	(a)	**94.**	(b)	**95.**	(a)	**96.**	(d)
97.	(a)	**98.**	(a)	**99.**	(d)	**100.**	(c)
101.	(b)	**102.**	(b)	**103.**	(c)	**104.**	(a)
105.	(b)	**106.**	(b)	**107.**	(c)	**108.**	(a)
109.	(a)	**110.**	(a)	**111.**	(a)	**112.**	(a)
113.	(b)	**114.**	(b)	**115.**	(b)	**116.**	(a)
117.	(b)						



VECTORS AND EQUILIBRIUM

Each question has four possible answers, encircled the correct answer:

1. A scalar quantity can be described by:

(a) Magnitude **(b)** Unit

(c) Magnitude and unit **(d)** Number

2. A vector quantity can be described by magnitude, unit and:

(a) Direction **(b)** Rotation

(c) Dimension **(d)** Unit vector

3. Which one of the following is a vector quantity:

(a) Energy **(b)** Power

(c) Work **(d)** Momentum

4. Which one of the following is a scalar quantity:

(a) Mass **(b)** Displacement

(c) Force **(d)** Torque

5. Two lines are drawn at right angle to each other are known as:

(a) Coordinate axis **(b)** xy-axis

(c) Components **(d)** Cartesian axis

6. A vector which gives the direction of a given vector is called:

(a) Unit vector **(b)** Position vector

(c) Null vector **(d)** Negative vector

7. When a vector is divided by its magnitude we get:

(a) Null vector **(b)** Unit vector

(c) Zero vector **(d)** Position vector

8. Pick out the scalar quantity among the following:

(a) Force **(b)** Torque

(c) Time **(d)** Velocity

9. Pick out the vector quantity among the following:

(a) Power **(b)** Energy

(c) Force **(d)** Mass

10. The magnitude of a null vector is:

(a) One **(b)** Zero

(c) Double **(d)** Negative

11. Null vector is a vector having zero magnitude and:

(a) Arbitrary direction **(b)** No direction

(c) Specific direction **(d)** Opposite direction

12. Unit vector of a vector $\vec{A}$ describes:

(a) Direction of a given vector **(b)** Magnitude of a given vector

(c) Shape of a given vector **(d)** All of above

13. The unit vector of among vector is determined:

(a) By multiplying the vector with its own magnitude

(b) By dividing the vector with its own magnitude

(c) Both (a) and (b)

(d) None of these

14. Unit vector is used to specify:

(a) Direction of a vector **(b)** Position of a vector

(c) Magnitude of a vector **(d)** Dimension of a vector

15. An example of a scalar quantity:

(a) Displacement **(b)** Acceleration

(c) Force **(d)** Speed

16. An example of a vector quantity:

(a) Speed **(b)** Work

(c) Acceleration **(d)** Mass

17. A vector which has magnitude one is called:

(a) Null vector **(b)** Unit vector

(c) Resultant vector **(d)** Position vector

18. A vector which has zero magnitude is called:

(a) Null vector **(b)** Unit vector

(c) Resultant vector **(d)** Position vector

19. The sum of two or more vectors is equal to a single vector which is called:

(a) Component of vector **(b)** Product vector

(c) Null vector **(d)** Resultant vector

20. When a vector $\vec{A}$ is multiplied by a number n, then its magnitude is given by:

(a) $n \times |\vec{A}|$ **(b)** $|n\vec{A}|$

(c) $n \times \vec{A}$ **(d)** None of these

21. When a vector $\vec{A}$ is multiplied by a negative number then its direction:

(a) Remains same **(b)** Changed by 180°

(c) Does not change **(d)** None of these

22. When a vector $\vec{A}$ is multiplied by a positive number then its direction:

(a) Remains same **(b)** Changed by 180°

(c) Does not change **(d)** None of these

23. The splitting up of a vector into its components is called:

(a) Sum of vector **(b)** Subtraction of a vector

(c) Resolution of a vector **(d)** None of these

24. The angle between two rectangular components is:

(a) 60° **(b)** 90°

(c) 180° **(d)** 270°

25. The resultant of two anti-parallel vectors $\vec{A}$ and $\vec{B}$ is:

(a) $\vec{A} + \vec{B}$ **(b)** $\vec{A} - \vec{B}$

(c) Zero **(d)** None of these

26. Two vectors having same magnitude and direction are called:

(a) Equal vectors **(b)** Unequal vectors

(c) Null vectors **(d)** None of these

27. The sum of two equal and opposite vectors is a vector called:

(a) Equal vector **(b)** Null vector

(c) Position vector **(d)** Unit vector

28. The magnitude of resultant of a vector $\vec{A}$ is given by:

(a) $\sqrt{A_x^2 + A_y^2}$ **(b)** $\sqrt{A_x + A_y}$

(c) $A_x^2 + A_y^2$ **(d)** None of these

29. What is the resultant of 3N and 4N forces acting at right angle to each other:

(a) 90 N **(b)** 5 N

(c) 7 N **(d)** 1 N

30. If a force of 10 N makes an angle of 30° with x-axis, its x-component is given by:

(a) 86.6 N **(b)** 0.866 N

(c) 8.66 N **(d)** None of these

31. Two forces of 10 N and 7 N respectively are acting to an object. The minimum value of their resultant is:

(a) 0 N **(b)** 10 N

(c) 7 N **(d)** 3 N

32. Two forces act together on a body, the magnitude of their resultant is greatest when the angle between the forces is:

(a) 45° **(b)** 60°

(c) 0° **(d)** 180°

33. The position vector in xy-plane is written as:

(a) $\vec{r} = x\hat{i} + y\hat{j}$ **(b)** $\vec{r} = y\hat{i} + z\hat{k}$

(c) $\vec{r} = y\hat{j} + z\hat{k}$ **(d)** None of these

34. The position vector in xz-plane is written as:

(a) $\vec{r} = x\hat{i} + y\hat{j}$ **(b)** $\vec{r} = y\hat{j} + z\hat{k}$

(c) $\vec{r} = x\hat{i} + z\hat{k}$ **(d)** None of these

35. The position vector in yz-plane is given by:

(a) $\vec{r} = x\hat{i} + z\hat{k}$ **(b)** $\vec{r} = x\hat{i} + y\hat{j}$

(c) $\vec{r} = y\hat{j} + z\hat{k}$ **(d)** $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$

36. If a force of 50 N is acting along x-axis, then its component along y-axis will be:

(a) The same **(b)** Zero

(c) Half magnitude **(d)** None of these

37. A force of 10 N is acting along z-axis, its component along x-axis and y-axis is:

(a) 5 N, 8 N **(b)** 3 N, 4 N

(c) 5 N each **(d)** Zero

38. If two vectors of magnitude F_1 and F_2 act on a body at an angle θ, the magnitude of their resultant is:

(a) $\sqrt{F_1^2 + F_2^2}$ **(b)** $\sqrt{F_1^2 + F_2^2 + 2F_1F_2}$

(c) $\sqrt{F_1^2 + F_2^2 + 2F_1F_2\cos\theta}$ **(d)** $F_1^2 + F_2^2 + 2F_1F_2\cos\theta$

39. The magnitude of a vector $\vec{A} = A_x\hat{i} + A_y\hat{j} + A_z\hat{k}$ is given by:

(a) $A_x + A_y + A_z$ **(b)** $A_x\cos\theta$

(c) $\sqrt{A_x^2 + A_y^2 + A_z^2}$ **(d)** None of these

40. If a vector $\vec{A}$ makes an angle θ with x-axis, the magnitude of its, x-component is:

(a) $A_y = A\sin\theta$ **(b)** $A_x = A\cos\theta$

(c) Both (a) and (b) **(d)** None of these

41. If a vector $\vec{A}$ makes an angle θ with x-axis, the magnitude of its y-component is:

(a) $A_y = A\sin\theta$ **(b)** $A_x = A\cos\theta$

(c) Both (a) and (b) **(d)** None of these

42. The reverse process of vector addition is called:

(a) Subtraction of a vector **(b)** Addition of a vector

(c) Negative of a vector **(d)** Resolution of a vector

43. The expression $\vec{r} = a\hat{i} + b\hat{j}$ is for:

(a) Unit vector **(b)** Position vector

(c) Null vector **(d)** Negative vector

44. The direction of a resultant vector $\vec{R}$ is given by:

(a) $\theta = \tan^{-1}\left(\frac{R_x}{R_y}\right)$ **(b)** $\theta = \tan^{-1}\left(\frac{R_y}{R_x}\right)$

(c) $\theta = \sin^{-1}\left(\frac{R_y}{R_x}\right)$ **(d)** None of these

45. If both the components of a vector are negative then vector is in:

(a) 1^{st} quadrant **(b)** 2^{nd} quadrant

(c) 3^{rd} quadrant **(d)** 4^{th} quadrant

46. The scalar product is also known as:

(a) Vector product **(b)** Dot product

(c) Vector sum **(d)** Scalar sum

47. The scalar product of $\vec{A}$ and $\vec{B}$ is given by:

(a) $\vec{A} \times \vec{B}$ **(b)** $\vec{A} \cdot \vec{B}$

(c) $\vec{A} - \vec{B}$ **(d)** AB

48. The projection of vector $\vec{A}$ on $\vec{B}$ is given by:

(a) $\frac{\vec{A} \cdot \vec{B}}{|A|}$ **(b)** $\frac{\vec{A} \cdot \vec{B}}{|\vec{B}|}$

(c) $AB\cos\theta$ **(d)** $\frac{\vec{A} \cdot \vec{B}}{A\cos\theta}$

49. The self scalar product of $\vec{A}$ is given by:

(a) $\sqrt{A}$ **(b)** A^3

(c) A^2 **(d)** A

50. If $\vec{A}$ and $\vec{B}$ are anti-parallel then their scalar product is:

(a) $AB\cos\theta$ **(b)** $-AB$

(c) $-AB\cos\theta$ **(d)** Zero

51. The scalar product of two similar unit vector is:

(a) One **(b)** Zero

(c) Twice **(d)** Negative

52. If $\vec{A} \cdot \vec{B} = \vec{B} \cdot \vec{A}$ this is called:

(a) Commutative law **(b)** Associative law

(c) Distributive law **(d)** None of these

53. If the multiplication of two vectors results into a vector quantity then the product is called:

(a) Dot product **(b)** Vector product

(c) Scalar product **(d)** None of these

54. If the multiplication of two vectors result into a scalar quantity then the product is called:

(a) Vector product **(b)** Cross product

(c) Scalar product **(d)** None of these

55. If $\vec{A} \times \vec{B}$ points along positive z-axis, then vector $\vec{A}$ and $\vec{B}$ will lie in:

(a) zx-plane **(b)** xy-plane

(c) yz-plane **(d)** None of these

56. If two vectors $\vec{A}$ and $\vec{B}$ are non-parallel vectors then the direction of $\vec{A} \times \vec{B}$ is along:

(a) y-axis **(b)** z-axis

(c) x-axis **(d)** None of these

57. Select the correct answer:

(a) $\hat{i} \cdot \hat{j} = \hat{k}$ **(b)** $\hat{i} \cdot \hat{j} = 0$

(c) $\hat{i} \cdot \hat{j} = -\hat{k}$ **(d)** $\hat{i} \cdot \hat{j} = 1$

58. Select the correct one:

(a) $\vec{A} \cdot \vec{B} = -\vec{B} \cdot \vec{A}$ **(b)** $\vec{A} \cdot \vec{B} = \frac{1}{2}\vec{B} \cdot \vec{A}$

(c) $\vec{A} \cdot \vec{B} = \vec{B} \cdot \vec{A}$ **(d)** None of these

59. Which of the following unit vectors represent the direction of normal drawn on a specific surface:

(a) $\hat{j}$ **(b)** $\hat{i}$

(c) $\hat{n}$ **(d)** $\hat{k}$

60. If $\hat{A} = 2\hat{i} + 4\hat{j} + 5\hat{k}$ and $\vec{B} = -2\hat{i} + 2\hat{j} + \hat{k}$. What will be the value of $\vec{A} \cdot \vec{B}$:

(a) 9 **(b)** –9

(c) 5 **(d)** 10

61. If $\vec{A} = 2\hat{i} + 2\hat{j} + \hat{k}$ then the value of $\hat{B}$ is:

(a) $\frac{2\hat{i} + 2\hat{j} + \hat{k}}{5}$ **(b)** $\frac{2\hat{i} + 2\hat{j} + \hat{k}}{9}$

(c) $\frac{2\hat{i} + 2\hat{j} + \hat{k}}{3}$ **(d)** None of these

62. The scalar product of two vectors is zero when:

(a) They are equal vectors **(b)** They are in the same direction

(c) They are at right angle **(d)** None of these

63. If the vectors $\vec{A}$ and $\vec{B}$ are parallel to each other then:

(a) $\vec{A} \cdot \vec{B} = AB$ **(b)** $\vec{A} \cdot \vec{B} = \pm AB$

(c) $\vec{A} \cdot \vec{B} = 0$ **(d)** $\vec{A} \cdot \vec{B} = AB \cos\theta$

64. If $\vec{A} = A_x\hat{i} + A_y\hat{j} + A_z\hat{k}$ and $\vec{B} = B_x\hat{i} + B_y\hat{j} + B_z\hat{k}$ then the value of $\vec{A} \cdot \vec{B}$ is:

(a) $A_xB_x + A_yB_z + A_zB_y$ **(b)** $A_xB_x + A_yB_y + A_zB_z$

(c) $A_yB_x + A_xB_y + A_zB_z$ **(d)** None of these

65. The scalar product of two vectors will be negative if:

(a) They are at right angle to each other **(b)** They are parallel

(c) They are anti-parallel **(d)** None of these

66. The dot product of $\hat{i} \cdot \hat{i} = \hat{j} \cdot \hat{j} = \hat{k} \cdot \hat{k}$ is equal to:

(a) 0 **(b)** 1

(c) −1 **(d)** 2

67. The dot product of $\hat{i} \cdot \hat{j} = \hat{j} \cdot \hat{k} = \hat{k} \cdot \hat{i}$ is equal to:

(a) 0 **(b)** 1

(c) −1 **(d)** 2

68. The vector product of two vectors $\vec{A}$ and $\vec{B}$ is given by:

(a) AB sin θ **(b)** AB sin θ $\hat{n}$

(c) $\vec{AB}$ sin θ **(d)** AB $\hat{n}$

69. Vector product does not hold:

(a) Commutative law **(b)** Associative law

(c) Distributive law **(d)** None of these

70. The direction of vector product is:

(a) Parallel to plane **(b)** Perpendicular to plane

(c) Anti-parallel **(d)** Along the plane

71. Self cross-product of a vector is equal to:

(a) Zero **(b)** One

(c) Double **(d)** Negative

72. The cross product of unit vectors $\hat{i} \times \hat{i} = \hat{j} \times \hat{j} = \hat{k} \times \hat{k}$ is:

(a) One **(b)** $\hat{i}$

(c) $\hat{k}$ **(d)** Zero

73. If $\vec{A} \times \vec{B} = 0$ then the angle between the vectors is:

(a) 60° **(b)** 90°

(c) 270° **(d)** 180°

74. The magnitude of $\vec{A} \times \vec{B}$ is equal to area of:

(a) Triangle **(b)** Circle

(c) Parallelogram **(d)** Rectangle

75. The cross product of two vectors will be negative when:

(a) They are anti-parallel **(b)** They are parallel

(c) They are rotated through an angle of 270° **(d)** None of these

76. The cross product of two parallel vectors $\vec{A}$ and $\vec{B}$ is equal to:

(a) $AB \sin\theta \hat{n}$ **(b)** $AB \sin\theta$

(c) AB **(d)** Zero

77. Select the correct one:

(a) $\vec{A} \cdot \vec{B} = -\vec{A} \cdot \vec{B}$ **(b)** $\vec{A} \times \vec{B} \neq \vec{B} \times \vec{A}$

(c) $\vec{A} \times \vec{B} = \vec{B} \times \vec{A}$ **(d)** None of these

78. The cross product of $\hat{i} \times \hat{j}$ is equal to:

(a) $\hat{k}$ **(b)** $-\hat{k}$

(c) $\vec{k}$ **(d)** $\hat{i}$

79. The cross product of $\hat{j} \times \hat{i}$ is equal to:

(a) $\hat{k}$ **(b)** $-\hat{k}$

(c) $\vec{k}$ **(d)** $\hat{i}$

80. Select the correct one:

(a) $\hat{j} \times \hat{k} = \hat{i}$ **(b)** $\hat{j} \times \hat{k} = -\hat{i}$

(c) $\hat{j} \times \hat{k} = \hat{j}$ **(d)** $\hat{j} \times \hat{k} = \hat{k}$

81. The turning effect of a force is called its moment or:

(a) Momentum **(b)** Inertia

(c) Torque **(d)** Impulse

82. The perpendicular distance from the line of action to the pivot is called:

(a) Displacement **(b)** Momentum

(c) Moment distance **(d)** Moment arm

83. The SI unit of torque is:

(a) $N \cdot m^2$ **(b)** $N \cdot m$

(c) N/m^2 **(d)** N^2m

84. The expression for torque is given by:

(a) $rF \cos\theta$ **(b)** $rF \sin\theta \hat{n}$

(c) $rF \sin\theta$ **(d)** $rF \cos\theta \hat{n}$

85. Torque acting on a body determines its:

(a) Velocity **(b)** Momentum

(c) Force **(d)** Angular momentum

86. When line of action of applied force passes through the pivot point then torque will be:

(a) Maximum **(b)** Constant

(c) Negative **(d)** Zero

87. The direction of torque $\vec{\tau} = \vec{r} \times \vec{F}$ is determined by:

(a) Head to tail rule **(b)** Right hand rule

(c) Left hand rule **(d)** None of these

88. Conventionally anti-clock wise torque is taken as:

(a) Zero **(b)** Negative

(c) Positive **(d)** None of these

89. Conventionally clockwise torque is taken as:

(a) Zero **(b)** Negative

(c) Positive **(d)** None of these

90. Torque is also called as:

(a) Moment of inertia **(b)** Moment arm

(c) Moment of force **(d)** Angular velocity

91. The dimension of torque are:

(a) $[ML^2T^{-2}]$ **(b)** $[MLT^{-1}]$

(c) $[ML^3T]$ **(d)** $[M^2LT^{-2}]$

92. Torque = ———— × Force:

(a) Velocity **(b)** Momentum

(c) Arm of the weight **(d)** Moment arm

93. Let torque = $\vec{\tau} = \vec{r} \times \vec{F}$ then direction of torque is:

(a) In the direction $\vec{F}$ **(b)** In the direction of $\vec{r}$

(c) Normal to the plane **(d)** None of these

94. Two equal and opposite forces acting on a body form a:

(a) Momentum **(b)** Torque

(c) Couple **(d)** None of these

95. The point at which the whole weight of the body acts is called:

(a) Torque **(b)** Centre of gravity

(c) Centre of mass **(d)** Centre of the body

96. The centre of gravity of a uniform body is:

(a) At the axis of rotation of the body **(b)** At its centre

(c) At its one end **(d)** None of these

97. The centre of gravity of a triangular plate is:

(a) At the axis of rotation of the body **(b)** At its centre

(c) At the intersections of medians **(d)** None of these

98. If a body is at rest or moving with uniform velocity then it is said to be in:

(a) Torque **(b)** Equilibrium

(c) Both (a) and (b) **(d)** None of these

99. Torque has zero value if angle between $\vec{r}$ and $\vec{F}$:

(a) 60° **(b)** 45°

(c) 90° **(d)** 0°

100. The torque has maximum value if angle between $\vec{r}$ and $\vec{F}$ is:

(a) 60° **(b)** 45°

(c) 90° **(d)** 0°

101. A body will be in translational equilibrium if:

(a) $\sum \vec{F} = 0$ **(b)** $\sum \vec{\tau} = 0$

(c) $\sum \vec{F_y} = 0$ **(d)** None of these

102. The condition of complete equilibrium is satisfied if:

(a) Vector sum of all the torques is zero **(b)** Vector sum of all forces and torques is zero

(c) Vector sum of all the forces is zero **(d)** None of these

103. $\hat{i} \cdot (\hat{j} \times \hat{k})$ is equal to:

(a) $\hat{k}$ **(b)** 2

(c) 1 **(d)** 0

104. If $|\bar{a} + \bar{b}| = |\bar{a} - \bar{b}|$ then angle between $\bar{a}$ and $\bar{b}$ is:

(a) 90° **(b)** 0°

(c) 180° **(d)** 45°

105. If $\vec{A} = 2\hat{i} + \hat{j} + 2\hat{k}$ then $|A|$ is:

(a) zero **(b)** 3

(c) 5 **(d)** 9

106. In rotational motion the analogue of force is:

(a) Moment arm **(b)** Torque

(c) Moment of inertia **(d)** None of these

107. The component of $9\hat{i} + 17\hat{j}$ along z-axis is:

(a) Zero **(b)** 18

(c) 26 **(d)** 11

108. If $|\vec{A} + \vec{B}| = |\vec{A} - \vec{B}|$, angle between $\vec{A}$ and $\vec{B}$ is:

(a) 0° **(b)** 90°

(c) 60° **(d)** 180°

109. If vectors $2\hat{i} + 4\hat{j} - 7\hat{k}$ and $2\hat{i} + 6\hat{j} + q\hat{k}$ are perpendiculars then value of q is:

(a) 4 **(b)** 7

(c) 8 **(d)** 10

110. The resultant of two vectors of magnitude 2 and 3 is 1. The angle between them is:

(a) 90° **(b)** 180°

(c) 0° **(d)** None of these

111. $|\hat{i} - \hat{j} - 3\hat{k}| =$

(a) $\sqrt{5}$ **(b)** $\sqrt{7}$

(c) $\sqrt{11}$ **(d)** $\sqrt{13}$

112. Resultant of two vectors of magnitude 24 and 7 is 25. The angle between them is:

(a) 90° **(b)** 180°

(c) 360° **(d)** 270°

113. If $|\vec{A} \times \vec{B}| = \sqrt{3}\,(\vec{A} \cdot \vec{B})$. Angle between $\vec{A}$ and $\vec{B}$ is:

(a) $\frac{\pi}{2}$ **(b)** $\frac{\pi}{4}$

(c) $\frac{\pi}{6}$ **(d)** $\frac{\pi}{3}$

114. If $\vec{P} = 3\hat{i} + 4\hat{j} - 2\hat{k}$, $\vec{Q} = 4\hat{i} - 3\hat{j} + 2\hat{k}$. Unit vector in the direction of $\vec{P} + \vec{Q}$ is:

(a) $7\hat{i} + \hat{j}$ **(b)** $\frac{7\hat{i} + \hat{j}}{5}$

(c) $\frac{1}{29}(2\hat{i} - 14\hat{j} - 25\hat{k})$ **(d)** None of these

115. Area of parallelogram =

(a) $\vec{A} \cdot \vec{B}$ **(b)** $\vec{A} \times \vec{B}$

(c) $|\vec{A} \times \vec{B}|$ **(d)** None of these

116. If the resultant of two vectors each of magnitude F is also of magnitude F, the angle between them is:

(a) 60° **(b)** 90°

(c) 180° **(d)** 120°

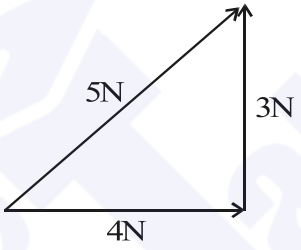
117. The resultant of two forces 3N and 4N making an angle 60° with each other is:

(a) 5 **(b)** 7

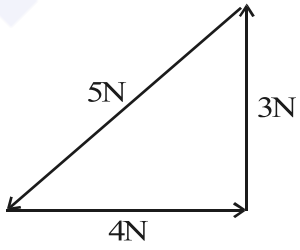
(c) 6.1 **(d)** 1

118. Which diagram correctly shows the addition of 4N and 3N vectors?

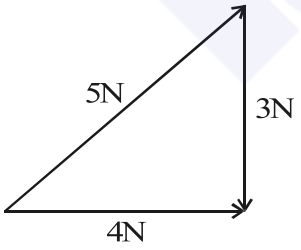
(a)



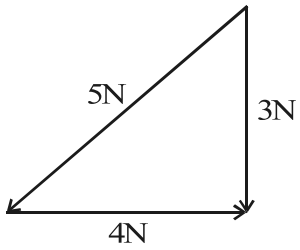
(b)



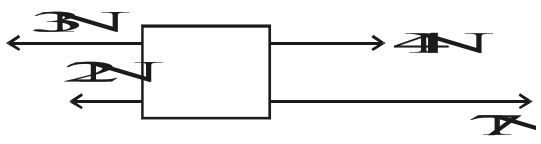
(c)



(d)



119. What is the resultant forces in diagram shown?



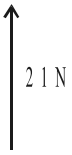
(a) Zero

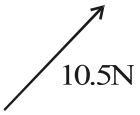
(b) 6N to left

(c) 6N to right

(d) 11N to right

120. A 9N force and a 12N force acting at right angles as shown in figure. Which of the following diagrams shows resultant force?

(a) 

(b) 

(c) 

(d) 

121. If position vector $\vec{r}$ and force $\vec{F}$ are in same direction then torque will be:

(a) Maximum **(b)** Minimum

(c) Same **(d)** None of these

122. If a vector is multiplied by a scalar then new quantity is:

(a) Scalar **(b)** Vector

(c) Both (a), (b) **(d)** None of these

123. If θ is angle between $\vec{A}$ and $\vec{B}$ then their resultant:

(a) $\sqrt{A^2 + B^2}$ **(b)** $\sqrt{A^2 + B^2 + 2AB\cos\theta}$

(c) $\sqrt{A^2 - B^2}$ **(d)** $\sqrt{A^2 + B^2 - AB\sin\theta}$

124. Scalar product of two vectors obey … law:

(a) Commutative **(b)** Distributive

(c) Associative **(d)** All

125. The angle between $\vec{A} \times \vec{B}$ and $\vec{B} \times \vec{A}$ is:

(a) 0° **(b)** 180°

(c) 90° **(d)** 45°

126. If $\vec{A}$ and $\vec{B}$ are parallel to each other then:

(a) $\vec{A} \cdot \vec{B} = 0$ **(b)** $\vec{A} \cdot \vec{B} = 1$

(c) $\vec{A} \cdot \vec{B} = AB$ **(d)** $\vec{A} \times \vec{B} = AB$

127. The magnitude of vector product of two vectors is $\sqrt{3}$ times then scalar product. Angle between vectors is:

(a) $\frac{\pi}{2}$ **(b)** $\frac{\pi}{6}$

(c) $\frac{\pi}{3}$ **(d)** $\frac{\pi}{4}$

128. The magnitude of the resultant of two forces is 10 N. One of the forces is of magnitude $10\sqrt{2}$ N. It makes an angle of 45° with resultant. The magnitude of other force is:

(a) 10 N **(b)** $10\sqrt{2}$ N

(c) 100 N **(d)** 10^9 N

129. A girl can throw a ball horizontally with a velocity 6 ms^{-1}. If she throws the ball at that speed while moving in a car at a speed of 8 ms^{-1} in a direction at right angles to the motion of the car, then the resultant velocity, in magnitude is:

(a) 2 ms^{-1} **(b)** 4 ms^{-1}

(c) 6 ms^{-1} **(d)** 10 ms^{-1}

130. Two forces of magnitudes 8 N and 15 N act at a point. If the resultant force is 17 N, then the angle between the forces has to be:

(a) 60° **(b)** 45°

(c) 90° **(d)** 30°

131. A vector $\vec{A}$ is added to the sum of two vectors $3\hat{i} - 2\hat{j} - 2\hat{k}$ and $2\hat{i} - \hat{j} + 3\hat{k}$ such that the resultant is a unit vector along z-axis. The value of $\vec{A}$ is:

(a) $-5\hat{i} + 3\hat{j}$ **(b)** $5\hat{i} - 3\hat{j}$

(c) $\hat{i} - \hat{k}$ **(d)** $\hat{k} + \hat{i} - \hat{j}$

132. A person travels 4 km east, then 4 km south and finally travels in such away that his journey terminates 8 km directly east of the starting point. What is the magnitude of the displacement during the third leg of the journey?

(a) 4 km **(b)** $\frac{4}{\sqrt{2}}$ km

(c) $4\sqrt{2}$ km **(d)** 16 km

133. The vector sum of N coplanar forces each of magnitude F, when each force is making an angle of $\frac{2\pi}{N}$ with that preceding it, is:

(a) F **(b)** $\frac{NF}{2}$

(c) NF **(d)** Zero

134. A vector $\vec{F}_1$ is along the positive direction of x-axis. Its vector product with another vector $\vec{F}_2$ is zero. Now, $\vec{F}_2$ is possibly equal to:

(a) $3\hat{j}$ **(b)** $-17.5(\hat{i} + \hat{j})$

(c) $11(\hat{j} + \hat{k})$ **(d)** $-2\hat{i}$

135. The resultant of three vectors whose magnitudes are 3 units in east, 12 units in north and 4 units vertically upwards is:

(a) $\sqrt{24}$ **(b)** 13

(c) $\sqrt{265}$ **(d)** 19

136. If the magnitudes of the vectors $\vec{A}$, $\vec{B}$ and $\vec{C}$ are 3, 4 and 5 units respectively and if $\vec{A} + \vec{B} = \vec{C}$, then the angle between $\vec{B}$ and $\vec{C}$ is:

(a) $\pi/2$ **(b)** arc cos (0.8)

(c) arc tan (0.75) **(d)** $\pi/4$

137. The point of application of the applied force $\vec{F} = 5\hat{i} - 3\hat{j} + 2\hat{k}$ is moved from $\vec{r_1} = 2\hat{i} + 7\hat{k} + 4\hat{k}$ to $\vec{r_2} = -5\hat{i} + 2\hat{j} + 3\hat{k}$. The work done by the applied force is:

(a) –22 units **(b)** 0 units

(c) –79.5 units **(d)** –9.8 units

138. If $0.6\hat{i} + 0.4\hat{j} + c\hat{k}$ represents a unit vector, then c is:

(a) 0.8 **(b)** $\sqrt{0.48}$

(c) $\sqrt{0.52}$ **(d)** Zero

139. Given $|\hat{a} \cdot \hat{b}|^2 - |\hat{a} \times \hat{b}|^2 = c$. What is value of c?

(a) ab sin θ **(b)** ab $\cos^2 \theta$

(c) sin 2θ **(d)** cos 2θ

140. If $\vec{P} \cdot \vec{Q} = |\vec{P} \times \vec{Q}|$. What is angle between $\vec{P}$ and $\vec{Q}$?

(a) 30° **(b)** 45°

(c) 60° **(d)** 90°

141. If $\vec{A} \times \vec{B} = \vec{B} \times \vec{C} = \vec{C} \times \vec{A}$. Then:

(a) $\vec{A} = 0$ **(b)** $\vec{A} + \vec{B} = 0$

(c) $\vec{B} + \vec{C} = 0$ **(d)** $\vec{A} + \vec{B} + \vec{C} = 0$

ANSWERS

1.	(c)	**2.**	(a)	**3.**	(d)	**4.**	(a)
5.	(d)	**6.**	(a)	**7.**	(b)	**8.**	(c)
9.	(c)	**10.**	(b)	**11.**	(a)	**12.**	(d)
13.	(b)	**14.**	(a)	**15.**	(d)	**16.**	(c)
17.	(b)	**18.**	(a)	**19.**	(d)	**20.**	(a)
21.	(b)	**22.**	(c)	**23.**	(c)	**24.**	(b)
25.	(b)	**26.**	(a)	**27.**	(b)	**28.**	(a)
29.	(b)	**30.**	(c)	**31.**	(d)	**32.**	(c)
33.	(a)	**34.**	(c)	**35.**	(c)	**36.**	(b)
37.	(d)	**38.**	(c)	**39.**	(c)	**40.**	(b)
41.	(a)	**42.**	(d)	**43.**	(b)	**44.**	(b)
45.	(c)	**46.**	(b)	**47.**	(b)	**48.**	(b)
49.	(c)	**50.**	(b)	**51.**	(a)	**52.**	(a)
53.	(b)	**54.**	(c)	**55.**	(b)	**56.**	(b)
57.	(b)	**58.**	(c)	**59.**	(c)	**60.**	(a)
61.	(c)	**62.**	(c)	**63.**	(a)	**64.**	(b)
65.	(c)	**66.**	(b)	**67.**	(a)	**68.**	(b)
69.	(a)	**70.**	(b)	**71.**	(a)	**72.**	(d)
73.	(d)	**74.**	(c)	**75.**	(b)	**76.**	(d)
77.	(b)	**78.**	(a)	**79.**	(b)	**80.**	(a)
81.	(c)	**82.**	(d)	**83.**	(b)	**84.**	(b)
85.	(b)	**86.**	(d)	**87.**	(b)	**88.**	(c)
89.	(b)	**90.**	(c)	**91.**	(a)	**92.**	(d)
93.	(c)	**94.**	(c)	**95.**	(b)	**96.**	(b)
97.	(c)	**98.**	(b)	**99.**	(d)	**100.**	(c)
101.	(a)	**102.**	(b)	**103.**	(c)	**104.**	(a)
105.	(b)	**106.**	(b)	**107.**	(a)	**108.**	(b)
109.	(a)	**110.**	(b)	**111.**	(c)	**112.**	(a)
113.	(d)	**114.**	(b)	**115.**	(c)	**116.**	(d)
117.	(c)	**118.**	(a)	**119.**	(c)	**120.**	(c)
121.	(b)	**122.**	(b)	**123.**	(b)	**124.**	(d)
125.	(b)	**126.**	(c)	**127.**	(c)	**128.**	(a)
129.	(d)	**130.**	(c)	**131.**	(a)	**132.**	(c)
133.	(d)	**134.**	(d)	**135.**	(b)	**136.**	(b)
137.	(a)	**138.**	(b)	**139.**	(d)	**140.**	(b)
141.	(d)						

MOTION AND FORCE

Each question has four possible answers, encircled the correct answer:

1. If a body changes its position with respect to its surroundings then it is said to be in:

(a) Rest **(b)** Motion

(c) Momentum **(d)** Force

2. If a body does not change its position with respect to its surroundings then it is said to be at:

(a) Rest **(b)** Motion

(c) Momentum **(d)** Force

3. The change in position of a body from initial to final position is called:

(a) Velocity **(b)** Displacement

(c) Acceleration **(d)** Speed

4. The rate of change of displacement is called:

(a) Velocity **(b)** Displacement

(c) Acceleration **(d)** Speed

5. The rate of change of distance is called:

(a) Velocity **(b)** Displacement

(c) Acceleration **(d)** Speed

6. The SI unit of velocity is:

(a) m/s **(b)** m-s

(c) s/m **(d)** None of these

7. The dimensions of velocity are:

(a) $[LT^2]$ **(b)** $[L^{-1}]$

(c) $[LT^{-1}]$ **(d)** $[L^2T]$

8. The expression $\underset{\Delta t \to 0}{\text{Limit}} \frac{\Delta \vec{d}}{\Delta t}$ represents:

(a) Average velocity **(b)** Displacement

(c) Instantaneous velocity **(d)** Acceleration

9. If the velocity of the body is increasing then its acceleration will be:

(a) Zero **(b)** Maximum

(c) Negative **(d)** Positive

10. The rate of change of velocity is called:

(a) Displacement **(b)** Velocity

(c) Speed **(d)** Acceleration

11. When the velocity of a body is increases at constant rate, it is said to be moving with:

(a) Constant velocity **(b)** Constant speed

(c) Constant displacement **(d)** None of these

12. With the help of velocity-time graph, we can find:

(a) Distance **(b)** Time

(c) Velocity **(d)** Momentum

13. The area under the curve of velocity-time graph gives:

(a) Acceleration **(b)** Velocity

(c) Distance **(d)** Direction

14. The motion and rest are:

(a) Relative **(b)** Discrete

(c) Absolute **(d)** None of these

15. When a body moves in straight line, displacement is:

(a) Circular **(b)** Curved

(c) Along the path **(d)** None of these

16. If the instantaneous velocity does not change, then the body is said to be moving with:

(a) Average velocity **(b)** Average acceleration

(c) Uniform velocity **(d)** Average speed

17. A man on the top of a tower throws an object upward with a certain velocity and allows another object to fall freely. The two objects strikes the Earth with:

(a) Different velocities **(b)** Same velocities

(c) Uniform velocities **(d)** None of these

18. If the velocity time graph becomes steeper and steeper then acceleration:

(a) Remains constant **(b)** Decreases

(c) Increases **(d)** None of these

19. Acceleration of a body sliding down a smooth inclined plane of constant angle is said to be:

(a) Variable **(b)** Increasing

(c) Decreasing **(d)** Constant

20. The dimensions of acceleration are:

(a) $[LT^{-1}]$ **(b)** $[LT^{2}]$

(c) $[L^{2}T]$ **(d)** $[LT^{-2}]$

21. Slope of velocity-time graph represents:

(a) Distance **(b)** Displacement

(c) Acceleration **(d)** None of these

22. A paratrooper moves downward with:

(a) Zero acceleration **(b)** Negative acceleration

(c) Positive acceleration **(d)** Acceleration due to gravity

23. If a body is moving with constant velocity of 20 m/s towards North then its acceleration is:

(a) 5 m/s^2 **(b)** 9 m/s^2

(c) 10 m/s^2 **(d)** Zero

24. Acceleration in a body is always produced in the direction of:

(a) Force **(b)** Velocity

(c) Weight **(d)** None of these

25. The velocity of a body at any instant of time is called:

(a) Average speed **(b)** Uniform velocity

(c) Instantaneous velocity **(d)** None of these

26. The unit of acceleration in SI unit is:

(a) m/s **(b)** m/s^2

(c) m-s **(d)** $\frac{1}{m\text{-}s^2}$

27. If a body covers equal displacement in equal interval of time then velocity of the body is:

(a) Uniform **(b)** Average

(c) Instantaneous **(d)** None of these

28. If a body covers unequal displacement in unequal interval of time then velocity of the body is:

(a) Uniform **(b)** Variable

(c) Instantaneous **(d)** None of these

29. The acceleration of a body at a particular instant of time is:

(a) Uniform acceleration **(b)** Variable acceleration

(c) Instantaneous acceleration **(d)** None of these

30. Graphs which are used to describe the variation of velocity with time are called:

(a) Speed-time graph **(b)** Velocity-time graph

(c) Distance-time graph **(d)** None of these

31. If a body is moving with constant acceleration then the velocity-time graph is:

(a) Parabola **(b)** Hyperbola

(c) Straight line **(d)** None of these

32. In displacement-time graph, if the slope of line increases then:

(a) The acceleration increases **(b)** The velocity becomes greater

(c) The speed decreases **(d)** None of these

33. The average and instantaneous accelerations will be equal when a body moves with:

(a) Constant acceleration **(b)** Variable acceleration

(c) Retardation **(d)** Positive acceleration

34. A frame of reference at rest is called:

(a) Non-inertial frame **(b)** Inertial frame

(c) Accelerated frame **(d)** None of these

35. Those frame of references which are moving with some acceleration is called:

(a) Non-inertial frame **(b)** Inertial frame

(c) Both (a) and (b) **(d)** None of these

36. If $\vec{\Delta V}$ is the change in the velocity of a body during time Δt, then its acceleration is given by:

(a) $\vec{a} = \frac{\vec{\Delta x}}{\Delta t}$ **(b)** $\vec{a} = \frac{\Delta t}{\vec{\Delta V}}$

(c) $\vec{a} = \frac{\vec{\Delta V}}{\Delta t}$ **(d)** $\vec{a} = \vec{\Delta V} \cdot \Delta t$

37. The laws of motion shows the relation between:

(a) Distance and velocity **(b)** Displacement and velocity

(c) Mass and velocity **(d)** Force and acceleration

38. The quantity of matter in a body is called:

(a) Force **(b)** Mass

(c) Displacement **(d)** Speed

39. Newton's first law of motion is also called:

(a) Law of inertia **(b)** Law of momentum

(c) Ampere's law **(d)** None of these

40. The property of a body due to which it opposes its state of rest or of motion is called:

(a) Momentum **(b)** Torque

(c) Weight **(d)** Inertia

41. Laws of motion are valid in a frame which is:

(a) In motion **(b)** Inertial

(c) Both (a) and (b) **(d)** None of these

42. Laws of motion are not valid in a frame which is:

(a) Inertial **(b)** Non-inertial

(c) In the space **(d)** None of these

43. Newton's laws are applicable on the objects which have:

(a) High speed and light mass **(b)** Low speed and light mass

(c) Low speed and heavy mass **(d)** None of these

44. The magnitude of acceleration produced in an object is inversely proportional with:

(a) Momentum **(b)** Velocity

(c) Mass **(d)** Applied force

45. The SI unit of force is:

(a) Newton **(b)** Kilogram

(c) Joule **(d)** Metre

46. The force which produces an acceleration of 1 m/s^2 in an object of mass 1 kg is equal to:

(a) One Ampere **(b)** One Watt

(c) One Newton **(d)** One Coulomb

47. If the force acting on a body is doubled, then acceleration becomes:

(a) Half **(b)** Constant

(c) One forth **(d)** Double

48. A mass of 10 kg moves with an acceleration of 10 m/s^2, the force on it is:

(a) 5 N **(b)** 100 N

(c) 50 N **(d)** 25 N

49. Inertia of a body is measured in terms of its:

(a) Weight **(b)** Force

(c) Mass **(d)** Acceleration

50. The rate of change of momentum is equal to:

(a) Applied force **(b)** Torque

(c) Distance **(d)** Time

51. The product of mass and velocity is called:

(a) Impulse **(b)** Momentum

(c) Force **(d)** Power

52. The expression $I = \vec{F} \times \Delta t$ represents:

(a) Momentum **(b)** Impulse

(c) Force **(d)** Power

53. Impulse is equal to the:

(a) Change in momentum **(b)** Change of force

(c) Change of time **(d)** Change of velocity

54. The dimensions of weight are:

(a) $[LT^{-1}]$ **(b)** $[MLT^{-2}]$

(c) $[M^2LT]$ **(d)** $[ML^2T]$

55. SI unit of impulse is:

(a) kg m/s **(b)** N-m

(c) Ns **(d)** None of these

56. The motion of the rocket in the space is according to the law of conservation of:

(a) Energy **(b)** Mass

(c) Linear momentum **(d)** None of these

57. A force of 100 N acts in a body for 5 seconds, what will be the change in momentum:

(a) 20 N-s **(b)** 500 N-s

(c) 100 N-s **(d)** 1000 N-s

58. A body thrown upward making an angle with the horizontal and moving freely under the action of gravity is called:

(a) Linear motion **(b)** Projectile motion

(c) Both (a) and (b) **(d)** None of these

59. The path followed by the projectile is called:

(a) Height of projectile **(b)** Range of projectile

(c) Trajectory **(d)** None of these

60. During projectile motion, the horizontal component of velocity:

(a) Remains constant **(b)** Increases

(c) Decreases **(d)** Becomes zero

61. The trajectory of a projectile is:

(a) Circle **(b)** Parabola

(c) Hyperbola **(d)** Straight line

62. The vertical component of velocity at highest point during projectile motion is:

(a) Maximum **(b)** Constant

(c) Zero **(d)** Same

63. A foot ball kicked in a air is the example of:

(a) Linear motion **(b)** Circular motion

(c) Rotational motion **(d)** Projectile motion

64. The acceleration along x-direction in case of projectile is:

(a) Zero **(b)** Equal to gravity

(c) Maximum **(d)** Constant

65. Motion of a projectile is:

(a) One dimension **(b)** Two dimension

(c) Three dimension **(d)** None of these

66. Initial vertical velocity of a projectile is given by:

(a) $v_i \cos\theta$ **(b)** $v_i \sin\theta$

(c) $v_i^2 \sin\theta$ **(d)** $v_i \tan\theta$

67. The magnitude of the velocity of the projectile is:

(a) $v = \sqrt{v_x^2 + v_y^2}$ **(b)** $v = \sqrt{v_x^2 - v_y^2}$

(c) $v = v_x^2 + v_y^2$ **(d)** None of these

68. The expression for maximum height is:

(a) $\frac{v_i^2 \sin^2\theta}{2g}$ **(b)** $\frac{v_i^2 \sin\theta}{g}$

(c) $\frac{v_i \sin^2\theta}{2g}$ **(d)** $\frac{v_i \sin\theta}{2g}$

69. The SI unit of acceleration is:

(a) ms^2 **(b)** m/s^2

(c) m^2s **(d)** None of these

70. The horizontal component of velocity of a projectile thrown with initial velocity 300 m/s at an angle of 90° will be:

(a) 450 m/s **(b)** 200 m/s

(c) 150 m/s **(d)** Zero

71. Height attained by the projectile will be maximum when the angle of projection is:

(a) 30° **(b)** 60°

(c) 45° **(d)** 90°

72. Velocity of the projectile at the maximum height attained when projected with velocity v_i is:

(a) $v_x = v_i \sin\theta$ **(b)** $v_H = v_i \cos\theta$

(c) Zero **(d)** v_i

73. A body falling freely strikes the ground in 5 seconds, distance covered by it in 5 second is:

(a) 122.5 m **(b)** 25 m

(c) 24.5 m **(d)** 34.5 m

74. The total time for which the projectile remains in air is called:

(a) Time of projectile **(b)** Time period

(c) Time of flight **(d)** Time constant

75. The time of flight is given by:

(a) $\frac{2v_i \sin\theta}{g}$ **(b)** $\frac{v_i \sin\theta}{g}$

(c) $\frac{v_i^2 \sin\theta}{2g}$ **(d)** $\frac{v_i \sin\theta}{2g}$

76. The angle of projection to cover maximum horizontal range is:

(a) 90° **(b)** 120°

(c) 18° **(d)** 45°

77. The expression for maximum range of projectile is given by:

(a) $\frac{v_i^2}{g}$ **(b)** $\frac{2v_i}{g}$

(c) $\frac{2v_i^2}{g}$ **(d)** $\frac{v_i^2}{2g}$

78. The path followed by the ballistic missile is called:

(a) Missile displacement **(b)** Ballistic trajectory

(c) Missile acceleration **(d)** Ballistic time

79. The ballistic missiles are useful only for:

(a) Long range **(b)** Vertical range

(c) Short range **(d)** Normal range

80. For long range, the missiles used are called:

(a) Long range missiles **(b)** Normal missiles

(c) Guided missiles **(d)** Rocket missiles

81. An object can have a constant speed even its velocity is:

(a) Constant **(b)** Changing

(c) Zero **(d)** Maximum

82. The system in which no external force acts called:

(a) Inertial system **(b)** Isolated system

(c) Non-material system **(d)** Thermal system

83. When there is no loss of K.E and momentum then the collision is called:

(a) Elastic collision **(b)** In-elastic collision

(c) Inertial collision **(d)** None of these

84. The ballistic trajectory is the path followed by:

(a) The powered guided missile **(b)** An un-powered and guided missile

(c) An un-powered and un-guided missile **(d)** None of these

85. The range of projectile is directly proportional to the:

(a) $\sin 2\theta$ **(b)** $\sin^2\theta$

(c) $\cos^2\theta$ **(d)** $\tan^2\theta$

86. The magnitude of vertical and horizontal range will be equal if angle of projection is:

(a) 120° **(b)** 45°

(c) 70° **(d)** 76°

87. A rocket propulsion is based on the principle of:

(a) Law of conservation of mass **(b)** Law of conservation of energy

(c) Law of conservation of momentum **(d)** None of these

88. The path of projectile is determined by:

(a) Magnetic field **(b)** Gravitational field

(c) Electric field **(d)** Electromagnetic field

89. The equation of parabola is:

(a) $y = bx - ax^2$ **(b)** $y = ax - bx^2$

(c) Both (a) and (b) **(d)** None of these

90. In a projectile motion, the horizontal range R depends upon:

(a) Angle of projection **(b)** Initial velocity

(c) Both (a) and (b) **(d)** None of these

91. The horizontal component of a projectile moving with initial velocity of 200 m/s at an angle of 60° to x-axis is:

(a) 100 m/s **(b)** 250 m/s

(c) 50 m/s **(d)** 200 m/s

92. The velocity of projectile is maximum at:

(a) Highest point **(b)** One forth of height

(c) Half of height **(d)** Before striking the ground

93. Horizontal range of projectile is:

(a) Equal to height **(b)** One fourth of height

(c) One half of height **(d)** Double of height

94. A force of 15 N acts on a body of mass 5 kg for 5 sec. to a distance of 10 cm, the rate of change of momentum is:

(a) 75 N **(b)** 45 N

(c) 15 N **(d)** 30 N

95. A fighter plane is chasing another plane, when it opens fire its speed.

(a) Increases **(b)** Decreases

(c) Remains same **(d)** It stops

96. If the horizontal range of a projectile is four times its maximum height, the angle of projection is:

(a) 30° **(b)** 45°

(c) $\sin^{-1}\left(\frac{1}{4}\right)$ **(d)** $\tan^{-1}\left(\frac{1}{4}\right)$

97. A train covers the first half distance between two stations at a speed of 40 kmh^{-1} and the other half at 60 kmh^{-1} then its average speed is:

(a) 45 kmh^{-1} **(b)** 48 kmh^{-1}

(c) 40 kmh^{-1} **(d)** None of these

98. During the projectile motion, the horizontal component of velocity.

(a) Changes with time **(b)** Becomes zero

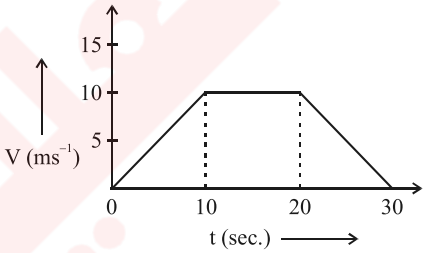
(c) Remains constant **(d)** Increases with time

99. A ball is projected at angle of 45° to the horizontal. If the horizontal range is 20 m, the maximum height to which the ball rises is:

(a) 2.5 m **(b)** 5.0 m

(c) 7.5 m **(d)** 10 m

100. In the following velocity time graph, the distance travelled by the body in metres is:



(a) 200

(b) 250

(c) 300

(d) 400

101. Newton's first law of motion gives definition of:

(a) Mass **(b)** Force

(c) Acceleration **(d)** Speed

102. Motion of rocket is based upon:

(a) Newton's third law of motion **(b)** Law of conservation of momentum

(c) Newton's law of gravitation **(d)** Both (a) and (b)

103. The acceleration of projectile at the highest point is:

(a) Zero **(b)** Increases

(c) Decreases **(d)** Constant

104. A force of 12 N gives an acceleration 4 ms^{-2} to an object. The force required to give it an acceleration of 10 ms^{-2} is:

(a) 15 N **(b)** 20 N

(c) 25 N **(d)** 30 N

105. Acceleration of 1.5 ms^{-2} expressed in kmh^{-2} is:

(a) 324 **(b)** 5.4

(c) 5400 **(d)** 19440

106. A bomb of mass 12 kg initially at rest, explodes into two pieces of masses 4 kg and 8 kg. The speed of the 8 kg mass is 6 ms^{-1}. The K.E of the 4 kg mass is:

(a) 32 J **(b)** 48 J

(c) 114 J **(d)** 288 J

107. The range of projectile when launched at an angle of 15° with the horizontal is 1.5 m. Its range, when launched at 45° with the same speed is:

(a) 3.0 m **(b)** 1.5 m

(c) 6.0 km **(d)** 0.75 km

108. For a projectile, the ratio of maximum height reached to the square of flight time is:

(a) 5 : 4 **(b)** 5 : 2

(c) 5 : 1 **(d)** 10 : 1

109. A stone is thrown vertically upward with a velocity of 30 ms^{-1}. If the acceleration due to gravity is 10 ms^{-2}, what is the distance travelled by the particle during the first second of its motion.

(a) 30 m **(b)** 25 m

(c) 10 m **(d)** None of these

110. A body is dropped from a tower with zero velocity reaches ground in 4 seconds. The height of the tower is about:

(a) 80 m **(b)** 20 m

(c) 160 m **(d)** 40 m

111. A body starting from rest covers a distance of 0.45 km and acquires a velocity of 300 km/h. Its acceleration will be:

(a) 0.092 ms^{-2} **(b)** 0.5 ms^{-2}

(c) 7.71 ms^{-2} **(d)** 0.15 ms^{-2}

112. The distance covered by a body in time 't' starting from rest is:

(a) $\frac{at^2}{2}$ **(b)** vt

(c) $\frac{a^2t}{2}$ **(d)** at^2

113. At what angle, the range and maximum range are equal?

(a) 45° **(b)** 90°

(c) 60° **(d)** 0°

114. A cricket ball is hit so that it travels straight up in air and it can acquires 3 seconds to reach the maximum height. Its initial velocity is:

(a) 10 ms^{-1} **(b)** 15 ms^{-1}

(c) 29.4 ms^{-1} **(d)** 12.2 ms^{-1}

115. A bullet of mass 10 g hits a target and penetrates 2 cm into it. If the average resistance offered by the target is 100 N then the velocity with which the bullet hits the target is:

(a) 10 ms^{-1} **(b)** 1052 ms^{-1}

(c) 20 ms^{-1} **(d)** $20\sqrt{2}$ ms^{-1}

ANSWERS

1.	(b)	**2.**	(a)	**3.**	(b)	**4.**	(a)
5.	(d)	**6.**	(a)	**7.**	(c)	**8.**	(c)
9.	(d)	**10.**	(d)	**11.**	(a)	**12.**	(a)
13.	(a)	**14.**	(a)	**15.**	(c)	**16.**	(c)
17.	(a)	**18.**	(c)	**19.**	(d)	**20.**	(d)
21.	(c)	**22.**	(a)	**23.**	(d)	**24.**	(a)
25.	(c)	**26.**	(b)	**27.**	(a)	**28.**	(b)
29.	(c)	**30.**	(b)	**31.**	(c)	**32.**	(b)
33.	(a)	**34.**	(b)	**35.**	(a)	**36.**	(c)
37.	(d)	**38.**	(b)	**39.**	(a)	**40.**	(d)
41.	(b)	**42.**	(b)	**43.**	(c)	**44.**	(c)
45.	(a)	**46.**	(c)	**47.**	(d)	**48.**	(b)
49.	(c)	**50.**	(a)	**51.**	(b)	**52.**	(b)
53.	(a)	**54.**	(b)	**55.**	(c)	**56.**	(c)
57.	(a)	**58.**	(b)	**59.**	(c)	**60.**	(a)
61.	(b)	**62.**	(c)	**63.**	(d)	**64.**	(a)
65.	(b)	**66.**	(b)	**67.**	(a)	**68.**	(a)
69.	(b)	**70.**	(d)	**71.**	(c)	**72.**	(c)
73.	(a)	**74.**	(c)	**75.**	(a)	**76.**	(d)
77.	(a)	**78.**	(b)	**79.**	(c)	**80.**	(c)
81.	(b)	**82.**	(b)	**83.**	(a)	**84.**	(c)
85.	(a)	**86.**	(d)	**87.**	(c)	**88.**	(b)
89.	(b)	**90.**	(c)	**91.**	(a)	**92.**	(a)
93.	(a)	**94.**	(c)	**95.**	(b)	**96.**	(b)
97.	(b)	**98.**	(c)	**99.**	(b)	**100.**	(a)
101.	(b)	**102.**	(d)	**103.**	(d)	**104.**	(d)
105.	(d)	**106.**	(d)	**107.**	(a)	**108.**	(a)
109.	(b)	**110.**	(a)	**111.**	(c)	**112.**	(a)
113.	(a)	**114.**	(c)	**115.**	(c)		

WORK AND ENERGY

Each question has four possible answers, encircled the correct answer:

1. Work is the product of:

(a) Force and distance **(b)** Force and displacement

(c) Force and velocity **(d)** Force and energy

2. Work is the product of:

(a) Two vectors **(b)** Two scalars

(c) Vector and scalar **(d)** None of these

3. The product of force and displacement represents:

(a) Torque **(b)** Momentum

(c) Work **(d)** Energy

4. Work done will be maximum when angle between $\vec{F}$ and $\vec{d}$ is:

(a) 180° **(b)** 90°

(c) 60° **(d)** 0°

5. The work done will be negative when force and displacement are:

(a) In opposite direction **(b)** Same direction

(c) Perpendicular **(d)** None of these

6. The work done will be zero when angle between $\vec{F}$ and $\vec{d}$ is:

(a) 180° **(b)** 90°

(c) 60° **(d)** 0°

7. The area under force displacement curve gives:

(a) Energy **(b)** Work

(c) Momentum **(d)** Torque

8. The dimensions of work are:

(a) $[MLT^{-2}]$ **(b)** $[ML^2T]$

(c) $[ML^2T^{-2}]$ **(d)** [MLT]

9. The SI units of work is:

(a) Newton **(b)** $N \times m^2$

(c) Joule **(d)** Kelvin

10. The unit of work is similar to that of:

(a) Energy **(b)** Power

(c) Force **(d)** Weight

11. The space where gravitational force acts is called:

(a) Electric field **(b)** Gravitational field

(c) Gravity **(d)** Conservative field

12. The work done is independent of:

(a) Path followed by the body **(b)** Force

(c) Direction **(d)** None of these

13. The total work done in a closed path in gravitational field is:

(a) Maximum **(b)** Zero

(c) Constant **(d)** None of these

14. Work is defined as ———— of force and displacement:

(a) Vector product **(b)** Scalar product

(c) Both (a) and (b) **(d)** None of these

15. A field in which work done is independent of the path followed is called:

(a) Electric field **(b)** Gravitational field

(c) Magnetic field **(d)** Conservative field

16. When a body is moved through a certain displacement $\vec{d}$ by a force $\vec{F}$ then work done is:

(a) $\vec{F} \cdot \vec{d}$ **(b)** $\vec{F} \times \vec{d}$

(c) $\vec{F} \div \vec{d}$ **(d)** None of these

17. If a force $\vec{F}$ makes an angle θ with the displacement $\vec{d}$ along the direction of motion, the work done is:

(a) Fd tan θ **(b)** Fd cos θ

(c) Fd sin θ **(d)** Fd

18. Work is a:

(a) Scalar quantity **(b)** Vector quantity

(c) Both (a) and (b) **(d)** None of these

19. Which of the following force can do no work on the body when it acts:

(a) Elastic force **(b)** Centripetal force

(c) Frictional force **(d)** Gravitational force

20. If a body of weight w is lifted through a height h then work done will be:

(a) wh **(b)** Zero

(c) wh sin θ **(d)** – wh

21. If a body of mass 5 kg raised vertically through a height of 1 m then work done will be:

(a) 49.0 J **(b)** 4.9 J

(c) 490 J **(d)** None of these

22. A force acting at right angle to the displacement perform:

(a) Negative work **(b)** No work

(c) Positive work **(d)** Maximum work

23. The component of the force in the direction of the displacement $\vec{d}$ is:

(a) Fd cos θ **(b)** Fd sin θ

(c) F cos θ **(d)** Zero

24. The rate of doing work is called:

(a) Work **(b)** Force

(c) Momentum **(d)** Power

25. Power is the scalar product of:

(a) Force and velocity **(b)** Force and distance

(c) Force and momentum **(d)** Force and energy

26. The S.I unit of power is:

(a) Joule **(b)** Joule-sec

(c) Watt **(d)** Newton-m

27. One horse power is equal to:

(a) 746 watt **(b)** 745 watt

(c) 750 watt **(d)** 775 watt

28. In British engineering system, the unit of power is:

(a) Joule **(b)** Watt

(c) Horse power **(d)** Kilowatt horse

29. One Giga watt (Gw) is equal to:

(a) 10^3 watt **(b)** 10^9 watt

(c) 10^{12} watt **(d)** 10^{18} watt

30. 1 kwh is equal to:

(a) 3.6×10^5 J **(b)** 36×10^5 J

(c) 36×10^6 J **(d)** 3.5×10^6 J

31. Dimensions of power are:

(a) $[MLT^{-3}]$ **(b)** $[M^2LT^{-2}]$

(c) $[ML^{-2}T]$ **(d)** $[ML^2T^{-3}]$

32. Commercial unit of electrical energy is:

(a) Erg-sec **(b)** J/s

(c) kwh **(d)** J-s

33. Work is always on a body when:

(a) It moves through a certain distance **(b)** It experiences a force while in motion

(c) A force is exerted on it **(d)** None of these

34. The power needed to lift a mass of 5 kg to a height of 1 m in 2 sec is:

(a) 24.5 watt **(b)** 2.45 watt

(c) 0.245 watt **(d)** 245 watt

35. The average and instantaneous powers become equal if work is done at:

(a) Constant rate **(b)** Variable rate

(c) Any rate **(d)** None of these

36. The power is one kilo-watt if work is done at the rate of:

(a) 500 J/s **(b)** 1000 J/s

(c) 1000 J/min **(d)** 1500 J/s

37. The relation between horse power and watt is:

(a) 1 hp = 546 watts **(b)** 1 hp = 846 watts

(c) 1 hp = 1000 watts **(d)** 1 hp = 746 watts

38. If an agent consumes a power of 1 kilo-watt in one hour, the work done is:

(a) One watt **(b)** One kilo-watt

(c) One kilo-watt hour **(d)** None of these

39. The capacity to do work is called:

(a) Work **(b)** Energy

(c) Power **(d)** Velocity

40. The energy possessed by the body due to its motion is:

(a) Kinetic energy **(b)** Potential energy

(c) Chemical energy **(d)** None of these

41. The energy possessed by the body due to its position is:

(a) Kinetic energy **(b)** Potential energy

(c) Chemical energy **(d)** None of these

42. The expression for kinetic energy is:

(a) $K.E = \frac{1}{2}mv^2$ **(b)** $K.E = \frac{1}{2}m^2v$

(c) $K.E = mv^2$ **(d)** $K.E = \frac{1}{2}mv$

43. The expression for potential energy is:

(a) $P.E = mgh^2$ **(b)** $P.E = \frac{1}{2}mgh$

(c) $P.E = mgh$ **(d)** $P.E = m^2gh$

44. The unit of potential energy is same as that:

(a) Work **(b)** Force

(c) Momentum **(d)** Power

45. Work done is equal to:

(a) Change in K.E **(b)** Change in momentum

(c) Change in force **(d)** None of these

46. The SI unit of energy is:

(a) Watt **(b)** Newton

(c) Joule **(d)** J-s

47. Energy stored in the spring of a watch is:

(a) Kinetic energy **(b)** Elastic potential energy

(c) Chemical energy **(d)** Magnetic energy

48. What is the kinetic energy of 50 kg mass moving with a speed of 5 m/s is:

(a) 625 J **(b)** 526 J

(c) 652 J **(d)** 256 J

49. When the speed of the moving body is doubled then its:

(a) Kinetic energy is doubled **(b)** Potential energy is doubled

(c) Both (a) and (b) **(d)** None of these

50. A body of mass 5 kg moving with a velocity of 2 m/s then its K.E is:

(a) 20 J **(b)** 5 J

(c) 10 J **(d)** 15 J

51. The potential energy of an object on the surface of earth is:

(a) $\frac{1}{2}mv^2$ **(b)** mgh

(c) 2mg **(d)** Zero

52. The work done on a body from earth surface to infinity appears as:

(a) Elastic potential energy **(b)** Absolute P.E

(c) Zero P.E **(d)** Maximum P.E

53. The absolute P.E on the surface of earth is:

(a) Zero **(b)** $\frac{GMm}{R}$

(c) Maximum **(d)** mgh

54. Kinetic and potential energies are:

(a) Two forms of energies **(b)** Two forms of torque

(c) Not related with each other **(d)** None of these

55. The velocity of a body with which it goes out of the earth's gravitational field is called:

(a) Average velocity **(b)** Escape velocity

(c) Instantaneous velocity **(d)** Maximum velocity

56. The expression for escape velocity is:

(a) $\sqrt{gR}$ **(b)** $2g\sqrt{R}$

(c) $2\sqrt{gR}$ **(d)** $\sqrt{2gR}$

57. The value of escape velocity is:

(a) 1.1 km/s **(b)** 11 km/s

(c) 11 km/h **(d)** 1.1 km/h

58. When a body falls, its velocity increases due to action of:

(a) Gravity **(b)** Force of friction

(c) Momentum **(d)** Rotation

59. The loss of potential energy is equal to gain of kinetic energy, is true only if there is no:

(a) Net force **(b)** Friction

(c) Weight **(d)** Gravity

60. According to conservation of energy, the total amount of energy remains:

(a) Change **(b)** Constant

(c) Increases **(d)** Decreases

61. The absolute potential energy is measured from the:

(a) Centre of earth **(b)** Surface of earth

(c) Near to earth **(d)** Infinity

62. Formula of work-energy principle is of the form:

(a) $\text{Work} = \frac{1}{2}mv_f^2 - \frac{1}{2}mv_1^2$ **(b)** $\text{Work} = \frac{1}{2}mv_f^2 + \frac{1}{2}mv_i^2$

(c) $\text{Work} = \frac{1}{2}mv_f^2 \div \frac{1}{2}mv_i^2$ **(d)** None of these

63. Gravitational potential energy by convention is:

(a) Positive **(b)** Negative

(c) Both (a) and (b) **(d)** None of these

64. The formula for escape velocity of a planet $v_{es} = \sqrt{2gR}$ gives only approximate value since:

(a) Value of g is not constant **(b)** Mass of planet may also affect the escape velocity

(c) Radius of the planet **(d)** All of these

65. The value of g at the earths centre is:

(a) Minimum **(b)** Maximum

(c) Zero **(d)** None of these

66. Energy possessed by a body due to its special configuration is called:

(a) Electrostatic energy **(b)** Gravitational P.E

(c) Elastic P.E **(d)** None of these

67. P.E of any form increases only when we get:

(a) Against the force **(b)** In the direction of force

(c) Perpendicular to the force **(d)** None of these

68. Gravitational interaction between the earth and the moon serves as source of:

(a) Tidal energy **(b)** Mechanical energy

(c) Thermal energy **(d)** Gravitational energy

69. The energy of waves can be used to generate:

(a) Magnetic effect **(b)** Electricity

(c) Solar energy **(d)** Geothermal energy

70. The solar cells are also known as:

(a) Dry cell **(b)** Chemical cell

(c) Photovoltaic cell **(d)** Wet cell

71. What is the work done in kilo joules in lifting a man of 10 kg through a vertical height of 10 m:

(a) 9.8 kJ **(b)** 980 kJ

(c) 0.98 kJ **(d)** 98 kJ

72. Solar cells are made up from the material called:

(a) Steel **(b)** Carbon

(c) Iron **(d)** Silicon

73. A solar cell is a device which converts solar energy into:

(a) Mechanical energy **(b)** Heat energy

(c) Chemical energy **(d)** Electrical energy

74. The relation which takes place in nuclear reactor is a:

(a) Fission reaction **(b)** Chemical reaction

(c) Fusion reaction **(d)** None of these

75. The tidal energy is due to the gravitational pull of:

(a) Sun **(b)** Planet

(c) Mars **(d)** Moon

76. Absolute potential energy of the body at the earths surface is equal to:

(a) $U_m = \frac{GMe}{Re}$ **(b)** $U_m = \frac{GMem}{Re}$

(c) $U_m = \frac{GmMe}{Re}$ **(d)** None of these

77. The source of geothermal energy is:

(a) The fusion in sun **(b)** The radioactive decay in the earths interior

(c) The rotation of earth around sun **(d)** None of these

78. 25000 watts power is equal to:

(a) 2.6 kilowatt **(b)** 25 h-p

(c) 50 h-p **(d)** 35.5 hp

79. Which one is the biggest unit of energy:

(a) Erg **(b)** Joule

(c) Kilowatt hour **(d)** Watt hour

80. The power of a machine is one kilowatt when work is done by it at the rate:

(a) 1000 J/min **(b)** 500 J/s

(c) 500 J/min **(d)** 1000 J/s

81. If a body of mass 5 kg is raised vertically through a distance of 1 m then the work done is:

(a) 49.0 J **(b)** 4.9 J

(c) 0.49 J **(d)** 490 J

82. Geyser derives its energy from the:

(a) Jupitter **(b)** Sun

(c) Snow **(d)** Earth

83. Geysers usually occurs in:

(a) Hot regions **(b)** Cold regions

(c) Volcanic regions **(d)** None of these

84. The energy stored in a dam is:

(a) Kinetic energy **(b)** Potential energy

(c) Chemical energy **(d)** Electrical energy

85. Ethanol is the replacement of:

(a) Kerosene oil **(b)** Gas oil

(c) Gasoline oil **(d)** Refinery oil

86. The process of getting energy by direct combustion method from the waste products is commonly known as:

(a) Liquid waste **(b)** Solid waste

(c) Gaseous waste **(d)** All of these

87. Biomass is a potential source of:

(a) Non-renewable energy source **(b)** Renewable energy source

(c) Both (a) and (b) **(d)** None of these

88. Earth receives huge amount of energy directly from:

(a) Moon **(b)** Wind

(c) Water **(d)** Sun

89. Tidal energy and wind energy is used to generate:

(a) Electric field **(b)** Magnetic field

(c) Friction **(d)** Electricity

90. The methods used to convert biomass into fuels are:

(a) Direct combustion **(b)** Fermentation

(c) Both (a) and (b) **(d)** None of these

91. Which of the following is non-renewable source of energy:

(a) Wind **(b)** Biomass

(c) Coal **(d)** None of these

92. Which of the following is renewable source of energy:

(a) Sunlight **(b)** Natural gas

(c) Oil **(d)** None of these

93. One dyne is equal to:

(a) 10^3 N **(b)** 10^5 N

(c) 10^{-5} N **(d)** 10^{-3} N

94. A body of mass 5 kg, initially at rest, is moved by a force of 2 N on smooth horizontal surface. The work done by the force in 10 s is:

(a) 20 J **(b)** 30 J

(c) 40 J **(d)** 60 J

95. The kinetic energy of a body of mass m is E. Its momentum is:

(a) $\sqrt{2mE}$ **(b)** 2mE

(c) $\sqrt{\frac{mE}{2}}$ **(d)** $\frac{2E}{m}$

96. The time taken by an engine of power 10 kw to lift a mass of 200 kg to a height of 40 m is:

(a) 2 sec. **(b)** 4 sec.

(c) 8 sec. **(d)** 16 sec.

97. The decrease in the potential energy of a ball of mass 20 kg which falls from a height of 50 cm is:

(a) 968 J **(b)** 98 J

(c) 1980 J **(d)** None

98. A body of mass 2 kg is thrown up vertically with a K.E of 490 J. If g = 9.8 ms^{-2} the height at which the kinetic energy becomes half its original value.

(a) 10 m **(b)** 12.5 m

(c) 25 m **(d)** 50 m

99. The K.E of a body of mass 2 kg and momentum 2 Ns is:

(a) 1 J **(b)** 2 J

(c) 3 J **(d)** 4 J

100. The momentum of particle is numerically equal to its K.E. What is the velocity of the particle?

(a) 9 ms^{-1} **(b)** 3 ms^{-1}

(c) 2 ms^{-1} **(d)** 1 ms^{-1}

101. Which of the following is not a conservative force?

(a) Electric force **(b)** Elastic spring force

(c) Frictional force **(d)** Gravitational force

102. One erg is equal to:

(a) 10^5 J **(b)** 10^7 J

(c) 10^{-5} J **(d)** 10^{-7} J

103. If moon's radius is 1600 km and 'g' on its surface is 1.6 ms^{-2} then the escape velocity on the moon is:

(a) 1600 ms^{-1} **(b)** 50.6 ms^{-1}

(c) 50.8 ms^{-1} **(d)** 2263 ms^{-1}

104. A body of mass 3 kg lies on the surface of the table 2 m high. It is moved on the surface by 4 m. The change of P.E. will be:

(a) Zero **(b)** 9.8 J

(c) 19.6 J **(d)** 329 J

105. The escape velocity of a body depends upon:

(a) The mass of the body **(b)** The mass of the planet

(c) Density of the planet **(d)** Volume of the planet

106. If a power of 1 kw is maintained for 1 second then work done is equal to:

(a) 10^3 J **(b)** 10^5 J

(c) 3.6×10^6 J **(d)** 3.6×10^5 J

107. Energy required to accelerate a car from 10 ms^{-1} to 20 ms^{-1} compared with that required to accelerate from 0 to 10 ms^{-1} is:

(a) Twice **(b)** Three times

(c) Four times **(d)** Same

108. Ratio of dimensions of power and K.E is:

(a) 1 : 1 **(b)** T : 1

(c) 1 : T **(d)** M : T

109. How large a force is required to accelerate a body of weight 5 N with 4 ms^{-2} is:

(a) 10 N **(b)** 5 N

(c) 2 N **(d)** 1 N

110. Which of the following is not a biomass?

(a) Crop residuce **(b)** Animal dung

(c) Coal **(d)** Sewage

111. A child on a swing is 1 m above the ground at the lowest point and 6 m above the ground at the highest point. The horizontal speed of the child at the lowest point of the swing is approximately.

(a) 8 ms^{-1} **(b)** 10 ms^{-1}

(c) 12 ms^{-1} **(d)** 14 ms^{-1}

ANSWERS

1.	(b)	**2.**	(a)	**3.**	(c)	**4.**	(d)
5.	(a)	**6.**	(b)	**7.**	(b)	**8.**	(c)
9.	(c)	**10.**	(a)	**11.**	(b)	**12.**	(a)
13.	(b)	**14.**	(b)	**15.**	(d)	**16.**	(a)
17.	(b)	**18.**	(a)	**19.**	(b)	**20.**	(d)
21.	(a)	**22.**	(b)	**23.**	(c)	**24.**	(d)
25.	(a)	**26.**	(c)	**27.**	(a)	**28.**	(c)
29.	(b)	**30.**	(a)	**31.**	(d)	**32.**	(c)
33.	(c)	**34.**	(a)	**35.**	(a)	**36.**	(b)
37.	(d)	**38.**	(c)	**39.**	(b)	**40.**	(a)
41.	(b)	**42.**	(a)	**43.**	(c)	**44.**	(a)
45.	(a)	**46.**	(c)	**47.**	(b)	**48.**	(a)
49.	(a)	**50.**	(c)	**51.**	(d)	**52.**	(b)
53.	(b)	**54.**	(a)	**55.**	(b)	**56.**	(d)
57.	(b)	**58.**	(a)	**59.**	(b)	**60.**	(b)
61.	(a)	**62.**	(a)	**63.**	(b)	**64.**	(d)
65.	(c)	**66.**	(c)	**67.**	(a)	**68.**	(a)
69.	(b)	**70.**	(c)	**71.**	(c)	**72.**	(d)
73.	(d)	**74.**	(a)	**75.**	(d)	**76.**	(b)
77.	(b)	**78.**	(d)	**79.**	(c)	**80.**	(d)
81.	(a)	**82.**	(d)	**83.**	(c)	**84.**	(b)
85.	(c)	**86.**	(b)	**87.**	(b)	**88.**	(d)
89.	(d)	**90.**	(c)	**91.**	(c)	**92.**	(a)
93.	(b)	**94.**	(c)	**95.**	(a)	**96.**	(c)
97.	(b)	**98.**	(c)	**99.**	(a)	**100.**	(c)
101.	(c)	**102.**	(d)	**103.**	(d)	**104.**	(a)
105.	(b)	**106.**	(c)	**107.**	(d)	**108.**	(c)
109.	(c)	**110.**	(c)	**111.**	(b)		

CIRCULAR MOTION

Each question has four possible answers, encircled the correct answer:

1. When a body is moving along a circular path, it covers a certain angle in given time. Such a type of motion is called:

(a) Linear motion **(b)** Angular motion

(c) Vibratory motion **(d)** Rotatory motion

2. When a body moves in such a way that its distance from the mean position remains constant is called:

(a) Linear motion **(b)** Circular motion

(c) Vibratory motion **(d)** Rotatory motion

3. The angle through which a body moves is called:

(a) Angular displacement **(b)** Angular velocity

(c) Angular acceleration **(d)** None of these

4. The SI unit of angular displacement is:

(a) Metre **(b)** Kilometre

(c) Radian **(d)** None of these

5. The angle subtended at the center of a circle by an arc equal to its radius is called:

(a) One radian **(b)** One degree

(c) One rotation **(d)** None of these

6. One radian is equal to:

(a) 47.3° **(b)** 57.3°

(c) 67.3° **(d)** 59.3°

7. The linear acceleration of bodies moving in circular path is:

(a) Constant **(b)** Negative

(c) Positive **(d)** Zero

8. The angular displacement is assign positive sign when the rotation is:

(a) Clockwise **(b)** Anti-clock wise

(c) Perpendicular **(d)** Parallel

9. The direction associated with angular displacement is given by:

(a) Left hand rule **(b)** Head to tail rule

(c) Right hand rule **(d)** None of these

10. Angular displacement is a:

(a) Scalar **(b)** Vector

(c) Neither scalar nor vector **(d)** None of these

11. Radian is defined as the angle subtended at the center of a circle by an:

(a) Arc whose length equal to radius of circle

(b) Arc whose length less than radius of circle

(c) Arc whose length greater than radius of circle

(d) None of these

12. Which one is the correct relation for angular displacement θ, radius r and length of arc S is:

(a) $S = r\theta$ **(b)** $\frac{S}{r} = \theta$

(c) $Sr = \theta$ **(d)** $S\theta = r$

13. The rate of change of angular displacement is called:

(a) Angular speed **(b)** Angular acceleration

(c) Angular velocity **(d)** None of these

14. Angular velocity is a:

(a) Scalar **(b)** Vector

(c) Neither scalar nor vector **(d)** None of these

15. The direction of angular velocity of a body moving in a circle is:

(a) Towards the axis of rotation **(b)** Away from the axis of rotation

(c) Along the axis of rotation **(d)** None of these

16. Average angular velocity is defined by the relation:

(a) $< \omega > = \theta t$ **(b)** $< \omega > = \frac{\theta}{t}$

(c) $< \omega > = \frac{t}{\theta}$ **(d)** $< \omega > = \frac{\theta^2}{t}$

17. When an object moves in a circle, the angle between angular velocity ω and linear velocity v is:

(a) 90° **(b)** 0°

(c) 45° **(d)** 60°

18. The angular velocity at any instant is called:

(a) Instantaneous angular velocity **(b)** Instantaneous angular speed

(c) Instantaneous angular displacement **(d)** None of these

19. If a particle moves in a circle of radius r with uniform angular velocity ω then the angle between radius r and linear velocity v is:

(a) 45° **(b)** 90°

(c) 60° **(d)** 180°

20. The rate of change of angular velocity is called:

(a) Angular velocity **(b)** Angular acceleration

(c) Angular displacement **(d)** None of these

21. SI unit of angular acceleration is:

(a) rad/s^2 **(b)** rad/s

(c) $rad.s^2$ **(d)** rad.s

22. The relation between linear acceleration and angular acceleration is:

(a) $\vec{\alpha} = \vec{a} \times \vec{r}$ **(b)** $\vec{a} = \vec{r} \times \vec{\alpha}$

(c) $\vec{r} = \vec{a} \times \vec{\alpha}$ **(d)** $\vec{a} = \vec{\alpha} \times \vec{r}$

23. The dimensions of angular acceleration are:

(a) $[LT^{-2}]$ **(b)** $[T^{-2}]$

(c) $[LT^{-1}]$ **(d)** $[T^{-3}]$

24. The relation between linear velocity and angular velocity is:

(a) $\vec{v} = \vec{r} \times \vec{\omega}$ **(b)** $\vec{v} = \vec{\omega} \times \vec{r}$

(c) $\vec{\omega} = \vec{v} \times \vec{r}$ **(d)** $\vec{r} = \vec{v} \times \vec{\omega}$

25. The dimensions of angular velocity are:

(a) $[LT^{-1}]$ **(b)** [LT]

(c) $[LT^{-2}]$ **(d)** $[T^{-1}]$

26. If a rotating body is moving anti-clockwise, the direction of angular velocity is:

(a) Towards the centre **(b)** Along the linear velocity

(c) Away from the centre **(d)** Perpendicular to both radius and linear velocity

27. Angular acceleration is produced due to:

(a) Centripetal force **(b)** Torque

(c) Force **(d)** None of these

28. The period of circular motion is given by:

(a) $T = \frac{2\pi}{\omega}$ **(b)** $T = \frac{\omega}{2\pi}$

(c) $T = 2\pi\omega$ **(d)** None of these

29. The force needed to bend the normally straight path of particle into a circular path is called:

(a) Inertia **(b)** Torque

(c) Centripetal force **(d)** None of these

30. When a body is moving in a circle of radius r with constant linear velocity v, its centripetal force is:

(a) $\frac{mv^2}{r}$ **(b)** $\frac{m^2v}{r}$

(c) $\frac{mv}{r^2}$ **(d)** None of these

31. When a body moves in a circle of radius r with angular speed ω, its centripetal force is:

(a) $\frac{m\omega}{r}$ **(b)** $mr\omega^2$

(c) $\frac{mr}{\omega^2}$ **(d)** $\frac{m\omega^2}{r}$

32. A body is moving in a circle of radius r with constant speed v, its centripetal acceleration is:

(a) $\frac{v^2}{r}$ **(b)** v^2r

(c) $\frac{r}{v^2}$ **(d)** $\frac{v}{r}$

33. A body is moving in a circle of radius r with constant angular velocity ω, its centripetal acceleration is:

(a) $\frac{\omega}{r}$ **(b)** ωr

(c) $\omega^2 r$ **(d)** ωr^2

34. The force required to keep a body into a circle is called:

(a) Centrifugal force **(b)** Centripetal force

(c) Gravitational force **(d)** None of these

35. A body is moving in a circle at constant speed. Which of the following statement is correct:

(a) There is no force acting away from the centre of the circle

(b) There is no force acting towards the centre of the circle

(c) There is no acceleration

(d) None of these

36. The vectorial form of centripetal force is:

(a) $-m\omega^2\vec{r}$ **(b)** $m\omega^2\vec{r}$

(c) $-m\omega\vec{r}$ **(d)** $m^2\omega\vec{r}$

37. An object is traveling in a circle with constant speed. Its acceleration is constant in:

(a) Direction only **(b)** Magnitude only

(c) Both magnitude and direction **(d)** None of these

38. A body of mass 4 kg moves along a circle of radius 2m with a constant speed of 4 m/s. The centripetal force is:

(a) 32 N **(b)** 16 N

(c) 20 N **(d)** 64 N

39. In case of planets, the necessary acceleration is provided by:

(a) Coulombs force **(b)** Centripetal force

(c) Gravitation force **(d)** None of these

40. The necessary centripetal force to the moving car round a corner track is provided by:

(a) Centrifugal force **(b)** Gravitational force

(c) Coulombs force **(d)** Frictional force

41. The mud flies off the tyre of a moving bicycle in the direction of:

(a) Towards the centre **(b)** Tangent to the tyre

(c) Along the radius **(d)** Along the motion

42. The angular momentum is defined as:

(a) $\vec{L} = m\vec{v}$ **(b)** $\vec{L} = \vec{r} \times \vec{F}$

(c) $\vec{L} = \vec{r} \times \vec{P}$ **(d)** $\vec{L} = \vec{P} \times \vec{r}$

43. The SI unit of angular momentum is:

(a) kg m^2/s **(b)** kg m^2/s^2

(c) kg^2 m/s **(d)** kg m/s

44. The dimensions of angular momentum $\vec{L}$ are:

(a) $[M^2LT^{-1}]$ **(b)** $[M^2L^2T]$

(c) $[ML^2T^2]$ **(d)** $[ML^2T^{-2}]$

45. Angular momentum of a body under central force is:

(a) Minimum **(b)** Zero

(c) Maximum **(d)** Constant

46. A body rotating in a circle of radius 1 m with an angular speed 10 rad/s has the tangential velocity:

(a) 2 m/s **(b)** 5 m/s

(c) 10 m/s **(d)** 15 m/s

47. The rate of change of angular momentum of a body is:

(a) The applied torque **(b)** The applied force

(c) Both (a) and (b) **(d)** None of these

48. Angular momentum is conserved under:

(a) Variable force **(b)** Constant force

(c) Central force **(d)** None of these

49. The direction of angular momentum $\vec{L}$ is:

(a) Along the direction of $\vec{P}$

(b) Along the direction $\vec{r}$

(c) Parallel to the plane containing $\vec{r}$ and $\vec{P}$

(d) Perpendicular to the plane containing $\vec{r}$ and $\vec{P}$

50. The angular momentum of a body about a fixed point is conserved if its velocity:

(a) Increases **(b)** Decreases

(c) Constant **(d)** None of these

51. Angular momentum of a rigid body is equal to:

(a) $I\omega$ **(b)** $I\alpha$

(c) $\frac{1}{2} I\omega$ **(d)** $\frac{1}{2} I^2\omega$

52. In rotational motion, the quantity which plays the same role as the inertial mass in term of linear motion is known as:

(a) Angular momentum **(b)** Linear momentum

(c) Momentum of inertia **(d)** Torque

53. The value of angular momentum is maximum when θ is:

(a) 60° **(b)** 45°

(c) 0° **(d)** 90°

54. The angular momentum $\vec{L}$ in terms of angular velocity ω is equal to:

(a) $mr^2\omega$ **(b)** $m^2r\omega$

(c) $mr\omega^2$ **(d)** $m^2r^2\omega^2$

55. The product of the mass m of the rotating body and the square of radius of gyration is called:

(a) Moment of inertia **(b)** Torque

(c) Linear momentum **(d)** None of these

56. Mathematically moment of inertia is equal to:

(a) $I = mr^2$ **(b)** $I = mr$

(c) $I = m^2r$ **(d)** $I = m^2r^2$

57. The moment of inertia depends upon:

(a) Angular momentum

(b) Mass of the body and its angular speed

(c) Mass of the body and its radius

(d) Mass as well as its distribution with respect to axis of rotation

58. Moment of inertia of a thin rod about mid length is:

(a) $I = \frac{1}{12} mL^2$ **(b)** $I = \frac{2}{5} mr^2$

(c) $I = \frac{1}{3} mr^2$ **(d)** $I = \frac{1}{2} mr^2$

59. Moment of inertia of a hoop about its axis is:

(a) $I = \frac{1}{3} mr^2$ **(b)** $I = \frac{1}{2} mr^2$

(c) $I = \frac{2}{3} mr^2$ **(d)** $I = \frac{2}{5} mr^2$

60. The moment of inertia of a body comes in action in:

(a) Circular motion **(b)** Straight line motion

(c) Curved path **(d)** None of these

61. The SI unit of angular momentum is:

(a) kgm^3 **(b)** kgm

(c) kgm^2 **(d)** kgm^{-2}

62. The physical quantity which plays the same part in angular motion as mass does in linear motion is called:

(a) Moment of inertia **(b)** Momentum

(c) Torque **(d)** None of these

63. The physical quantity which produces angular acceleration is known as:

(a) Force **(b)** Torque

(c) Inertia **(d)** None of these

64. Moment of inertia of a solid disc about its axis is:

(a) $\frac{1}{2}mr^2$ **(b)** $\frac{2}{5}mr^3$

(c) $\frac{2}{3}mr^2$ **(d)** $\frac{1}{3}mr^2$

65. Moment of inertia of a sphere is:

(a) $\frac{1}{2}mr^2$ **(b)** $\frac{2}{5}mr^3$

(c) $\frac{2}{5}mr^2$ **(d)** $\frac{1}{3}mr^2$

66. The dimensions of moment of inertia are:

(a) $[ML^2]$ **(b)** $[ML^{-2}]$

(c) $[ML^{-1}]$ **(d)** $[M^2L]$

67. The force and torque are analogues to:

(a) Each other **(b)** Moment of inertia

(c) Velocity **(d)** None of these

68. The total weight of the body acts at:

(a) its center of gravity **(b)** its centre

(c) its one end **(d)** its other end

69. The center of gravity is also called:

(a) Centre of body **(b)** Centre of mass

(c) Both (a) and (b) **(d)** None of these

70. The acceleration due to gravity:

(a) Same value at every place **(b)** Same value everywhere on the surface of earth

(c) Varies with altitude **(d)** None of these

71. The value of 'g' at the center of the Earth is:

(a) Infinite **(b)** Double

(c) Zero **(d)** None of these

72. Law of conservation of angular momentum states that if no ———— acts on a system, the total angular momentum of the system remains constant:

(a) External torque **(b)** External couple

(c) External force **(d)** None of these

73. The axis of rotation of a body will not change its orientation unless an external ———— causes it to do so:

(a) Force **(b)** Torque

(c) Work **(d)** Energy

74. A cricketer spins the ball before bowling to:

(a) Give it downward deflection **(b)** Give it upward deflection

(c) Keep it straight **(d)** None of these

75. An elevator is accelerated downward with acceleration a, the apparent weight of a body of mass m in it will be:

(a) m(a – g) **(b)** m(g + a)

(c) m(g – a) **(d)** mg

76. An elevator is accelerated upward with acceleration a, the apparent weight of a body of mass m in it will be:

(a) m(a – g) **(b)** m(a + g)

(c) m(g – a) **(d)** mg

77. If the rope of an elevator moving downward with acceleration a breaks, the apparent weight of a body of mass m in it will be:

(a) m(a – g) **(b)** m(a + g)

(c) m(g – a) **(d)** Zero

78. The K.E of a disc of mass m rolling down on an included plane is:

(a) $\frac{1}{2}mv^2$ **(b)** $\frac{1}{4}mv^2$

(c) $\frac{3}{4}mv^2$ **(d)** None of these

79. The rotation K.E of any hoop of radius r is given by:

(a) $\frac{1}{2}mr^2\omega^2$ **(b)** $\frac{1}{2}r\omega^2$

(c) $\frac{1}{2}r^2\omega^2$ **(d)** None of these

80. Suppose a body of cylindrical shape is called down on an inclined plane of height h. It contains:

(a) Translation K.E **(b)** Rotational K.E

(c) Both (a) and (b) **(d)** None of these

81. Speed of hoop at the bottom can be given by:

(a) $v = \sqrt{gh}$ **(b)** $v = \sqrt{2gh}$

(c) $v = \sqrt{\frac{3}{4}gh}$ **(d)** None of these

82. Orbital velocity of a satellite orbiting closer to the planet is given by:

(a) $v = \sqrt{\frac{GM}{R}}$ **(b)** $v = \sqrt{\frac{GMm}{R}}$

(c) $v = \sqrt{gR}$ **(d)** None of these

83. If the earth stops rotating weight of a body on the equator:

(a) Increases **(b)** Remains constant

(c) Decreases **(d)** None of these

84. A body becomes weightless:

(a) Spaceship orbiting the earth **(b)** Outside the field free region

(c) On the earth's centre **(d)** All of above

85. The axis of rotation of a rotating body in the absence of external torque:

(a) Continuously changes **(b)** Remain fixed in direction

(c) Both (a) and (b) **(d)** None of these

86. The number of satellite included in the Global positioning system is:

(a) 20 **(b)** 48

(c) 24 **(d)** None of these

87. Orbital speed of a satellite at large enough height h above the earth's surface is:

(a) $\sqrt{gR}$ **(b)** $\sqrt{\frac{GM}{R+h}}$

(c) $\sqrt{\frac{GM}{R}}$ **(d)** None of these

88. In a spaceship orbiting the earth, the apparent weight of the body in it is:

(a) Less than its real weight **(b)** Greater than its real weight

(c) Weightlessness **(d)** None of these

89. One communication satellite covers:

(a) 240 longitudinal lines **(b)** 360 longitudinal lines

(c) 120 longitudinal lines **(d)** None of these

90. International telecommunication in satellite organization (INTELSAT):

(a) Operates at microwave frequency 4.611 and 149 Hz

(b) Has capability of 30,000 two-way telephone circuits

(c) Provides facility of three T.V channels

(d) All of above

91. Height of the closest orbit of the satellite above the earth is:

(a) 300 km **(b)** 250 km

(c) 500 km **(d)** 400 km

92. Radius of the geo-stationary orbit from the earths center is:

(a) 4.24×10^4 km **(b)** 3.23×10^4 km

(c) 4.23×10^3 km **(d)** None of these

93. Height of geo-stationary satellite above the equator is:

(a) 40,000 km **(b)** 24,000 km

(c) 30,000 km **(d)** 36,000 km

94. Entire populated earth, surface is covered by:

(a) Four **(b)** Three

(c) Two **(d)** None of these

95. The geo-stationary satellite are used for:

(a) World communications **(b)** Weather observations

(c) Navigation **(d)** All of above

96. Einstein theory was considered as a:

(a) Scientific trump **(b)** Simple trump

(c) Natural trump **(d)** None of these

97. Which theory of gravitation is better:

(a) Newton **(b)** Einstein

(c) Compton **(d)** Plank

98. The time period T of the artificial satellite is given by:

(a) $T = \frac{2\pi v}{R}$ **(b)** $T = \frac{2v}{\pi R}$

(c) $T = \frac{2\pi R}{v}$ **(d)** None of these

99. $1° =$ ———— radian.

(a) 0.01745 **(b)** 57

(c) 0.1745 **(d)** 0.2

100. If $r = 1$ m and $\theta = 1°$ then what is value of S:

(a) 0.01745 m **(b)** 1 m

(c) 2 m **(d)** None

101. Dimensions of angular velocity:

(a) $[LT^{-1}]$ **(b)** $[T^{-1}]$

(c) [LT] **(d)** None

102. An electric fan rotating at 3 rev/s is switched off. It comes to rest in 18 s. Assuming deceleration to be uniform. What is its value?

(a) $0.167\ rev/s^2$ **(b)** $-0.167\ rev/s^2$

(c) $-0.176\ rev/s^2$ **(d)** $0.176\ rev/s^2$

103. Unit of moment of inertia is:

(a) kg/m^2 **(b)** $kg\ m^2$

(c) gm^2 **(d)** $kg\ cm^2$

104. The product of linear momentum and moment arm for momentum is called:

(a) Momentum **(b)** Angular momentum

(c) Torque **(d)** Moment of inertia

105. The axis of rotation of an object will not change its orientation unless an external ———— causes it to do so.

(a) Force **(b)** Torque

(c) Both (a), (b) **(d)** None

106. Moment of inertia of a thin rod of mass 'm' and length 'L' is:

(a) $\frac{2}{5}mL^2$ **(b)** $\frac{1}{12}mL^2$

(c) $\frac{1}{12}mL$ **(d)** $\frac{1}{12}m^2L$

107. If an artificial satellite move with 30000 km/h then it follow:

(a) Circular orbit **(b)** Elliptical orbit

(c) Escape **(d)** None of these

108. Global positioning system can be formed by ———— artificial satellites.

(a) 22 **(b)** 42

(c) 3 **(d)** 24

109. When the lift is moving upwards with an acceleration $\vec{a}$ then weight of the object appears to be ———— than real weight.

(a) Less **(b)** More

(c) No change **(d)** None

110. If distance between satellite and centre of Earth is 2R then orbital velocity of satellite:

(a) $\sqrt{2gR}$ **(b)** $\sqrt{\frac{gR}{2}}$

(c) $\sqrt{\frac{GM}{r}}$ **(d)** None of these

111. To create artificial gravity spaceship rotates with frequency:

(a) $2\pi\sqrt{\frac{g}{R}}$ **(b)** $\frac{1}{2\pi}\sqrt{\frac{R}{g}}$

(c) $\frac{1}{2\pi}\sqrt{\frac{g}{R}}$ **(d)** All

112. The Earth rotates on its axis once a day. Suppose by some process the Earth contracts so that its radius is only half as large as at present. The Earth would complete its rotation in:

(a) 24 h **(b)** 6 h

(c) 12 h **(d)** 18 h

113. The minute hand of a large clock is 3.0 m long. What is its mean angular speed?

(a) 1.4×10^{-4} rad s^{-1} **(b)** 1.7×10^{-3} rad s^{-1}

(c) 5.2×10^{-3} rad s^{-1} **(d)** 1.0×10^{-1} rad s^{-1}

114. When an aircraft is moving in a horizontal plane at a constant speed of 650 ms^{-1}, its turning circle has a radius of 80 km. What is the ratio of the centripetal force to the weight of the aircraft?

(a) 8.3×10^{-4} **(b)** 0.54

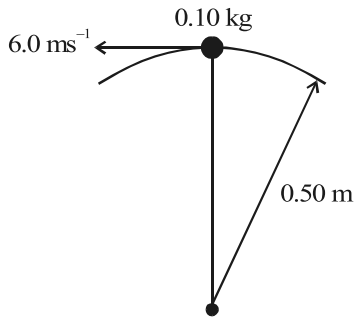
(c) 1.9 **(d)** 52

115. An object travels at constant speed around a circle of radius 1.0 m in 1.0 s. What is the magnitude of its acceleration?

(a) Zero **(b)** 1.0 ms^{-2}

(c) 2π ms^{-2} **(d)** $4\pi^2$ ms^{-2}

116. A ball of mass 0.10 kg is attached to a string and swung in a vertical circle of radius 0.50 m, as shown. Its speed at the top of the circle is 6.0 ms^{-1}. (Take g as 10 ms^{-2})



What is the tension in the string at this moment?

(a) 1.0 N **(b)** 6.2 N

(c) 7.2 N **(d)** 8.2 N

117. An object on the end of a spring oscillates with simple harmonic motion of angular frequency 2.0 rad s^{-1}. What is the period of the oscillation?

(a) 0.080 s **(b)** 0.32 s

(c) 0.50 s **(d)** 3.1 s

118. An object is travelling in a circle of radius r with angular velocity ω and speed v. Which expression gives the centripetal acceleration?

(a) rω **(b)** vω

(c) v/r **(d)** v/r^2

119. When brakes of a car are applied, angular velocity of a flywheel reduces from 900 cycle/min. to 720 cycle/min. in 6sec. Angular retardation is:

(a) π rad/s^2 **(b)** 9π rad/s^2

(c) 8π rad/s^2 **(d)** None of these

120. A motor operates at 20 rev/s. What is power delivered by it? If it supply a torque of 75 Nm:

(a) 75 W **(b)** 85 W

(c) 90 W **(d)** 9.4×10^3 W

121. A wheel starts from rest and gets a rotational speed of 240 rev/s in time 2 min. Its average acceleration will be:

(a) 1 rev/s^2 **(b)** 2 rev/s^2

(c) 5 rev/s^2 **(d)** 8 rev/s^2

122. Ratio of magnitude of angular velocity of hour hand of a watch to that of earth's rotation about its own axis is:

(a) 3 : 1 **(b)** 1 : 3

(c) 2 : 1 **(d)** 1 : 4

123. If a solid sphere rolls on a horizontal surface, the ratio of its rotational K.E. to its total K.E. is:

(a) 1 : 3 **(b)** 2 : 7

(c) 7 : 3 **(d)** None of these

124. A solid cylinder rolls down an inclined plane of height 1 m in 10 s. Its acceleration is:

(a) 0.3 m/s^2 **(b)** 0.7 m/s^2

(c) 5 m/s^2 **(d)** 1 m/s^2

125. A particle of mass m tied to a string of length l is rotating in a circular path with constant speed v. Torque on it is:

(a) Zero **(b)** mv$l$

(c) $\frac{mv}{l}$ **(d)** $\frac{mv^2}{l}$

126. A motor runs at 20 rev/s and supplies a torque of 75 Nm. Power delivered by it is:

(a) 6.12 hp **(b)** 12.6 hp

(c) 7.3 hp **(d)** 8.3 hp

127. A body is executing uniform circular motion. Its angular acceleration is:

(a) 2 **(b)** 4

(c) Zero **(d)** None of these

ANSWERS

1.	(b)	**2.**	(b)	**3.**	(a)	**4.**	(c)
5.	(a)	**6.**	(b)	**7.**	(d)	**8.**	(b)
9.	(c)	**10.**	(b)	**11.**	(a)	**12.**	(a)
13.	(c)	**14.**	(b)	**15.**	(c)	**16.**	(b)
17.	(a)	**18.**	(a)	**19.**	(b)	**20.**	(b)
21.	(a)	**22.**	(d)	**23.**	(b)	**24.**	(a)
25.	(d)	**26.**	(d)	**27.**	(b)	**28.**	(a)
29.	(c)	**30.**	(a)	**31.**	(b)	**32.**	(a)
33.	(c)	**34.**	(b)	**35.**	(b)	**36.**	(b)
37.	(b)	**38.**	(a)	**39.**	(c)	**40.**	(d)
41.	(b)	**42.**	(c)	**43.**	(a)	**44.**	(d)
45.	(d)	**46.**	(c)	**47.**	(a)	**48.**	(c)
49.	(d)	**50.**	(b)	**51.**	(a)	**52.**	(c)
53.	(d)	**54.**	(a)	**55.**	(a)	**56.**	(a)
57.	(d)	**58.**	(a)	**59.**	(b)	**60.**	(a)
61.	(c)	**62.**	(a)	**63.**	(b)	**64.**	(a)
65.	(c)	**66.**	(a)	**67.**	(a)	**68.**	(a)
69.	(b)	**70.**	(c)	**71.**	(c)	**72.**	(c)
73.	(b)	**74.**	(b)	**75.**	(c)	**76.**	(b)
77.	(d)	**78.**	(b)	**79.**	(a)	**80.**	(c)
81.	(a)	**82.**	(c)	**83.**	(c)	**84.**	(d)
85.	(b)	**86.**	(c)	**87.**	(b)	**88.**	(c)
89.	(c)	**90.**	(d)	**91.**	(d)	**92.**	(a)
93.	(d)	**94.**	(b)	**95.**	(d)	**96.**	(a)
97.	(b)	**98.**	(c)	**99.**	(a)	**100.**	(a)
101.	(b)	**102.**	(b)	**103.**	(b)	**104.**	(b)
105.	(b)	**106.**	(b)	**107.**	(a)	**108.**	(d)
109.	(b)	**110.**	(b)	**111.**	(c)	**112.**	(b)
113.	(b)	**114.**	(b)	**115.**	(d)	**116.**	(b)
117.	(d)	**118.**	(b)	**119.**	(a)	**120.**	(d)
121.	(b)	**122.**	(c)	**123.**	(c)	**124.**	(a)
125.	(a)	**126.**	(b)	**127.**	(c)		

FLUID DYNAMICS

Each question has four possible answers, encircled the correct answer:

1. The fractional effect between different layers of a flowing fluid is called:

(a) Viscosity of the fluid **(b)** Velocity of the fluid

(c) Displacement of the fluid **(d)** Acceleration of the fluid

2. The force required to slide one layer of the liquid over another layer is measured by:

(a) Acceleration **(b)** Viscosity

(c) Momentum **(d)** Velocity

3. An object moving through a fluid experience a retarding force is called:

(a) Centripetal force **(b)** Horizontal force

(c) Drag force **(d)** Gravitational force

4. The study of the properties of fluid at rest is called:

(a) Viscosity **(b)** Fluid dynamic

(c) Fluid static **(d)** Friction

5. The study of properties of fluids in motion is called:

(a) Viscosity **(b)** Fluid dynamics

(c) Fluid static **(d)** Friction

6. Drag force between two layers under consideration depends upon:

(a) Distance between the layers **(b)** Relative velocity

(c) Surface area of layer **(d)** All of these

7. The drag force between different layers of the liquid is given by:

(a) $F_d = 6\pi\eta rv$ **(b)** $F_d = \dfrac{6\pi\eta}{rv}$

(c) $F_d = \dfrac{6\pi\eta r}{v}$ **(d)** None of these

8. Stoke's law holds for:

(a) Cylindrical bodies **(b)** Cubical bodies

(c) Spherical bodies **(d)** None of these

9. According to Stoke's law, drag force depends on:

(a) Coefficient of viscosity **(b)** Terminal velocity

(c) Radius of the spherical body **(d)** All of these

10. The drag force increases as the speed of particle:

(a) Increases **(b)** Decreases

(c) Remains constant **(d)** None of these

11. The drag force F_d on a sphere of radius r moving slowly with speed v through the fluid of viscosity η is given by:

(a) $4\pi\eta rv$ **(b)** $6\pi\eta rv$

(c) $2\pi\eta rv$ **(d)** $3\pi\eta rv$

12. The word fluid means:

(a) To fall **(b)** To rise

(c) To flow **(d)** None of these

13. Stokes law obey only:

(a) Ideal fluid **(b)** Viscous fluid

(c) Perfect fluid **(d)** Non-ideal fluid

14. ☟ The formula $F_d = 6\pi\eta rv$ is derived by:

(a) Einstein **(b)** Newton

(c) Sadi Carnot **(d)** Stoke

15. Due to increase in temperature, the viscosity of the fluid:

(a) Increases **(b)** Decreases

(c) Remains constant **(d)** Becomes double

16. The dimensions of coefficient of viscosity are:

(a) $[ML^{-1}T^{-2}]$ **(b)** $[ML^{2}T^{-1}]$

(c) $[ML^{-1}T^{-1}]$ **(d)** None of these

17. Viscosity of the gases with rise in temp:

(a) Increases **(b)** Decreases

(c) Remains constant **(d)** None of these

18. ☟ Which one of the following is most viscous:

(a) Glycerine **(b)** Coal Tar

(c) Honey **(d)** None of these

19. ☟ The SI unit of coefficient of viscosity is:

(a) $kg\ m^{-1}s^{-1}$ **(b)** Nm^2s^2

(c) $kg\ m^2s^{-2}$ **(d)** $kg\ ms^{-2}$

20. Internal friction of a fluid is called:

(a) Surface tension **(b)** Resistance

(c) Viscosity **(d)** None of these

21. When the magnitude of the drag force becomes equal to the weight, the net force acting on the droplet is:

(a) Zero **(b)** Maximum

(c) Remains the same **(d)** None of these

22. The drag force increases as the speed of the object:

(a) Decreases **(b)** Increases

(c) Remains constant **(d)** None of these

23. The force of friction that comes into action after the motion has started is called:

(a) Limiting friction **(b)** Static friction

(c) Friction **(d)** None of these

24. A body of mass m is falling downward in a viscous medium with terminal velocity v, net force on the body is:

(a) mg **(b)** $mg - 6\pi\eta rv$

(c) $6\pi\eta rv - mg$ **(d)** Zero

25. Viscosity of air is:

(a) $0.019 \times 10^{3}\ Nsm^{-2}$ **(b)** $0.019 \times 10^{-3}\ N\text{-}sm^{-2}$

(c) $0.0019 \times 10^{-3}\ N\text{-}sm^{-2}$ **(d)** $0.0019 \times 10^{3}\ N\text{-}sm^{-2}$

26. The viscosity of water is:

(a) $0.019 \times 10^{-3}\ N\text{-}sm^{-2}$ **(b)** $0.801 \times 10^{-3}\ N\text{-}sm^{-2}$

(c) $6.29 \times 10^{-3}\ N\text{-}sm^{-2}$ **(d)** $0.081 \times 10^{3}\ N\text{-}sm^{-2}$

27. The viscosity of glycrine is:

(a) $0.019 \times 10^{-3}\ Nsm^{-2}$ **(b)** $0.801 \times 10^{-3}\ Nsm^{-2}$

(c) $6.29 \times 10^{-3}\ N\text{-}sm^{-2}$ **(d)** $6.29 \times 10^{3}\ Nsm^{-2}$

28. The maximum velocity attained by a spherical droplet when drag force F and the weight of the droplet becomes equal is called:

(a) Instantaneous velocity **(b)** Terminal velocity

(c) Uniform velocity **(d)** None of these

29. The terminal velocity in case of spherical droplet is directly proportional to the:

(a) Square of the radius **(b)** Radius of the droplet

(c) Half of the radius **(d)** None of these

30. The terminal velocity of the spherical object is given by:

(a) $v_t = \frac{2gr^2\rho}{9\eta}$ **(b)** $v_t = \frac{mg}{4\pi\eta r}$

(c) $v_t = \frac{mg}{6\pi\eta r}$ **(d)** None of these

31. The terminal velocity of water droplet of radius 1×10^{-4} m and density 1000 kg/m^3 falling through air of viscosity 19×10^{-6} kg/ms is:

(a) 1.5 m/s **(b)** 2.3 m/s

(c) 3.4 m/s **(d)** 1.1 m/s

32. The terminal velocity v_t of a sphere of radius r in fluid of viscosity η depends upon:

(a) Radius **(b)** Viscosity

(c) Density **(d)** All of above

33. If each particle of fluid passing through a point follows the same path, then flow is called:

(a) Regular flow **(b)** Streamline flow

(c) Normal flow **(d)** Turbulent flow

34. The irregular flow of the fluids is called:

(a) Regular flow **(b)** Normal flow

(c) Turbulent flow **(d)** Streamline flow

35. For the steady flow of incompressible fluid, the equation of continuity is given by:

(a) $A_1v_1 = A_2v_2$ **(b)** $\frac{A_1}{v_1} = \frac{A_2}{v_2}$

(c) $\frac{v_1}{A_1} = \frac{v_2}{A_2}$ **(d)** $A_1v_1t_1 = A_2v_2t_2$

36. The product of cross-sectional area of the pipe and the fluid speed at any point along the pipe is:

(a) Zero **(b)** Constant

(c) Variable **(d)** None of these

37. A fog droplet falls vertically through air with an acceleration:

(a) Greater than g **(b)** Less than g

(c) Equal to g **(d)** Equal to zero

38. The formula for continuity is given by the relation:

(a) $\rho_1v_2v_1 = \rho_2v_1v_2$ **(b)** $\rho_1A_1v_1 = \rho_2v_2A_2$

(c) $\rho_2A_2v_1 = \rho_1A_1v_2$ **(d)** None of these

39. The SI units of flow rate is:

(a) m^2/s^2 **(b)** m^3/s

(c) m^3/s^2 **(d)** m^2/s

40. Bernoullis equation is based upon law of conservation of:

(a) Momentum **(b)** Energy

(c) Mass **(d)** All of these

41. The fluid which is in compressible and non-viscous is called:

(a) Viscous fluid **(b)** Non-ideal fluid

(c) Ideal fluid **(d)** Perfect fluid

42. When the velocity of a liquid flowing steadily in a tube increases, its pressure:

(a) Becomes zero **(b)** Remains the same

(c) Increases **(d)** Decreases

43. The application of Bernoulli's theorem is:

(a) Torricelli's theorem **(b)** Venturi relation

(c) Both (a) and (b) **(d)** None of these

44. According to Bernoulli's theorem, velocity and pressure:

(a) Are inversely proportional **(b)** Are directly proportional

(c) Have no relation **(d)** None of these

45. Bernoulli's equation includes as a special case of:

(a) Torricelli's theorem **(b)** Stoke's law

(c) Newton's laws **(d)** None of these

46. When there is no change in pressure at the beginning and end of a flow process, Bernoulli's equation reduces to:

(a) $v = \sqrt{2gh}$ **(b)** $P = \rho gh$

(c) $P + \frac{1}{2}\rho v^2 = \text{Constant}$ **(d)** None of these

47. If the cross-sectional area of the pipe decreases, the speed of the fluid must increases according to:

(a) Venturi relation **(b)** Equation of continuity

(c) Torricelli's thereom **(d)** None of these

48. Bernoulli's equation is applicable to points flow:

(a) In a streamline flow **(b)** In any non-viscous liquid

(c) In a steady of flowing liquid **(d)** None of these

49. The Torricellis expression is expressed as:

(a) $v_2 = \sqrt{2g(h_1 + h_2)}$ **(b)** $v_2 = \sqrt{2g(h_1 + h_2)}$

(c) $v_2 = \sqrt{2g(h_1 - h_2)}$ **(d)** None of these

50. The velocity of efflux of a liquid from an orifice is:

(a) $\sqrt{gh}$ **(b)** $\sqrt{2gh}$

(c) $\frac{gh}{2}$ **(d)** $2\sqrt{gh}$

51. The Venutri relation is given by:

(a) $P_1 + P_2 = \rho v_2^2$ **(b)** $P_1 - P_2 = \rho v_2^2$

(c) $P_1 - P_2 = \frac{1}{2}\rho v_2^2$ **(d)** $P_1 + P_2 = \frac{1}{2}\rho v_2^2$

52. The speed of efflux is equal to the velocity gained by the falling fluid under the action of gravity through a certain height is called:

(a) Torricell's theorem **(b)** Venture's theorem

(c) Cornot engine **(d)** None of these

53. Venturi meter is a device used to measure:

(a) Viscosity of fluid **(b)** Density of fluid

(c) Pressure of fluid **(d)** Speed of fluid

54. The fundamental equation in fluid dynamics which relates the pressure with speed fluid and height is:

(a) Bernoulli's equation **(b)** Equation of continuity

(c) Torricelli's equation **(d)** Venturi equation

55. The Bernoulli's equation is written as:

(a) $P - \frac{1}{2}\rho v^2 = \text{Constant}$ **(b)** $P + \frac{1}{2}\rho v^2 + \rho gh = \text{Constant}$

(c) $P + \frac{1}{2}\rho v^2 - \rho gh = \text{Constant}$ **(d)** None of these

56. The pressure will be low, where the speed of fluid is:

(a) High **(b)** Low

(c) Zero **(d)** Constant

57. At any two points along streamline flow, the sum of the pressure, P.E per unit volume and K.E per unit volume remains constant, this is the statement:

(a) Equation of continuity **(b)** Venturi relation

(c) Terricelli's theorem **(d)** Bernoulli's theorem

58. The speed of efflux of liquid is the same as the speed of ball falls through a height of:

(a) $h_1 + h_2$ **(b)** $h_2 - h_1$

(c) $h_1 - h_2$ **(d)** None of these

59. Blood is an incompressible fluid having a density nearly equal to that of:

(a) Water **(b)** Oil

(c) Milk **(d)** All of these

60. Human blood pressure is measured in:

(a) N/m^2 **(b)** Torr

(c) Pascal **(d)** cm

61. Blood has a density:

(a) Greater than water **(b)** Equal to water

(c) Less than water **(d)** None of these

62. Blood pressure is measured by:

(a) Barometer **(b)** Stetho scope

(c) Sphygmomanometer **(d)** Hydrometer

63. Blood is an:

(a) Incompressible fluid **(b)** Compressible fluid

(c) Ideal fluid **(d)** Perfect fluid

64. The instrument which detects the instant at which the external pressure becomes equal to the systolic pressure is called:

(a) Manometer **(b)** Sphygmomanometer

(c) Barometer **(d)** Hydrometer

65. Tubes of narrow bore and liquids of high viscosity and low density promote:

(a) Streamline flow **(b)** Turbulent flow

(c) Both (a) and (b) **(d)** None of these

66. Streamlines passing through a given cross-section normally form:

(a) Liquid does not cross the boundaries of tubes of flow

(b) Tubes of flow

(c) Steady flow do not overlap each other

(d) All of these

67. Dimensions of $\left[\frac{1}{2}\rho v^2\right]$ are:

(a) $[ML^{-1}T^{-1}]$ **(b)** $[ML^{3}T^{-2}]$

(c) $[ML^{-1}T^{-2}]$ **(d)** $[ML^{-1}T^{-1}]$

68. Dimensions of $[\rho gh]$ are:

(a) $[ML^{-1}T^{-2}]$ **(b)** $]ML^{-3}T^{-2}]$

(c) $[ML^{-1}T^{-1}]$ **(d)** $[ML^{-2}T^{-2}]$

69. In the formula for velocity of efflux $v = \sqrt{2gh}$ where h is:

(a) The height of orifice from the bottom of the vessel

(b) Height of liquid column above the orifice

(c) Height of liquid column

(d) None of these

70. Sphygmo is a:

(a) Greek word **(b)** Spanish word

(c) Latin word **(d)** None of these

71. Sphygmo means:

(a) Liver **(b)** Pulse

(c) Liver **(d)** Heart

72. Bunsen burner works on the principle of:

(a) Venturi effect **(b)** Torricilli's effect

(c) Bernoulli's effect **(d)** None of these

73. In Laminar flow, adjacent layers:

(a) Mix with each other **(b)** Smoothly slide one over the other

(c) Oppose each other **(d)** None of these

74. A man is standing near a fast moving train:

(a) To fall towards the track **(b)** To fall away from the track

(c) No effect **(d)** None of these

75. Two boats moving parallel in a river:

(a) Remain always parallel **(b)** Pulled towards each other due to less pressure

(c) Get a part due to increase in pressure **(d)** None of these

76. Streamlines are:

(a) Largely spaced on the upper side than on the inner side of the wing

(b) Equally spaced both on the upper and lower side of the wing

(c) Closer together on the upper side of the wing

(d) None of these

77. A fluid is said to be ideal if it is:

(a) Non-viscous, incompressible and streamline

(b) Non-viscous and streamline

(c) Non-viscous and incompressible

(d) None of these

78. The blood pressure varies from high systolic pressure to low diastolic pressure of about:

(a) 80 – 90 torr **(b)** 75 – 85 torr

(c) 75 – 80 torr **(d)** None of these

79. 1 torr in N/m^2 is:

(a) 129 N/m^2 **(b)** 133.3 N/m^2

(c) 135.6 N/m^2 **(d)** 125 N/m^2

80. The systolic pressure is about:

(a) 120 torr **(b)** 125 torr

(c) 115 torr **(d)** 130 torr

81. Blood pressure of a person:

(a) Increases with age **(b)** Decreases with age

(c) Remain same **(d)** None of these

82. The smoot or steady streamline flow is known as:

(a) Turbulent flow **(b)** Laminar flow

(c) Simple flow **(d)** None of these

83. The velocity of liquid below which its flow is laminar is called:

(a) Critical velocity **(b)** Escape velocity

(c) Relative velocity **(d)** None of these

84. For which position, will the maximum blood pressure in the body have the smallest value:

(a) Standing one's leg **(b)** Lying horizontally

(c) Standing up right **(d)** None of these

85. The smooth r steady streamline flow is called:

(a) Turbulent flow **(b)** Laminar flow

(c) Simple flow **(d)** Regular flow

86. Friction in fluids is known as:

(a) Drag force **(b)** Viscosity

(c) Surface tension **(d)** None

87. Unit of coefficient of viscosity:

(a) $Nm^{-2}s$ **(b)** $kg\ m^{-1}s^{-1}$

(c) Both (a), (b) **(d)** None

88. When the magnitude of the drag force becomes equal to the weight, the net force acting on the droplet:

(a) Minimum **(b)** Zero

(c) Maximum **(d)** None

89. If velocity of particle at different points does not change with time, flow is:

(a) Streamline **(b)** Laminar

(c) Steady **(d)** All

90. Equation of continuity is the basis of law of conservation of:

(a) Mass **(b)** Momentum

(c) Energy **(d)** None

91. The product of cross-sectional area of the pipe and the fluid speed at any point along the pipe:

(a) Constant **(b)** Flow rate

(c) Volume flow per second **(d)** All

92. As Bernoulli's equation $P + \frac{1}{2}\rho v^2 + \rho gh = \text{Constant}$. Here $\frac{1}{2}\rho v^2$ is:

(a) K.E. **(b)** K.E. per unit volume

(c) K.E. per unit time **(d)** None

93. Torricelli's theorem is:

(a) $\sqrt{2g}$ **(b)** $\sqrt{2g(h_1 - h_2)}$

(c) $\sqrt{2g(x_1 - x_2)}$ **(d)** None

94. A device used to measure speed of liquid flow:

(a) Venturi-meter **(b)** Speed-meter

(c) Sphyginomeno-meter **(d)** None

95. A liquid flows through a pipe of varying diameter. The velocity of the liquid is 2 m/s at a point where the diameter is 6 cm. The velocity of the liquid at a point where diameter is 3 cm will be:

(a) 1 m/s **(b)** 4 m/s

(c) 8 m/s **(d)** 16 m/s

96. The dimensional formula of surface tension is:

(a) $[MLT^{-1}]$ **(b)** $[MLT^{-2}]$

(c) $[ML^0T^{-2}]$ **(d)** $[ML^{-1}T^{-1}]$

ANSWERS

1.	(a)	**2.**	(b)	**3.**	(c)	**4.**	(c)
5.	(b)	**6.**	(d)	**7.**	(a)	**8.**	(c)
9.	(d)	**10.**	(a)	**11.**	(b)	**12.**	(c)
13.	(b)	**14.**	(d)	**15.**	(b)	**16.**	(c)
17.	(a)	**18.**	(b)	**19.**	(a)	**20.**	(c)
21.	(a)	**22.**	(b)	**23.**	(a)	**24.**	(b)
25.	(b)	**26.**	(b)	**27.**	(c)	**28.**	(b)
29.	(a)	**30.**	(a)	**31.**	(d)	**32.**	(d)
33.	(b)	**34.**	(c)	**35.**	(a)	**36.**	(b)
37.	(a)	**38.**	(b)	**39.**	(b)	**40.**	(b)
41.	(c)	**42.**	(d)	**43.**	(c)	**44.**	(a)
45.	(a)	**46.**	(a)	**47.**	(b)	**48.**	(b)
49.	(c)	**50.**	(b)	**51.**	(c)	**52.**	(a)
53.	(d)	**54.**	(a)	**55.**	(b)	**56.**	(a)
57.	(d)	**58.**	(c)	**59.**	(a)	**60.**	(b)
61.	(b)	**62.**	(c)	**63.**	(a)	**64.**	(b)
65.	(a)	**66.**	(d)	**67.**	(c)	**68.**	(a)
69.	(b)	**70.**	(c)	**71.**	(b)	**72.**	(a)
73.	(b)	**74.**	(a)	**75.**	(b)	**76.**	(c)
77.	(a)	**78.**	(c)	**79.**	(b)	**80.**	(a)
81.	(a)	**82.**	(b)	**83.**	(a)	**84.**	(b)
85.	(b)	**86.**	(b)	**87.**	(c)	**88.**	(b)
89.	(d)	**90.**	(a)	**91.**	(d)	**92.**	(b)
93.	(b)	**94.**	(a)	**95.**	(c)	**96.**	(c)

OSCILLATIONS

Each question has four possible answers, encircled the correct answer:

1. To and fro motion of a body about its mean position is known as:

(a) Linear motion **(b)** Rotatory motion

(c) Angular motion **(d)** Vibratory motion

2. A motion which repeats itself in equal intervals of time is:

(a) Rotatory motion **(b)** Periodic motion

(c) Oscillatory motion **(d)** Translatory motion

3. In SHM, the acceleration of a body is directly proportional to:

(a) Applied force **(b)** Displacement

(c) Restoring force **(d)** Amplitude

4. The law which derived in SHM by:

(a) Hook's law **(b)** Ampere's law

(c) Dalton's law **(d)** Newton's law

5. The wave form of SHM is:

(a) Square wave **(b)** Sine wave

(c) Cosine wave **(d)** None of these

6. The maximum distance of the vibrating body from the mean position is called:

(a) Displacement **(b)** Time period

(c) Frequency **(d)** Amplitude

7. The number of vibrations completed in one second is called:

(a) Amplitude **(b)** Frequency

(c) Time period **(d)** Revolution

8. The relation between time period and frequency is:

(a) $f = 2\pi T$ **(b)** $f = \frac{1}{2\pi T}$

(c) $f = \frac{T}{2\pi}$ **(d)** $f = \frac{1}{T}$

9. The time taken to complete one revolution is called:

(a) Frequency **(b)** Time period

(c) Time **(d)** Displacement

10. A force 20 N is applied on an elastic spring. If the extension produced in the spring is 10 cm, the spring constant k is:

(a) 20 N/m **(b)** 40 N/m

(c) 10 N/m **(d)** 200 N/m

11. An example of SHM is:

(a) Motion of earth around the sun **(b)** Motion of simple pendulum

(c) Motion of cricket ball **(d)** None of these

12. A body attached to a spring is pulled to a distance of 20 cm. If the spring constant k is 48 N/m then find the force applied:

(a) 5.3 N **(b)** 9.6 N

(c) 96 N **(d)** 192 N

13. The main cause of an oscillatory motion of an elastic spring is:

(a) Mass of the spring **(b)** Weight of spring

(c) K.E of the spring **(d)** Restoring force of the spring

14. The restoring force is directly proportional to the displacement within elastic limit, this is the statement of:

(a) Hook's law **(b)** Newton's law

(c) Meld's law **(d)** Youngs law

15. The unit of frequency is:

(a) m/s **(b)** Hz

(c) N/m **(d)** None of these

16. A particle performing SHM has displacement equal to:

(a) $x_0 \sin \omega t$ **(b)** $x_0 \cos \omega t$

(c) $x_0 \cos^2 \omega t$ **(d)** $x_0 \sin^2 \omega t$

17. Instantaneous acceleration of a system executing SHM is directed:

(a) Towards the mean position

(b) Away from the mean position

(c) Perpendicular to the mean position upward

(d) Perpendicular to the mean position downward

18. The angular speed of mass attached with spring is:

(a) $\omega = \frac{1}{2\pi}\sqrt{\frac{m}{m}}$ **(b)** $\omega = \sqrt{\frac{k}{m}}$

(c) $\omega = \frac{2\pi}{T}$ **(d)** $\omega = 2\pi\sqrt{\frac{m}{k}}$

19. The time period of mass attached with the spring is:

(a) $T = 2\pi\sqrt{\frac{m}{k}}$ **(b)** $T = 2\pi\sqrt{\frac{k}{m}}$

(c) $T = \frac{2\pi}{\omega}$ **(d)** $T = \frac{1}{2\pi}\sqrt{\frac{l}{g}}$

20. The velocity of a body in SHM is maximum at the:

(a) Extreme position **(b)** Between mean and extreme position

(c) Mean position **(d)** Between extreme and mean

21. The velocity of the body is minimum at the:

(a) Mean position **(b)** Extreme position

(c) Between mean and extreme position **(d)** None of the above

22. The acceleration of projection of a point P on the diameter moving on a circle is:

(a) $-\omega^2 x$ **(b)** ωx^2

(c) $-\omega x^2$ **(d)** $\omega^2 x$

23. The time period of simple pendulum depends upon:

(a) Thickness of the thread **(b)** Mass of the pendulum

(c) Length of the pendulum **(d)** Amplitude

24. The time period of simple pendulum is:

(a) 1 second **(b)** 1.5 second

(c) 2 second **(d)** None of these

25. The phase angle $\theta = \omega t$ of a body performing SHM indicates:

(a) Only the magnitude of displacement **(b)** Only the direction of the displacement

(c) Both magnitude and direction **(d)** None of these

26. A body performing SHM has a displacement X given by the equation X = 30 sin 50 t, what is the frequency of oscillation:

(a) 0.020 Hz **(b)** 0.13 Hz

(c) 8.0 Hz **(d)** 50 Hz

27. In vibratory motion:

(a) P.E remains constant **(b)** K.E remains constant

(c) Total energy remains constant **(d)** None of these

28. When a particle is moving along a circular path, its projection along the diameter executes:

(a) S.H.M **(b)** Angular motion

(c) Linear motion **(d)** Rotatory motion

29. The instantaneous speed of the projection on the diameter for a particle moving in a circle is:

(a) $\omega^2\sqrt{x_o^2 - x^2}$ **(b)** $\omega^2\sqrt{x_o - x}$

(c) $\omega\sqrt{x_o^2 - x^2}$ **(d)** None of these

30. The maximum K.E of the mass attached with spring is given by:

(a) $(K.E)_{max} = \frac{1}{2}kx_0^2$ **(b)** $(K.E)_{max} = \frac{1}{2}Kx_0$

(c) $(K.E)_{max} = \frac{1}{2}Kx^2$ **(d)** $(K.E)_{max} = \frac{1}{2}Kx$

31. The maximum velocity V_0 of the mass attached to the end of an elastic spring is:

(a) $v_0 = x_0\sqrt{\frac{m}{k}}$ **(b)** $v_0 = x\sqrt{\frac{k}{m}}$

(c) $v_0 = x\,.\sqrt{\frac{m}{k}}$ **(d)** $v_0 = x_0\sqrt{\frac{k}{m}}$

32. The total energy of a body executing S.H.M is directly proportional to:

(a) The amplitude **(b)** Square of amplitude

(c) Square root of amplitude **(d)** None of these

33. The total energy of a mass attached with spring is:

(a) Remain constant **(b)** Increased

(c) Decreased **(d)** None of these

34. The force which is responsible for the motion of simple pendulum is:

(a) $-mg\sin\theta$ **(b)** $-mg\cos\theta$

(c) mg **(d)** $mg\tan\theta$

35. The time period of simple pendulum is given as:

(a) $T = 2\pi\sqrt{\frac{l}{g}}$ **(b)** $T = 2\pi\sqrt{\frac{g}{l}}$

(c) $T = \frac{1}{2\pi}\sqrt{\frac{l}{g}}$ **(d)** $T = \frac{1}{\pi}\sqrt{\frac{l}{g}}$

36. The time period of a simple pendulum is directly proportional to the:

(a) $\sqrt{\frac{1}{l}}$ **(b)** $\sqrt{l}$

(c) $\sqrt{g}$ **(d)** $\sqrt{\frac{1}{g}}$

37. If the mass of the bob of simple pendulum is doubled, its time period is:

(a) One half **(b)** Double

(c) Remains constant **(d)** One fourth

38. The time period of a simple pendulum is independent of its:

(a) Mass **(b)** Length

(c) Acceleration due to gravity **(d)** Restoring force

39. The frequency of the second pendulum is:

(a) 0.5 Hz **(b)** 15 Hz

(c) 2 Hz **(d)** 1 Hz

40. The frequency of second pendulum is given by:

(a) $f = \frac{1}{2\pi}\sqrt{\frac{g}{l}}$ **(b)** $f = 2\pi\sqrt{\frac{l}{g}}$

(c) $T = \frac{1}{2\pi}\sqrt{\frac{l}{g}}$ **(d)** None of these

41. The length of second's pendulum is:

(a) 0.99 m **(b)** 0.6 m

(c) 3 m **(d)** 2 m

42. When the bob of simple pendulum is at extreme position, it has:

(a) Potential energy **(b)** Kinetic energy

(c) Both P.E and K.E **(d)** None of these

43. When the bob of simple pendulum is at mean position then it has:

(a) Potential energy **(b)** Kinetic energy

(c) Both P.E and K.E **(d)** None of these

44. Total energy of a particle executing SHM at any displacement X is given by:

(a) $T.E = kx$ **(b)** $T.E = \frac{1}{2}kx_0^2$

(c) $T.E = \frac{1}{2}kx_0$ **(d)** $T.E = \frac{1}{2}kx^2$

45. At the centre of the earth, the simple pendulum will:

(a) Vibrate with double time period **(b)** Vibrate with half time period

(c) Not move **(d)** None of these

46. The value of g is calculated from:

(a) $g = \frac{\pi^2 l}{T^2}$ **(b)** $g = \frac{2\pi^2}{lT^2}$

(c) $g = \sqrt{\frac{4\pi^2 l}{T}}$ **(d)** $g = \frac{4\pi^2 l}{T^2}$

47. The length of simple pendulum is calculated from the expression:

(a) $l = \frac{Tg^2}{4\pi^2}$ **(b)** $l = \frac{T^2 g}{4\pi^2}$

(c) $l = \frac{T^2 g^2}{4\pi^2}$ **(d)** $l = \frac{4\pi^2}{T^2 g^2}$

48. The acceleration of the body having SHM depends upon its:

(a) Velocity **(b)** Mass

(c) Displacement from mean position **(d)** None of these

49. The time period of a simple pendulum depends upon:

(a) Mass of bob **(b)** Length of thread

(c) Height of bob **(d)** None of these

50. The time period of second's pendulum is:

(a) 4 seconds **(b)** 1 seconds

(c) 3 seconds **(d)** 2 seconds

51. The time period of the mass attached with spring executing S.H.M is:

(a) $T = 2\pi\sqrt{\frac{m}{k}}$ **(b)** $T = \pi\sqrt{\frac{k}{m}}$

(c) $T = 2\pi\sqrt{mk}$ **(d)** None of these

52. A heating and cooking of food evenly by Microwave oven is an example of:

(a) S.H.M **(b)** Damped oscillations

(c) Resonance **(d)** None of these

53. The angular velocity and angular frequency is related by the relation:

(a) $\omega = 2\pi f$ **(b)** $f = 2\pi\omega$

(c) $f = \frac{2\pi}{\omega}$ **(d)** $\omega = \frac{2\pi}{f}$

54. Work done during horizontal mass spring system by the average force is:

(a) $\frac{1}{2}kx$ **(b)** $\frac{1}{2}F_{avc}\,x$

(c) $\frac{F_{avc}}{x}$ **(d)** $\frac{1}{2}kx^2$

55. The direction of both acceleration and restoring force in SHM is:

(a) Same direction **(b)** Opposite direction

(c) Perpendicular to each other **(d)** None of these

56. If an oscillating body is subjected to an external force then it is said to be executing:

(a) Free oscillations **(b)** Forced oscillations

(c) Mixed oscillations **(d)** Damping

57. If a body vibrates with its natural frequency without the effect of an external force then it is said to be:

(a) Free oscillations **(b)** Forced oscillations

(c) Mixed oscillations **(d)** Oscillations

58. Loud music produced by sounding wooden boards of strings instruments is an example of:

(a) Free oscillations **(b)** Beats

(c) Forced oscillations **(d)** Damped oscillations

59. When damping is small, the amplitude of vibration in resonance will be:

(a) Unchanged **(b)** Large

(c) Small **(d)** None of these

60. How long must be the length of a simple pendulum in order to have a period of one second:

(a) 0.50 m **(b)** 0.25 m

(c) 1 m **(d)** 3 m

61. Shock absorber in automobiles is a practical form of:

(a) SHM **(b)** Damped oscillations

(c) Pascal's law **(d)** None of these

62. Damping effect applied on an aeroplane wing is:

(a) For more speed **(b)** To push upward

(c) To overcome resonance effect **(d)** To overcome gravity

63. The amplitude of the lead ball is much greater than that of the:

(a) Pitch ball **(b)** Iron ball

(c) Plastic ball **(d)** None of these

64. When potential energy of the mass is maximum, the kinetic energy of the spring is:

(a) Zero **(b)** Maximum

(c) Minimum **(d)** None of these

65. If the position of oscillating object is given by the equation $X = \sqrt{2}\cos\left(\frac{\pi}{8}t\right)$ then its displacement after 2 second is:

(a) 3 m **(b)** 2 m

(c) 1 m **(d)** 0 m

66. The projection of a particle moving along a circular path executes:

(a) Simple motion **(b)** Angular motion

(c) Translatory motion **(d)** S.H.M

67. In simple harmonic motion, the acceleration is always directed:

(a) Towards its mean position **(b)** Away from mean position

(c) Along the tangent **(d)** None of these

68. In oscillating motion:

(a) P.E remains constant **(b)** K.E remains constant

(c) Total energy remains constant **(d)** None of these

69. The body oscillates due to:

(a) Gravitational force **(b)** Frictional force

(c) Restoring force **(d)** Deforming force

70. The oscillatory motion which does not repeat after regular interval of time is called:

(a) Periodic motion **(b)** Circular motion

(c) Non-periodic motion **(d)** Orbital motion

71. Acceleration of spring mass system is:

(a) Uniform

(b) Variable due to both change in magnitude and direction

(c) Variation due to change in direction

(d) Variation due to change in magnitude

72. In an isolated spring mass system, total energy is:

(a) Variable **(b)** Constant

(c) Low **(d)** High

73. The formula $T = 2\pi\sqrt{\frac{l}{g}}$ of a simple pendulum holds only if:

(a) Amplitude of the motion should be small **(b)** Length of pendulum is small

(c) Length of pendulum is large **(d)** Mass of pendulum is small

74. Potential energy of spring mass system is stored in:

(a) Spring **(b)** Mass

(c) Length **(d)** None of these

75. A quantity which indicates the state and direction of motion of a vibrating body is known as:

(a) Amplitude **(b)** Displacement

(c) Phase angle **(d)** Time period

76. In microwave oven, heating is produced by phenomenon of:

(a) Harmonic vibration **(b)** Forced vibration

(c) Free vibration **(d)** Resonance

77. The frequency of waves produced in microwave oven is:

(a) 2450 MHz **(b)** 1435 MHz

(c) 1760 MHz **(d)** 2550 MHz

78. The wavelength of the waves produced in microwave oven is:

(a) 8 cm **(b)** 10 cm

(c) 14 cm **(d)** 12 cm

79. The sharpness of the resonance curve depends on:

(a) Loss of energy **(b)** Loss of potential energy

(c) Loss of kinetic energy **(d)** Frictional loss of energy

80. The amplitude of a vibrating body at resonance in vacuum is:

(a) Maximum **(b)** Infinite

(c) Minimum **(d)** None of these

81. If F = 0.4 N and x = 2 cm then k =

(a) 10 N/m **(b)** 20 N/m

(c) 3 N/n **(d)** 30 N/n

82. At what place motion of simple pendulum will be slowest at:

(a) Equator **(b)** Poles

(c) On the surface of earth **(d)** At the centre of the earth

83. If mass attached to spring increases, then its time period:

(a) Increases **(b)** Decreases

(c) No change **(d)** None of these

84. Frequency of a vibratory motion is:

(a) Less than time period **(b)** Equal to time period

(c) Reciprocal of time period **(d)** None of these

85. At which of the following places motion of a simple pendulum is fatest:

(a) Karachi **(b)** Rehim Yar Kan

(c) Lahore **(d)** Islamabad

86. A cheap pendulum clock will:

(a) Lose time in summer and gain time in winter

(b) Gain time in summer and lose time in winter

(c) Keep correct time

(d) None of these

87. A simple pendulum is vibrating in an evacuation chamber it will:

(a) Oscillate forever with the same amplitude frequency

(b) Come to rest eventually

(c) Oscillate with same amplitude with frequency decreasing with time

(d) None of these

88. Total energy of a particle performing S.H.M. is directly proportional to:

(a) Square root of the amplitude **(b)** Amplitude

(c) Reciprocal of amplitude **(d)** Square of amplitude

89. When the mass and speed of a body are doubled, the K.E becomes:

(a) 5 times **(b)** 4 times

(c) 8 times **(d)** 16 times

90. Solar cells are made up from the material called:

(a) Iron **(b)** Oxygen

(c) Carbon **(d)** Silicon

91. At present, the hydroelectric generating capacity in Pakistan amounts to about:

(a) 4000 mega watt **(b)** 3000 mega watt

(c) 5000 mega watt **(d)** None of these

92. The consumption of energy by a 60 watt bulb in 2s in:

(a) 120 J **(b)** 100 J

(c) 90 J **(d)** 0.02 J

93. In SHM, the restoring force is directly proportionate to:

(a) Velocity **(b)** Acceleration

(c) Displacement **(d)** Time period

94. A student made a simple pendulum of time period 1 sec. The string used is of length 1 m, in order to make a simple pendulum of time period 2 sec, he should use a string of length.

(a) 2 m **(b)** 3 m

(c) 4 m **(d)** 4 sec.

95. Time period of second pendulum at moon is:

(a) 1 sec. **(b)** 2 sec.

(c) 3 sec. **(d)** 4 sec.

96. If the period of oscillation of mass M suspended from a spring is 1 sec., then period of mass 4 M will be:

(a) $\frac{1}{4}$ sec. **(b)** $\frac{1}{2}$ sec.

(c) 2 sec. **(d)** 4 sec.

97. A girl is swinging on a swing in the sitting position. How will the period of swing be affected if she stands up?

(a) The period will now be shorter

(b) The period will now be longer

(c) The period will remain unchanged

(d) The period may become longer or shorter depending upon the height of girl

98. A simple harmonic oscillator has time period T. The time taken by it to travel from the extreme position to half the amplitude is:

(a) $\frac{T}{6}$ **(b)** $\frac{T}{4}$

(c) $\frac{T}{8}$ **(d)** $\frac{T}{2}$

99. The frequency of oscillation of a simple pendulum of length L mounted in a cabin that is falling freely under gravity is:

(a) Infinity **(b)** Zero

(c) $\sqrt{\frac{g}{2L}}$ **(d)** $\sqrt{\frac{g}{L}}$

100. A particle executes S.H.M with frequency 'f', the frequency with which its K.E oscillates is:

(a) f **(b)** 2f

(c) 3f **(d)** 4f

101. A body executes S.H.M with an amplitude x_o. Its energy is half kinetic and half potential when displacement is:

(a) $\frac{x_o}{2}$ **(b)** $\frac{x_o}{3}$

(c) $\frac{x_o}{\sqrt{2}}$ **(d)** $\frac{x_o}{2\sqrt{2}}$

102. Total energy of a particle executing S.H.M of amplitude A is proportional to:

(a) A^2 **(b)** A^{-2}

(c) A **(d)** A^{-1}

103. The velocity of a particle undergoing S.H.M is v at mean position. If its amplitude is doubled. The velocity at mean position will be:

(a) v **(b)** 2v

(c) $\sqrt{2}$ times **(d)** 4v

104. The maximum velocity of 1 kg mass attached to a spring constant of 1 Nm^{-1} upto the displacement of 5 cm is:

(a) 1 ms^{-1} **(b)** 0.01 ms^{-1}

(c) 5 ms^{-1} **(d)** 0.05 ms^{-1}

105. A simple pendulum is oscillating in a lift. If the lift starts moving upwards with a uniform acceleration, the period will:

(a) remains unaffected

(b) be shorter

(c) be longer

(d) may be shorter or longer depending on the magnitude of acceleration

106. A body of mass 5 kg in executing S.H.M with amplitude 10 cm. Its maximum velocity is 100 cms^{-1}. Its velocity will be 50 cms^{-1} at a displacement from the mean position equal to:

(a) 5 cm **(b)** $5\sqrt{3}$ cm

(c) 10 cm **(d)** $10\sqrt{3}$ cm

107. A particle of mass 200 g executes S.H.M. The restoring force is provided by a spring of force constant 80 Nm^{-1}. The time period of oscillation is:

(a) 0.31 sec. **(b)** 0.15 sec.

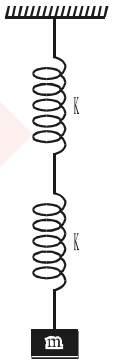
(c) 0.05 sec. **(d)** 0.02 sec.

108. A particle of mass 0.5 kg executes S.H.M its energy is 0.04 J. If time period is π-seconds its amplitude is:

(a) 10 cm **(b)** 15 cm

(c) 20 cm **(d)** 40 cm

109. The two spring mass system, shown in the figure oscillates with a period T. If one spring is used, the time period will be:



(a) $\frac{T}{\sqrt{2}}$ **(b)** $\frac{T}{2}$

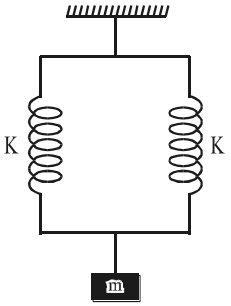
(c) $\sqrt{2}T$ **(d)** 2T

110. A particle executing S.H.M has an amplitude of 6 cm. Its acceleration at a distance of 2 cm from the mean position is 8 cms^{-2}. The maximum speed of the particle is:

(a) 8 cms^{-1} **(b)** 12 cms^{-1}

(c) 16 cms^{-1} **(d)** 24 cms^{-1}

111. The two spring mass system, shown in the figure, oscillates with a period T. If only one spring is used, the time period will be:



(a) $\frac{T}{\sqrt{2}}$ **(b)** $\frac{T}{2}$

(c) $\sqrt{2}T$ **(d)** 2T

112. The equation of displacement of a body executing S.H.M is $x = x_o \cos \omega t$. What is initial phase?

(a) 0° **(b)** 90°

(c) 180° **(d)** 270°

113. Which of the following is an example of damped oscillations?

(a) Mass attached to a spring **(b)** Bob of pendulum

(c) Shock absorber of a car **(d)** All of them

114. The sharpness of the resonance curve of a resonating curve depends on:

(a) Loss of K.E. **(b)** Loss of P.E.

(c) Frictional loss of energy **(d)** Loss of mechanic energy

115. The displacement of vibrating body executing SHM at quarter of the time period is:

(a) Zero **(b)** Maximum

(c) Half of the maximum **(d)** Quarter of the maximum

116. A body moves with SHM and makes a complete oscillations in n second. What is angular frequency?

(a) n rad s^{-1} **(b)** 1/n rad s^{-1}

(c) 2πn rad s^{-1} **(d)** 2π/n rad s^{-1}

117. The product of time period and frequency is equal to:

(a) 3 **(b)** 2

(c) 1 **(d)** Zero

118. Waves transmit from one place to another:

(a) Wavelength **(b)** Amplitude

(c) Mass **(d)** Energy

119. If water is disturbed in a ripple tank periodically, waves one after the other passing through a point are known as:

(a) Matter waves **(b)** Longitudinal waves

(c) Transverse period waves **(d)** Mechanical waves

120. When two identical travelling waves are superposed, the velocity of the resultant waves:

(a) Decreases **(b)** Increases

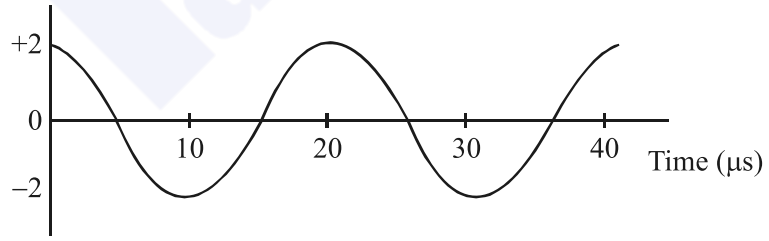
(c) Remains unchanged **(d)** Becomes zero

121. The distance between two consecutive nodes is:

(a) $\lambda/2$ **(b)** $\lambda/4$

(c) λ **(d)** 2λ

122. The diagram below represents the displacement of a particle caused by a progressive wave travelling at a speed 5.0 kms^{-1}.



When is the frequency of the vibration of the particle.

(a) 2.5 KHz **(b)** 5.0 KHz

(c) 25 KHz **(d)** 50 KHz

123. A particle performs simple harmonic motion of amplitude 0.020 m and frequency 2.5 Hz. What is its maximum speed?

(a) 0.008 ms^{-1} **(b)** 0.050 ms^{-1}

(c) 0.125 ms^{-1} **(d)** 0.314 ms^{-1}

124. Vibratory (or oscillatory) motion is always under:

(a) An applied force **(b)** An elastic restoring force and inertia

(c) Periodic force **(d)** Gravitational force

125. The maximum K.E. of the mass attached to an elastic spring is given by:

(a) $(K.E.)_{max} = \frac{kx_o}{2}$ **(b)** $(K.E.)_{max} = \frac{kx_o^2}{2}$

(c) $(K.E.)_{max} = \frac{kx}{2}$ **(d)** $(K.E.)_{max} = \frac{kx^2}{2}$

126. The length of second's pendulum is:

(a) 100 cm **(b)** 99 cm

(c) 99.2 cm **(d)** 98 cm

127. At what place motion of simple pendulum will be slowest:

(a) Poles **(b)** Equator

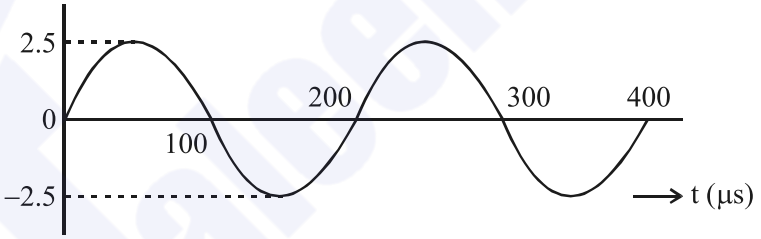
(c) On the surface of earth **(d)** At the centre of the earth

128. The frequency of the second pendulum is:

(a) 1 hertz **(b)** 0.5 hertz

(c) 1.5 hertz **(d)** 2 hertz

129. The diagram below represents the variation with time of pressure at a point in air through which a sound wave is travelling at 340 ms^{-1}.



What is the frequency of the wave?

(a) 1.7 Hz **(b)** 5.0×10^3 Hz

(c) 1.6×10^4 Hz **(d)** 3.1×10^4 Hz

130. A body performing simple harmonic motion has a displacement x given by the equation = 30 sin 50 t, where t is the time in seconds. What is the frequency of oscillations?

(a) 0.020 Hz **(b)** 0.13 Hz

(c) 8.0 Hz **(d)** 30 Hz

ANSWERS

1.	(d)	**2.**	(b)	**3.**	(a)	**4.**	(a)
5.	(b)	**6.**	(d)	**7.**	(b)	**8.**	(d)
9.	(b)	**10.**	(d)	**11.**	(b)	**12.**	(b)
13.	(d)	**14.**	(a)	**15.**	(b)	**16.**	(a)
17.	(a)	**18.**	(b)	**19.**	(a)	**20.**	(c)
21.	(b)	**22.**	(a)	**23.**	(c)	**24.**	(c)
25.	(c)	**26.**	(c)	**27.**	(c)	**28.**	(a)
29.	(c)	**30.**	(a)	**31.**	(d)	**32.**	(b)
33.	(a)	**34.**	(a)	**35.**	(b)	**36.**	(b)
37.	(c)	**38.**	(a)	**39.**	(a)	**40.**	(a)
41.	(a)	**42.**	(a)	**43.**	(b)	**44.**	(b)
45.	(a)	**46.**	(d)	**47.**	(b)	**48.**	(c)
49.	(b)	**50.**	(d)	**51.**	(a)	**52.**	(c)
53.	(a)	**54.**	(b)	**55.**	(b)	**56.**	(b)
57.	(a)	**58.**	(b)	**59.**	(b)	**60.**	(b)
61.	(b)	**62.**	(c)	**63.**	(b)	**64.**	(c)
65.	(c)	**66.**	(d)	**67.**	(a)	**68.**	(c)
69.	(c)	**70.**	(c)	**71.**	(b)	**72.**	(b)
73.	(a)	**74.**	(a)	**75.**	(c)	**76.**	(d)
77.	(a)	**78.**	(d)	**79.**	(d)	**80.**	(b)
81.	(b)	**82.**	(d)	**83.**	(a)	**84.**	(c)
85.	(a)	**86.**	(a)	**87.**	(a)	**88.**	(d)
89.	(c)	**90.**	(d)	**91.**	(b)	**92.**	(a)
93.	(c)	**94.**	(c)	**95.**	(b)	**96.**	(c)
97.	(a)	**98.**	(c)	**99.**	(b)	**100.**	(b)
101.	(c)	**102.**	(a)	**103.**	(b)	**104.**	(d)
105.	(a)	**106.**	(b)	**107.**	(a)	**108.**	(d)
109.	(c)	**110.**	(b)	**111.**	(a)	**112.**	(b)
113.	(d)	**114.**	(c)	**115.**	(b)	**116.**	(c)
117.	(c)	**118.**	(d)	**119.**	(d)	**120.**	(c)
121.	(a)	**122.**	(b)	**123.**	(d)	**124.**	(b)
125.	(b)	**126.**	(c)	**127.**	(d)	**128.**	(b)
129.	(b)	**130.**	(c)				

WAVES

Each question has four possible answers, encircled the correct answer:

1. The mechanism in which energy is transferred from one place to another place is called:

(a) Wave motion **(b)** Wave

(c) Mechanical waves **(d)** Sound waves

2. The particle of the medium vibrates in longitudinal waves:

(a) Along the direction of wave motion **(b)** Do not vibrate at all

(c) Opposite the direction of wave motion **(d)** Perpendicular to the direction of wave motion

3. The waves which required certain medium for their propagation are called:

(a) Matter waves **(b)** Mechanical waves

(c) Water waves **(d)** Wave motion

4. The waves which do not required any medium for their propagation are called:

(a) Electromagnetic waves **(b)** Light waves

(c) X-rays **(d)** Radio waves

5. The waves associated with particles in motion are called:

(a) Light waves **(b)** Electronic waves

(c) Matter waves **(d)** Light waves

6. Electrons moving with high velocities behave like:

(a) Mechanical waves **(b)** Electronic waves

(c) Matter waves **(d)** Light waves

7. A mechanical wave is represented by:

(a) Light **(b)** Heat

(c) Compressional waves **(d)** None of the above

8. A wave which transfer energy in moving from the source of disturbance is called:

(a) Travelling waves **(b)** Matter waves

(c) Water waves **(d)** Radio waves

9. When the amplitude of the wave becomes double, its energy becomes:

(a) Four times **(b)** One half

(c) Double **(d)** Nine times

10. The speed of waves can be found indirectly from its:

(a) Frequency and time period **(b)** Frequency and wavelength

(c) Wavelength and time period **(d)** None of the above

11. Waves under ideal conditions may act as sources for transfer of:

(a) Matter only **(b)** Mass only

(c) Energy only **(d)** Transfer both mass and energy

12. The wavelength, frequency and speed of any progressive waves are written as:

(a) $f = \frac{\lambda}{v}$ **(b)** $f = \frac{v}{\lambda}$

(c) $f = v \times \lambda$ **(d)** $f = \lambda + v$

13. The distance between two successive crests or troughs is called:

(a) Area **(b)** Displacement

(c) Amplitude **(d)** Wavelength

14. The portion of the wave above the mean level is called:

(a) Trough **(b)** Crest

(c) Displacement **(d)** Amplitude

15. The portion of the wave below the mean level is called:

(a) Trough **(b)** Crest

(c) Wavelength **(d)** Amplitude

16. Crests and troughs are formed in:

(a) Chemical waves **(b)** Longitudinal waves

(c) Stationary waves **(d)** Transverse waves

17. All parts of the wave pattern move with:

(a) Same speed **(b)** Different speed

(c) Double speed **(d)** None of above

18. The expression $v = f\lambda$ is valid for all types of:

(a) Linear motion **(b)** Angular motion

(c) Wave motion **(d)** Circular motion

19. When a spring under tension is plucked one end at the wave formed as:

(a) Transverse waves **(b)** Square waves

(c) Longitudinal waves **(d)** Compressed waves

20. Waves in which particles of the medium vibrate parallel to the direction of propagation are called:

(a) Transverse waves **(b)** Stationary waves

(c) Longitudinal waves **(d)** Complex waves

21. Passage of waves from one medium into another is called:

(a) Reflection **(b)** Refraction

(c) Transmission **(d)** Diffraction

22. If 30 waves per second pass through a medium at a speed of 30 m/s, wavelength of these waves is:

(a) 30 m **(b)** 15 m

(c) 1 m **(d)** 280 m

23. Distance between two consecutive nodes is:

(a) λ **(b)** $\frac{\lambda}{2}$

(c) $\frac{\lambda}{4}$ **(d)** 2λ

24. The point at which the displacement of the wave is zero called:

(a) Node **(b)** Trough

(c) Anti-node **(d)** Crest

25. The point at which the displacement of the wave is maximum called the:

(a) Node **(b)** Trough

(c) Anti-node **(d)** Crest

26. When two identical waves are superposed, the velocity of the resultant wave:

(a) Becomes zero **(b)** Remains unchanged

(c) Increased **(d)** Decreased

27. When two similar waves moving along the same line in opposite direction are superposed, they give rise to:

(a) Stationary waves **(b)** Longitudinal waves

(c) Compressed waves **(d)** Travelling waves

28. The distance between two consecutive anti-node is:

(a) λ **(b)** 2λ

(c) $\frac{\lambda}{4}$ **(d)** $\frac{\lambda}{2}$

29. The stationary waves consists of:

(a) Crest and troughs **(b)** Nodes and anti-nodes

(c) Reflection & refraction **(d)** None of these

30. Water waves are:

(a) Stationary waves **(b)** Longitudinal waves

(c) Electromagnetic waves **(d)** Transverse waves

31. When a transverse wave is reflected on going from a denser to a rare medium, then:

(a) There is a 180° phase shift **(b)** There is no change in path

(c) A trough is converted into a crest **(d)** A crest is converted into a trough

32. When stationary waves are setup in a cord which is fixed at both ends, the points which always remain at rest is called:

(a) Nodes **(b)** Anti-nodes

(c) Both (a) & (b) **(d)** None of these

33. Expression for Newton's formula for speed of sound is:

(a) $v = \sqrt{\frac{E}{\rho}}$ **(b)** $v = \sqrt{\frac{\rho}{E}}$

(c) $v = \sqrt{\frac{E\gamma}{\rho}}$ **(d)** $v = \sqrt{\frac{\rho\gamma}{E}}$

34. The speed of sound waves is independent of:

(a) Pressure **(b)** Source of sound

(c) Medium **(d)** Temperature

35. The speed of sound in air proposed by Newton is:

(a) 280 m/s **(b)** 332 m/s

(c) 333 m/s **(d)** None of the above

36. Newton's formula for the speed of sound is corrected by:

(a) Graham Bell **(b)** Laplace

(c) Huygen **(d)** Weber-Fechner

37. If E is the modulus of elasticity and ρ is the density then the speed of sound is:

(a) $\sqrt{\frac{1}{E\rho}}$ **(b)** $\sqrt{\frac{E}{\rho}}$

(c) $\sqrt{E\rho}$ **(d)** $\sqrt{\frac{\rho}{E}}$

38. Laplace expression for the speed of sound in gas is:

(a) $v = \sqrt{\frac{\rho P}{\gamma}}$ **(b)** $v = \sqrt{\frac{\rho\gamma}{P}}$

(c) $v = \sqrt{\frac{P}{\gamma\rho}}$ **(d)** $v = \sqrt{\gamma P\rho}$

39. The velocity of sound in air at 0°C is:

(a) 332 m/s **(b)** 300 m/s

(c) 322 m/s **(d)** 280 m/s

40. Velocity of sound in vacuum is:

(a) Zero **(b)** 332 m/s

(c) 280 m/s **(d)** 325 m/s

41. The speed of sound waves in a medium depends upon:

(a) Density of medium **(b)** Amplitude of the particle

(c) Elasticity of medium **(d)** Both density and elasticity of medium

42. The velocity of sound is greatest in:

(a) Steel **(b)** Air

(c) Iron **(d)** Water

43. For all gases:

(a) $v_t = v_0\left(1 - \frac{t}{273}\right)$ **(b)** $v_t = v_0\left(1 + \frac{t}{273}\right)$

(c) $v_t = v_0\left(1 + \frac{273}{t}\right)$ **(d)** $v_t = v_0\,(1 + 273\,t)$

44. For temperature:

(a) $\frac{v_t}{v_0} = \sqrt{\frac{T}{T_0}}$ **(b)** $\frac{v_t}{v_0} = \sqrt{\frac{T_0}{T}}$

(c) $\frac{v_t}{v_0} = \frac{T}{T_0}$ **(d)** $\frac{v_t}{v_0} = TT_0$

45. For small temperature changes, velocity of sound can be determined by the relation:

(a) $v_t = v_0 + 0.61\,t$ **(b)** $v_t = v_0 + 61t$

(c) $v_t = v_0 + 2t$ **(d)** All of the above

46. Increase in velocity of sound in air for 1°C rise in temperature is:

(a) 0.61 m/s **(b)** 61.0 m/s

(c) 1.61 m/s **(d)** 2.00 m/s

47. The speed of sound is greater in solids than in gases due to their high:

(a) Temperature **(b)** Pressure

(c) Density **(d)** Elasticity

48. Which of the following properties for sound is affected by change in air temperature:

(a) Wavelength **(b)** Intensity

(c) Amplitude **(d)** Frequency

49. The superposition of a number of harmonic waves form:

(a) Standing waves **(b)** Complex waves

(c) Transverse waves **(d)** Matter waves

50. At the closed end of an air column, node occurs:

(a) Never **(b)** Always

(c) In certain case **(d)** None of these

51. Two waves having same frequency and traveling in the same direction is called:

(a) Beats **(b)** Interference

(c) Sound waves **(d)** None of these

52. Two waves of different frequency and traveling in the same direction is called:

(a) Interference **(b)** Beats

(c) Stationary waves **(d)** Sound waves

53. The interference in which the two waves are added up is called:

(a) Interaction **(b)** Constructive interference

(c) Destructive interference **(d)** None of these

54. The interference of sound waves in which two waves cancel each other is called:

(a) Interaction **(b)** Constructive interference

(c) Destructive interference **(d)** None of these

55. Two waves can interfere only if they have:

(a) Different frequency **(b)** Same velocity

(c) Propagation in opposite direction **(d)** Phase coherence

56. Periodic alternation of sound between maximum and minimum loudness are called:

(a) Diffraction **(b)** Interference

(c) Beats **(d)** None of these

57. Principle of superposition of waves is applied in:

(a) Formation of beats **(b)** Formation of stationary waves

(c) Interference of sound waves **(d)** All of the above

58. Beats cannot be heard if the difference of frequencies is more than about:

(a) 6 **(b)** 4

(c) 9 **(d)** 10

59. Laws of transverse vibrations of a stretched string are:

(a) $f \propto \sqrt{F}$ **(b)** $F \propto \frac{1}{l}$

(c) $f \propto \frac{1}{\sqrt{m}}$ **(d)** All of the above

60. A stretched string with both ends fixed corresponds to:

(a) A closed end pipe **(b)** An open-end organ pipe

(c) Both (a) & (b) **(d)** None of these

61. With the rise of temperature, the velocity of sound is:

(a) Increased **(b)** Decreased

(c) Remains constant **(d)** Becomes zero

62. The magnitude of auditory sensation produced by sound on the ear is known as:

(a) Loudness **(b)** Quality

(c) Intensity **(d)** Frequency

63. The loudness of sound L is proportional to the logarithm of intensity I_0 which is called:

(a) Newton formula for sound **(b)** Laplace formula for sound

(c) Weber-Fechner's law **(d)** None of these

64. The pitch of the sound is determined by its:

(a) Speed **(b)** Frequency

(c) Direction **(d)** Number of beats

65. The amplitude of sound waves determined by its:

(a) Speed **(b)** Frequency

(c) Direction **(d)** Number of beats

66. The amplitude of sound waves determines its:

(a) Pitch **(b)** Loudness

(c) Interference **(d)** None of the above

67. What is the approximate range of audible frequencies for a young person:

(a) 2 Hz to 2000 Hz **(b)** 20 Hz to 2000 Hz

(c) 20 Hz to 20,000 Hz **(d)** 200 Hz to 2 Hz

68. The unit of intensity level is:

(a) Watt **(b)** Joule

(c) Bel **(d)** None of these

69. Sound of frequencies lower than 20 Hz are called:

(a) Supersonics **(b)** Infrasonics

(c) Ultrasonics **(d)** Audible sound waves

70. Beats are the result of:

(a) Interference **(b)** Diffraction of sound waves

(c) Polarization **(d)** None of the above

71. Musical sound depends upon:

(a) Velocity **(b)** Frequency

(c) Amplitude **(d)** Periodicity and regularity

72. Quality of sound depends upon its:

(a) Amplitude **(b)** Frequency

(c) Harmonics **(d)** Intensity of sound

73. The pitch of sound depends upon:

(a) Loudness of sound **(b)** Wavelength of sound

(c) Intensity of sound **(d)** Frequency of sound

74. Loudness of sound depends upon:

(a) Frequency **(b)** Pitch

(c) Intensity of sound & ear **(d)** Ear alone

75. The number of beats produced per second is equal to:

(a) The difference of frequencies of two tuning forks

(b) The sum of the frequencies of two tuning forks

(c) The ratio of the frequencies of two tuning forks

(d) None of these

76. Two tuning forks of frequencies 260 Hz and 257 Hz are sounded together, the number of beats per second is:

(a) 3 **(b)** 4

(c) 2 **(d)** Zero

77. The apparent change in frequency as heard by an observer when there is relative motion between the source and observer is known as:

(a) Compton effect **(b)** Photo electric effect

(c) Doppler effect **(d)** None of these

78. Radar system is the application of:

(a) Photoelectric effect **(b)** Doppler effect

(c) Compton effect **(d)** None of these

79. Doppler's effect applies to:

(a) Light waves only **(b)** Sound waves only

(c) Both sound and light waves **(d)** None of these

80. When Doppler's effect is applied to electromagnetic waves source approaching the observer at rest represents:

(a) Identical situations **(b)** Different situations

(c) No change **(d)** None of these

81. When source of sound approaches the listener at rest, the frequency of sound received by him is:

(a) Less than the frequency of sound produced by source

(b) Greater than the frequency of sound produced by source

(c) Same as that produced by source

(d) Zero

82. When the source of sound moves away from a stationary listener, then there is:

(a) An apparent increase in frequency **(b)** An apparent decrease in frequency

(c) An apparent decrease in wavelength **(d)** No apparent change in frequency

83. When a listener is moving with velocity u_o towards the stationary source of sound of frequency f the speed of sound in air is v then changed frequency of the sound is given by:

(a) $f' = \frac{v}{v + u_o} f$ **(b)** $f' = \frac{v}{v - u_o} f$

(c) $f' = \frac{v - u_o}{v} f$ **(d)** $f' = \frac{v + u_o}{v} f$

84. When a listener is moving away with velocity u_o from the stationary source of sound of frequency f the speed of sound in air is v then the changed frequency of sound is given by:

(a) $f' = \frac{v + u_o}{v} f$ **(b)** $f' = \frac{v - u_o}{v} f$

(c) $f' = \frac{v}{v + u_o} f$ **(d)** $f' = \frac{v}{v - u_o} f$

85. A source of waves which gives out pure note means that it gives out:

(a) Mixture of frequency **(b)** Quantum frequencies

(c) Single frequency **(d)** None of these

86. When the difference between the frequencies of two sounds is more than about ————. Then it becomes difficult to recognize beats:

(a) 15 Hz **(b)** 10 Hz

(c) 5 Hz **(d)** 20 Hz

87. Dog hears sound which ranges:

(a) 150 – 150000 Hz **(b)** 100 – 12000 Hz

(c) 50 – 70000 Hz **(d)** 15 – 50000 Hz

88. Cat hears sound which ranges:

(a) 60 – 7000 Hz **(b)** 60 – 70000 Hz

(c) 15 – 50000 Hz **(d)** 150 – 150000 Hz

89. Speed of sound in hydrogen at 20°C at STP is:

(a) 332 m/s **(b)** 280 m/s

(c) 258 m/s **(d)** 333 m/s

90. Speed of sound in iron at 20°C is:

(a) 5130 m/s **(b)** 5230 m/s

(c) 5030 m/s **(d)** 3600 m/s

91. The distance between a node and antinode:

(a) λ **(b)** $\frac{\lambda}{2}$

(c) $\frac{\lambda}{4}$ **(d)** $\frac{3\lambda}{2}$

92. The speed of sound in air at 30°C is approximately equal to:

(a) 333 m/s **(b)** 350 m/s

(c) 340 m/s **(d)** 335 m/s

93. The speed of sound in air at S.T.P is 300 ms^{-1}. If the air pressure becomes double, the temperature remaining the same, the speed of sound would become:

(a) 1200 ms^{-1} **(b)** 600 ms^{-1}

(c) $300\sqrt{2}$ ms^{-1} **(d)** 300 ms^{-1}

94. If the number of loops of a stationary waves are increasing then:

(a) Wavelengths gets higher **(b)** Wavelengths gets shorter

(c) Wavelength becomes constant **(d)** None of these

95. Two pipes one is open and other is closed at one end are of same length then the ratio of their fundamental frequencies is:

(a) 1 : 2 **(b)** 2 : 1

(c) 1 : 1 **(d)** 1 : 4

96. The frequency of a stretched wire 1000 mm long is 256 Hz. When the wire is shortened to 400 mm at the same tension. What is the fundamental frequency?

(a) 102 Hz **(b)** 640 Hz

(c) 416 Hz **(d)** 162 Hz

97. The quantities which together determine the speed of sound in a liquid are:

(a) the bulk Modulus and the density **(b)** the bulk Modulus and the pressure

(c) the Young Modulus and the volume **(d)** the Young Modulus and the density

98. An organ pipe of effective length 0.68 m is closed at one end. Given that the speed of sound is 340 ms^{-1}. The two lowest Resonant frequencies are:

(a) 125 Hz and 250 Hz **(b)** 125 Hz and 375 Hz

(c) 250 Hz and 500 Hz **(d)** 250 Hz and 750 Hz

99. Two sources of sound have frequencies f_1 and f_2 respectively f_1 being slightly greater then f_2. What is the period of the beats heard when the sources operate simultaneously?

(a) $f_1 - f_2$ **(b)** $\frac{1}{f_1 - f_2}$

(c) $\frac{2}{f_1 - f_2}$ **(d)** $\frac{2\pi}{f_1 - f_2}$

100. When temperature increases, frequency of organ pipe:

(a) Decreases **(b)** Increases

(c) Unchanged **(d)** Becomes zero

101. The temperature at which the speed of sound in air becomes double its value at 0°C is:

(a) 1092°C **(b)** 819 K

(c) 819°C **(d)** 546°C

102. The distance between two consecutive antinodes is 0.50 m. The distance travelled by the wave in half the time period is:

(a) 2 m **(b)** 1 m

(c) 0.5 m **(d)** 0.25 m

103. It is possible to distinguish between transverse and longitudinal waves from the property of:

(a) Refraction **(b)** Interference

(c) Diffraction **(d)** Polarization

104. The wavelength of the fundamental mode of vibration of a closed end pipe is:

(a) $2l$ **(b)** l

(c) $4l$ **(d)** $l/2$

105. Stationary waves only of discrete set of frequencies are set up in a medium. This fact is called:

(a) Harmonics **(b)** Overtones

(c) Quantization of frequencies **(d)** Superposition of frequencies

106. Newton calculated the velocity of sound in air at S.T.P equal to:

(a) 280 ms^{-1} **(b)** 250 ms^{-1}

(c) 300 ms^{-1} **(d)** 322 ms^{-1}

107. Velocity of sound in vacuum at 0°C is:

(a) 332 ms^{-1} **(b)** 320 ms^{-1}

(c) Zero **(d)** 224 ms^{-1}

108. The magnitude of auditory sensation produced by sound on the ear is known as:

(a) Frequency **(b)** Intensity

(c) Quality **(d)** Loudness

109. If 20 waves pass through the medium in 1 second with speed of 20 ms^{-1} then the wavelength is:

(a) 20 m **(b)** 2 m

(c) 400 m **(d)** 1 m

110. The number of nodes between two consecutive antinodes is:

(a) Zero **(b)** 3

(c) 2 **(d)** 1

111. The system followed by Newton for the determination of speed of sound in air is:

(a) Adiabatic **(b)** Isothermal

(c) Isobaric **(d)** Isochoric

112. Stars moving towards the Earth show a:

(a) Red shift **(b)** Blue shift

(c) Yellow shift **(d)** Green shift

113. When two notes of frequencies f_1 and f_2 are sounded together, beats are formed if $f_1 > f_2$ then the frequency of beat is:

(a) $f_1 + f_2$ **(b)** $\frac{1}{2}(f_1 + f_2)$

(c) $f_1 - f_2$ **(d)** $\frac{1}{2}(f_1 - f_2)$

114. The speed of sound at 30° c is approximately equal to:

(a) 332 ms^{-1} **(b)** 335 ms^{-1}

(c) 340 ms^{-1} **(d)** 350 ms^{-1}

115. An air column in a pipe, which is closed at one end, will be in resonance with a vibrating tuning fork of frequency 250 Hz. The length of the column in cm is (Velocity of sound in air = 340 ms^{-1})

(a) 21.25 **(b)** 125

(c) 62.50 **(d)** 33.2

116. The minimum length of a closed pipe which can resound with a note of wavelength 1 m is:

(a) 0.25 m **(b)** 0.5 m

(c) 0.75 m **(d)** 1 m

117. A particle executes S.H.M. with a period of 6 s and amplitude of 3 cm. Its maximum speed in cm/s is:

(a) $\frac{\pi}{2}$ **(b)** π

(c) 2π **(d)** 3π

118. The end correction of a resonance column is 1 cm. If the shortest length resonating with a tunning fork is 15 cm, then the next resonating length is:

(a) 45 cm **(b)** 31 cm

(c) 46 cm **(d)** 47 cm

119. The ratio of the velocity of sound in air at 4 atmosphere and that at 1 atmosphere pressure would be:

(a) 1 : 1 **(b)** 4 : 1

(c) 1 : 4 **(d)** 3 : 1

120. A string of length l, fixed at both ends is vibrating in two segments. The wavelength of the corresponding wave is:

(a) $\frac{l}{4}$ **(b)** $\frac{l}{2}$

(c) l **(d)** $2l$

121. The frequency of waves produced to microwave oven is:

(a) 1435 MHz **(b)** 2450 MHz

(c) 1860 MHz **(d)** 2850 MHz

ANSWERS

1.	(a)	**2.**	(a)	**3.**	(b)	**4.**	(a)
5.	(c)	**6.**	(c)	**7.**	(c)	**8.**	(a)
9.	(a)	**10.**	(b)	**11.**	(d)	**12.**	(b)
13.	(d)	**14.**	(b)	**15.**	(a)	**16.**	(c)
17.	(a)	**18.**	(c)	**19.**	(a)	**20.**	(c)
21.	(c)	**22.**	(c)	**23.**	(b)	**24.**	(a)
25.	(c)	**26.**	(b)	**27.**	(a)	**28.**	(c)
29.	(b)	**30.**	(d)	**31.**	(c)	**32.**	(a)
33.	(a)	**34.**	(a)	**35.**	(a)	**36.**	(b)
37.	(b)	**38.**	(a)	**39.**	(a)	**40.**	(a)
41.	(d)	**42.**	(a)	**43.**	(a)	**44.**	(a)
45.	(a)	**46.**	(a)	**47.**	(d)	**48.**	(a)
49.	(a)	**50.**	(b)	**51.**	(b)	**52.**	(b)
53.	(b)	**54.**	(c)	**55.**	(d)	**56.**	(c)
57.	(d)	**58.**	(d)	**59.**	(d)	**60.**	(b)
61.	(a)	**62.**	(a)	**63.**	(c)	**64.**	(c)
65.	(c)	**66.**	(c)	**67.**	(c)	**68.**	(c)
69.	(b)	**70.**	(a)	**71.**	(d)	**72.**	(c)
73.	(d)	**74.**	(c)	**75.**	(a)	**76.**	(a)
77.	(c)	**78.**	(b)	**79.**	(c)	**80.**	(a)
81.	(b)	**82.**	(b)	**83.**	(d)	**84.**	(b)
85.	(c)	**86.**	(b)	**87.**	(d)	**88.**	(b)
89.	(c)	**90.**	(a)	**91.**	(c)	**92.**	(b)
93.	(d)	**94.**	(b)	**95.**	(b)	**96.**	(b)
97.	(a)	**98.**	(b)	**99.**	(b)	**100.**	(a)
101.	(c)	**102.**	(c)	**103.**	(d)	**104.**	(c)
105.	(c)	**106.**	(a)	**107.**	(c)	**108.**	(d)
109.	(d)	**110.**	(d)	**111.**	(d)	**112.**	(d)
113.	(b)	**114.**	(d)	**115.**	(d)	**116.**	(c)
117.	(c)	**118.**	(d)	**119.**	(a)	**120.**	(c)
121.	(b)						

PHYSICAL OPTICS

Each question has four possible answers, encircled the correct answer:

1. The carpuscular nature of light was given by:

(a) Huygen **(b)** Maxwell

(c) Newton **(d)** Thomas young

2. Light is the source to:

(a) Create energy **(b)** Destroy energy

(c) Carry energy **(d)** All of above

3. Wave theory of light was proposed by:

(a) Thomas young **(b)** Huygen

(c) Newton **(d)** Maxwell

4. According to Newton, light travels in the form of:

(a) Photons **(b)** Waves

(c) Carpascular **(d)** Electrons

5. Huygen proposed that light travels in spaced by means of wave motion in:

(a) 1960 **(b)** 1690

(c) 1680 **(d)** 1670

6. Light is the type of:

(a) Momentum **(b)** Velocity

(c) Energy **(d)** Acceleration

7. The light reaches the earth from the sun in plane:

(a) Amplitude **(b)** Frequency

(c) Wavelength **(d)** Wavefronts

8. In interference and diffraction of light, the waves and wavefronts considered as:

(a) Cylindrical **(b)** Conical

(c) Spherical **(d)** Plane

9. Huygen principle is used to explain the:

(a) Dispersion of light **(b)** Reflection of light

(c) Speed of light **(d)** Propagation of light

10. The shape of wavefronts depends upon:

(a) Shape of medium **(b)** Viscosity of medium

(c) Density of medium **(d)** All of above

11. The direction in which light energy is carried called:

(a) Ray **(b)** Wavefront

(c) Locus **(d)** All of above

12. A plane wave is obtained if a point source of light is placed at the focus of a:

(a) Glass **(b)** Plane lens

(c) Mirror **(d)** None of these

13. When the disturbance is propagated out in all directions from a point source, the wavefronts are:

(a) Spherical **(b)** Conical

(c) Plane **(d)** None of these

14. All the points on a primary wavefront can be considered as the source for the production of secondary wavelets is:

(a) Huygen principle **(b)** Hertz principle

(c) Newton's principle **(d)** Maxwell's principle

15. The electromagnetic theory was developed by:

(a) Newton **(b)** Huygen

(c) Maxwell **(d)** Thomas young

16. Direction of propagation of light ray is:

(a) Along the wavefront

(b) Perpendicular to wavefront

(c) At an angle of 45° to the plane of the wavefront

(d) None of these

17. Light waves are:

(a) Complex **(b)** Monochromatic

(c) Mixture of monochromatic and complex **(d)** None of these

18. A medium which separates out a complex waves into component waves is called a:

(a) Polarizing medium **(b)** Refractive medium

(c) Dispersive medium **(d)** None of these

19. When light waves pass through a dispersive medium what happens to them:

(a) No effect at all **(b)** Split into its component waves

(c) Both (a) and (b) **(d)** None of these

20. When waves pass from one medium to another:

(a) Their wavelength changes **(b)** Their speed changes

(c) Frequency remains constant **(d)** All of above

21. Electromagnetic theory of radiation failed to explain:

(a) Compton effect **(b)** Mass-energy relation

(c) Photoelectric effect **(d)** All of them

22. Electromagnetic waves travel in free space with velocity equal to:

(a) 3×10^{10} m/s **(b)** 3×10^{8} m/s

(c) 3×10^{9} m/s **(d)** 6×10^{7} m/s

23. The first explanation of wave nature of light was provided in 1801 by the experiment of:

(a) Maxwell **(b)** Thomas young

(c) Huygen **(d)** Newton

24. Huygen's principle is used to explain:

(a) The speed of light **(b)** The polarisation

(c) Locate the wavefront **(d)** None of these

25. The locus of all points in a medium having the same phase of vibration is called:

(a) Wavefront **(b)** Wavelength

(c) Focal length **(d)** None of these

26. Huygen principle states that:

(a) Light travel in electromagnetic waves

(b) Light has dual nature

(c) Light travel in straight line

(d) All points on primary wavefront are source of secondary wavelets

27. The phenomenon of the resultant wave obtained by overlapping of two or more waves is called:

(a) Reflection **(b)** Refraction

(c) Interference **(d)** Polarisation

28. The monochromatic sources of light emit waves having a constant phase difference are called:

(a) Reliable sources **(b)** Unreliable sources

(c) Primary sources **(d)** Coherent sources

29. Interference effects of light was verified by:

(a) Bragg **(b)** Newton

(c) Thomas young **(d)** None of the above

30. Which one of the following is monochromatic light source:

(a) Light from simple lamp **(b)** Light from sodium lamp

(c) Light from fluouscent **(d)** Light from neon lamp

31. Two sources of light are coherent if they emit rays of:

(a) Same amplitude

(b) Same wavelengths

(c) Same amplitude and wavelength

(d) Same wavelength with constant phase coherence

32. When the crest of one wave falls on the crest of the other waves, this phenomena is known as:

(a) Polarisation **(b)** Dispersion

(c) Constructive interference **(d)** Destructive interference

33. When crest of one wave falls over the trough of other wave, this phenomenon is known as:

(a) Diffraction **(b)** Polarisation

(c) Constructive interference **(d)** Destructive interference

34. Interference produced by reflected light in thin films is constructive when path difference is:

(a) $d \sin \theta = m\lambda$ **(b)** $d \sin \theta = \left(m + \frac{1}{2}\right)\lambda$

(c) $d \sin \theta = \left(m - \frac{1}{2}\right)\lambda$ **(d)** $2d \sin \theta = m\lambda$

35. In order to get interference of light waves:

(a) The sources should be monochromatic

(b) The sources should be phase coherent

(c) The law of super-position should be applicable

(d) All of above

36. The condition for constructive interference of two waves is that the path difference should be:

(a) Integral multiple of λ **(b)** Integral multiple of $\frac{\lambda}{2}$

(c) Even integral multiple of λ **(d)** None of these

37. The condition for destructive interference of two waves is that the path difference should be:

(a) Integral multiple of λ **(b)** Integral multiple of $\frac{\lambda}{2}$

(c) Odd integral multiple of $\frac{\lambda}{2}$ **(d)** None of these

38. In young's double slit experiment, the path difference for bright fringe is:

(a) $d \cos \theta = m\lambda$ **(b)** $d \sin \theta = m\lambda$

(c) $d \sec \theta = m\lambda$ **(d)** $d \tan \theta = m\lambda$

39. In young's double slit experiment, the path difference for dark fringe is:

(a) $d \sin \theta = \left(m - \frac{1}{2}\right)\lambda$ **(b)** $d \sin \theta = m\lambda$

(c) $d \sin \theta = \left(m + \frac{1}{2}\right)\lambda$ **(d)** $d \tan \theta = \left(m + \frac{1}{2}\right)\lambda$

40. The distance between two adjacent bright or dark fringes is:

(a) $\Delta y = \frac{L\lambda}{d}$ **(b)** $\Delta y = \frac{\lambda}{d}$

(c) $\Delta y = \frac{\lambda}{Ld}$ **(d)** $\Delta y = Ld\lambda$

41. In young's double slits experiment, the fringe spacing is:

(a) $\Delta y = \frac{d}{\lambda D}$ **(b)** $\Delta y = \frac{2\lambda d}{D}$

(c) $\Delta y = \frac{\lambda D}{d}$ **(d)** $\Delta y = \frac{\lambda d}{D}$

42. In young's experiment if white light is used:

(a) Dark fringe will be seen

(b) Bright fringe will be seen

(c) Alternate dark and bright fringes will be seen

(d) No fringe will be seen

43. The distance between any two consecutive bright fringes is called:

(a) Wavelet **(b)** Fringe spacing

(c) Amplitude **(d)** Wavelength

44. The interference fringe spacing depends upon:

(a) Separation between the sources **(b)** The wavelength of light used

(c) The distance of screen from the source **(d)** All of above

45. A thin film is transparent medium whose thickness is comparable with wavelength of:

(a) Sound **(b)** Heat

(c) Light **(d)** None of these

46. A thin layer of oil on the surface of water looks coloured due to:

(a) Transmission of light **(b)** Polarization of light

(c) Interference of light **(d)** None of these

47. Soap film in sunlight appears coloured due to:

(a) Diffraction of light **(b)** Scattering of light

(c) Interference of light **(d)** Dispersing of light

48. Brilliant and beautiful colours in soap bubbles on surface of water are due to:

(a) Interference of heat **(b)** Interference of light

(c) Interference of sound **(d)** All of the above

49. A white light passed through a prism is:

(a) Polarized **(b)** Dispersed

(c) Diffracted **(d)** Deviated

50. Newton's rings are formed due to:

(a) Reflection of light **(b)** Polarization of light

(c) Interference of light **(d)** Diffraction of light

51. When Newton's rings interference is seen by mean of reflected light, the central spot is:

(a) Dark **(b)** Bright

(c) Blue **(d)** Red

52. Michelson interferometer can be used to find the:

(a) Wavelength of light **(b)** Wavelength of sound

(c) Velocity of sound **(d)** Velocity of light

53. The Michelson formula for displacement L is:

(a) $L = m\frac{\lambda}{2}$ **(b)** $L = 2m\lambda$

(c) $\lambda L = 2m$ **(d)** $\lambda L = \frac{m}{2}$

54. Michelson interferometer was devised in:

(a) 1987 **(b)** 1881

(c) 1687 **(d)** 1789

55. When one mirror of a Michelson interferometer is move a distance of 0.5 mm, 2000 fringes are observed, the wavelength of light used is:

(a) 2000 A° **(b)** 1000 cm

(c) 5000 A° **(d)** None of these

56. The property of bending light when it passes from one medium to another medium is known as:

(a) Dispersion of light **(b)** Diffraction of light

(c) Reflection of light **(d)** None of these

57. Diffraction effects are:

(a) More for sharp edges **(b)** Less for cylindrical

(c) Less for round edge **(d)** Less for sharp edge

58. We get light inside a room in a day time due to:

(a) Diffraction **(b)** Refraction

(c) Interference **(d)** Polarized

59. Diffraction effects was discovered in 1801 by:

(a) Newton **(b)** Henry

(c) Huygen **(d)** W.L Bragg

60. A glass plate having a large number of close parallel equidistant slits mechanically rules on it is called:

(a) Diffraction **(b)** Diffraction grating

(c) Fring spacing **(d)** All of the above

61. A diffraction grating has 500 lines per mm. Its grating element will be:

(a) 500 mm **(b)** 5×10^{-3} mm

(c) 2×10^{-3} mm **(d)** 5×10^{3} mm

62. The formula for grating element is:

(a) $d \sin \theta = \lambda$ **(b)** $d \sin \theta = m\lambda$

(c) $d \sin \theta = \frac{3}{2}\lambda$ **(d)** $md \sin \theta = \lambda$

63. The condition for constructive interference in case of diffraction grating:

(a) $d \sin \theta = m\lambda$ **(b)** $2d \sin \theta = m\lambda$

(c) $d \sin \theta = \frac{m}{\lambda}$ **(d)** $d \sin \theta = 2m\lambda$

64. Interference effects of light were verified by:

(a) Thomas young **(b)** Newton

(c) Einstien **(d)** W.L. Bragg

65. A fringe is a path of:

(a) Constant phase **(b)** Constant amplitude

(c) Same wavelength **(d)** None of these

66. The main advantage of a grating over young's apparatus is the:

(a) Absence of bright light **(b)** Greater deviation of light

(c) Absence of dark fringes **(d)** Sharpness of bright lines

67. Michelson interferometer is based on the principle of:

(a) Division of wavefronts **(b)** Division of amplitude

(c) Addition of amplitude **(d)** None of these

68. The blue of the sky is due to:

(a) Polarization **(b)** Reflection

(c) Refraction **(d)** Scattering

69. The velocity of light was accurately measured by:

(a) Newton **(b)** Faraday

(c) Michelson **(d)** Young

70. The wavelength of X-rays is:

(a) 1000 A° **(b)** 10 A°

(c) 1 A° **(d)** 100 A°

71. Interference and diffraction of light support the:

(a) Particle nature of light **(b)** Quantum nature of light

(c) Transverse nature of light **(d)** Wave nature of light

72. Polarization of light shows that light is:

(a) Extremely short wavelength **(b)** Transverse waves

(c) Longitudinal waves **(d)** Corpuscular in nature

73. Polarization of light takes place in:

(a) Transverse waves **(b)** Longitudinal waves

(c) Sound waves **(d)** None of these

74. The polarization of an electromagnetic waves is determined by:

(a) Electric field **(b)** Magnetic field

(c) Both electric and magnetic **(d)** The direction of waves

75. A polarized is:

(a) A light filter **(b)** To analysed polarized light

(c) Used in polarimeter **(d)** An adjustable shatter

76. Which one of the following cannot be polarized:

(a) Sound waves **(b)** Radio waves

(c) Ultraviolet rays **(d)** X-rays

77. One angstrom is equal to:

(a) 10^{-6} m **(b)** 10^{-8} nm

(c) 10^{-10} nm **(d)** 10^{-8} cm

78. Diffraction is a special type of:

(a) Interference **(b)** Reflection

(c) Polarization **(d)** None of these

79. Young's double slit experiment proves:

(a) Dual nature of light **(b)** Particle nature of light

(c) Wave nature of light **(d)** None of these

80. Two light waves which are not coherent cannot:

(a) Be interference **(b)** Be diffracted

(c) Be polarized in the same plane **(d)** None of these

81. Light on passing through a Polaroid is:

(a) Unpolarized **(b)** Plane polarized

(c) Elliptically polarized **(d)** Circularly polarized

82. Longitudinal waves do not exhibit:

(a) Diffraction **(b)** Polarization

(c) Reflection **(d)** Refraction

83. Light has:

(a) Particle nature **(b)** Wave nature

(c) Dual nature **(d)** None of these

84. Light waves are:

(a) Longitudinal waves **(b)** Transverse waves

(c) Compressional waves **(d)** None of these

85. Wave length of light on the average is given by:

(a) 10^{-9} **(b)** 10^{-10}

(c) 10^{-4} **(d)** 10^{-6}

86. Light waves are:

(a) Mechanical waves **(b)** Electromagnetic waves

(c) Matter waves **(d)** None of these

87. Monochromatic light means waves of:

(a) Same colour **(b)** Same wavelength

(c) Same frequency **(d)** All of these

88. The path difference 'd' for constructive interference should be:

(a) $d = \lambda/2$ **(b)** $d = 5\lambda/2$

(c) $d = m\lambda$ **(d)** $d = m\lambda \quad m = 0, \pm1, \pm2$

89. The equation $2d \sin\theta = n\lambda$ denotes:

(a) Huygen's principle **(b)** Young's double slit experiment

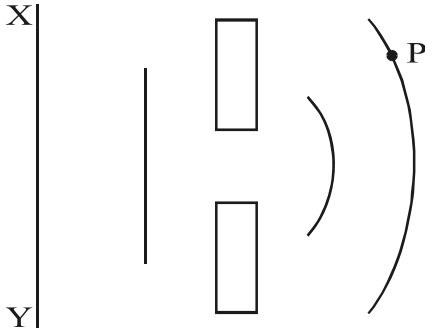
(c) Brogg's equation **(d)** Diffraction grating equation

90. Ultra-violet rays differ from x-rays in that ultra-violet rays:

(a) cannot be diffracted **(b)** cannot be polarized

(c) do not affect a photo-graphic plate **(d)** have a lower frequency

91. A monochromatic plane wave of speed 'c' and wavelength 'λ' is diffracted at a small aperture. The diagram illustrated successive wavefronts. After what time will some portion of the wavefront xy reach P:



(a) $\frac{3\lambda}{2c}$ **(b)** $\frac{2\lambda}{c}$

(c) $\frac{3\lambda}{c}$ **(d)** $\frac{4\lambda}{c}$

92. For which of the following colours will the fringe width be minimum in the double-slit experiment:

(a) Violet **(b)** Red

(c) Green **(d)** Yellow

93. A diver in a lake wants to signal his distress to a person sitting on the edge of the lake flashing his water proof torch. He should direct the beam.

(a) Vertically upwards

(b) Horizontally

(c) At angle to the vertical which is slightly less than the critical angle

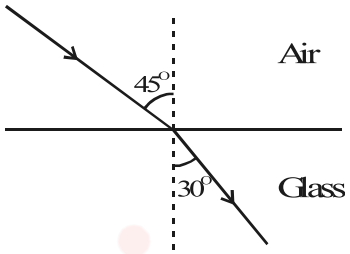
(d) At an angle to the vertical which is slightly more than critical angle

94. The least distance of distinct vision is 25 cm. The focal length of a convex lens is 5 cm. It can act as a simple microscope of magnifying power.

(a) 4 **(b)** 5

(c) 6 **(d)** 3

95. A ray of light travels from air to glass as shown in figure. What is the speed of light in the glass?



(a) 2.0×10^{-6} ms^{-1}

(b) 2.12×10^{-8} ms^{-1}

(c) 2.12×10^{8} ms^{-1}

(d) 3.25×10^{8} ms^{-1}

96. Light reaches the earth from sun in nearly:

(a) 15 minutes **(b)** 10 minutes

(c) 8 minutes **(d)** 8 minutes 20 second

97. Longitudinal waves do not exhibit (show):

(a) Reflection **(b)** Refraction

(c) Diffraction **(d)** Polarisation

98. The danger signals are red while the eye is more sensitive to yellow because:

(a) Scattering in yellow colour is less than that of red

(b) Red light is longer in wavelength than yellow light

(c) Scattering in red is less than in yellow

(d) Red colour has greater frequency than yellow light

99. When crest of one wave falls over the crest of the other waves, this phenomenon is known as:

(a) Destructive interference **(b)** Constructive interference

(c) Dispersion **(d)** Polarisation

100. In Young's double experiment, if white light is used:

(a) Bright fringes will be seen

(b) Dark fringes will be seen

(c) Alternate dark and bright fringes will be seen

(d) No interference fringes will be seen

101. In Young's double slit experiment, if the distance between the slits is doubled and distance between the slits and the screen is halved, the fringe width or spacing is:

(a) Half **(b)** Double

(c) Four times **(d)** One fourth

102. The blue of the sky is due to:

(a) Diffraction **(b)** Reflection

(c) Polarisation **(d)** Scattering

103. When one mirror of a Michelson interferometer is moved a distance of 0.5 mm, 2000 fringes are observed, the wavelength of light used is:

(a) 5000 nm **(b)** 5000 A°

(c) 500 cm **(d)** 2000 A°

104. The wavelength of X-rays is of the order of:

(a) 10 A° **(b)** 1000 A°

(c) 1 A° **(d)** 100 A°

105. Wavelength of X-rays falling at glancing angle of 30° on a crystal with atomic spacing 2×10^{-10} m for the first order diffraction is:

(a) 4×10^{-10} m **(b)** 2×10^{-10} m

(c) 0.2×10^{-10} m **(d)** 20×10^{-10} m

106. If 5000 lines per cm are ruled on a diffraction grating, then the slit spacing will be:

(a) 5×10^{-3} A° **(b)** 0.02 m

(c) 2×10^{-4} A° **(d)** 2×10^{4} A°

107. Which one of the following cannot be polarized?

(a) Radio waves **(b)** Ultraviolet rays

(c) X-rays **(d)** Sound waves

108. The ratio of fringe width for bright and dark fringes is:

(a) 1 : 2 **(b)** 2 : 1

(c) 1 : 4 **(d)** 1 : 1

109. Ratio of intensities of two waves are 4 : 1 then ratio of amplitude of two waves is:

(a) 2 : 1 **(b)** 1 : 2

(c) 4 : 1 **(d)** 1 : 4

110. The index of refraction of diamond is 2.0 velocity of light in diamond in m/sec. is:

(a) 6×10^{8} **(b)** 3×10^{8}

(c) 2×10^{8} **(d)** 1.5×10^{8}

ANSWERS

1.	(c)	**2.**	(c)	**3.**	(b)	**4.**	(c)
5.	(b)	**6.**	(c)	**7.**	(d)	**8.**	(c)
9.	(d)	**10.**	(d)	**11.**	(a)	**12.**	(b)
13.	(a)	**14.**	(a)	**15.**	(c)	**16.**	(b)
17.	(a)	**18.**	(c)	**19.**	(b)	**20.**	(d)
21.	(d)	**22.**	(b)	**23.**	(b)	**24.**	(c)
25.	(a)	**26.**	(d)	**27.**	(c)	**28.**	(d)
29.	(c)	**30.**	(b)	**31.**	(d)	**32.**	(c)
33.	(b)	**34.**	(a)	**35.**	(d)	**36.**	(a)
37.	(b)	**38.**	(b)	**39.**	(c)	**40.**	(a)
41.	(c)	**42.**	(d)	**43.**	(b)	**44.**	(d)
45.	(c)	**46.**	(c)	**47.**	(c)	**48.**	(b)
49.	(b)	**50.**	(c)	**51.**	(a)	**52.**	(a)
53.	(a)	**54.**	(b)	**55.**	(c)	**56.**	(b)
57.	(a)	**58.**	(a)	**59.**	(c)	**60.**	(b)
61.	(b)	**62.**	(b)	**63.**	(a)	**64.**	(a)
65.	(a)	**66.**	(d)	**67.**	(b)	**68.**	(d)
69.	(c)	**70.**	(c)	**71.**	(d)	**72.**	(b)
73.	(a)	**74.**	(a)	**75.**	(c)	**76.**	(a)
77.	(d)	**78.**	(a)	**79.**	(c)	**80.**	(a)
81.	(b)	**82.**	(b)	**83.**	(c)	**84.**	(b)
85.	(d)	**86.**	(b)	**87.**	(d)	**88.**	(d)
89.	(c)	**90.**	(d)	**91.**	(c)	**92.**	(a)
93.	(c)	**94.**	(c)	**95.**	(c)	**96.**	(d)
97.	(d)	**98.**	(c)	**99.**	(b)	**100.**	(c)
101.	(d)	**102.**	(d)	**103.**	(b)	**104.**	(c)
105.	(b)	**106.**	(b)	**107.**	(d)	**108.**	(d)
109.	(a)	**110.**	(d)				

OPTICAL INSTRUMENT

Each question has four possible answers, encircled the correct answer:

1. Any transparent medium bounded by one or two spherical surface, is called:

(a) Lens **(b)** Mirror

(c) Prism **(d)** None of these

2. The minimum distance from the eye at which an object appears to be distinct is called the least distance of:

(a) Focal length **(b)** Distinct vision

(c) Focus **(d)** All of above

3. A lens which is thicker from middle and thinner from edges called:

(a) Convex lens **(b)** Concave lens

(c) Convex mirror **(d)** Concave mirror

4. A lens which is thinner from middle and thicker from edges called:

(a) Convex lens **(b)** Concave mirror

(c) Convex mirror **(d)** Concave lens

5. The ratio of the size of image to the size of object is called:

(a) Magnification **(b)** Angular magnification

(c) Classification **(d)** None of these

6. The ratio of the angles subtended by the image as seen through the optical device to that angle subtended by the object at the eye is called:

(a) Linear magnification **(b)** Angular magnification

(c) Tabulation **(d)** Calculation

7. A straight line joining the centers of curvature of two surfaces is called:

(a) Principal axis **(b)** Radius of lens

(c) Diameter of lens **(d)** Principal focus

8. A point where the incident rays of light converge or appears to diverge after passing through the lens is called:

(a) Aperture **(b)** Focus

(c) Optical centre **(d)** Pole of lens

9. When light passes from one medium to another medium, it is bend away from the normal. This phenomenon is called:

(a) Diffraction **(b)** Refraction

(c) Dispersion **(d)** Polarization

10. The distance of near point from the eye is about:

(a) 25 cm **(b)** 25 m

(c) 10 cm **(d)** 10 cm

11. A fixed point inside the lens through which a ray of light does not change its path is called:

(a) Pole **(b)** Principal focus

(c) Optical centre **(d)** None of these

12. The distance between the principal focus and the optical centre of the lens is called:

(a) Aperture **(b)** Focal length

(c) Radius of curvature **(d)** None of these

13. When an object is brought from a far point to the focal point of a convex lens, the size of image is:

(a) Unchanged **(b)** Decreasing

(c) Increasing **(d)** All of above

14. The apparent size of the object depends upon its actual size and angle subtended by it at the:

(a) Eye **(b)** Face

(c) Mouth **(d)** Near point at eye

15. When an object is viewed at a shorter distance, the image on the retina of the eye is:

(a) Greater **(b)** Smaller

(c) Unchanged **(d)** None of these

16. The reciprocal of the focal length of a lens is expressed in metres is called:

(a) Power of lens **(b)** Focus of lens

(c) Aperture of lens **(d)** None of these

17. The unit of power of a lens is:

(a) Newton **(b)** Watt

(c) Dioptre **(d)** None of above

18. The power of a convex lens of focal length 50 cm will be:

(a) 2 dioptre **(b)** 5 dioptre

(c) 1.5 dioptre **(d)** None of these

19. The focal length of concave lens is:

(a) Positive **(b)** Negative

(c) Positive and negative **(d)** None of these

20. The focal length of convex lens is:

(a) Positive **(b)** Negative

(c) Positive and negative **(d)** None of these

21. In case of concave lens, the image of the real object is:

(a) Real, magnified and inverted **(b)** Virtual, diminished and erect

(c) Virtual, magnified and erect **(d)** None of these

22. The resolving power of an instrument can be expressed as:

(a) α_{min} **(b)** α_{max}

(c) α **(d)** None of these

23. Raleigh showed that for a light of wavelength λ through a lens of diameter D, the resolving power is:

(a) $\alpha_{min} = 1.22 \frac{\lambda}{D}$ **(b)** $\alpha_{min} = 1.22 \frac{D}{\lambda}$

(c) $\alpha_{min} = \frac{1.22}{\lambda D}$ **(d)** $\alpha_{min} = 1.22\ \lambda D$

24. In case of grating spectrometer, the resolving power R of the grating is defined as:

(a) $R = \lambda \,.\, \Delta\lambda$ **(b)** $R = \frac{\lambda}{\Delta\lambda}$

(c) $R = \frac{\Delta\lambda}{\lambda}$ **(d)** None of these

25. The resolving power in the mth order grating equals to:

(a) $R = N \times m$ **(b)** $R = \frac{N}{m}$

(c) $R = \frac{m}{N}$ **(d)** $R = \frac{1}{N\text{-}m}$

26. If an object is placed in front of convex lens then the image will be:

(a) Real and erect **(b)** Real and inverted

(c) Virtual and erect **(d)** Virtual

27. If an object is placed in front of concave lens then the image will be:

(a) Virtual and erect **(b)** Real and inverted

(c) Real and erect **(d)** Virtual

28. If an object is placed at 2F from convex lens, the image is located behind the lens:

(a) Between lens and focus **(b)** At 2F

(c) Between F and 2F **(d)** At the focus

29. Convex lens forms:

(a) Real and erect image **(b)** Virtual and inverted image

(c) Real and inverted image **(d)** None of these

30. If an object is placed slightly more than 2F from a converging lens, the image is located behind the lens:

(a) At 2F **(b)** Between F and 2F

(c) At the focus **(d)** None of these

31. Magnification of a lens is positive when the image is:

(a) Real and inverted **(b)** Virtual and inverted

(c) Real and erect **(d)** None of these

32. Magnification of a lens is negative when the image is:

(a) Real and inverted **(b)** Virtual and inverted

(c) Virtual and erect **(d)** None of these

33. Magnifying power of an optical instrument is given by the ratio of:

(a) $\frac{\beta}{\alpha}$ **(b)** $\frac{\alpha}{\beta}$

(c) $\frac{2\beta}{\alpha}$ **(d)** $\frac{2\alpha}{\beta}$

34. The magnification of the simple microscope if α and β are the angles subtended by the object when seen through the lens and when viewed directly is:

(a) $M = \frac{\beta}{\alpha}$ **(b)** $M = \frac{\alpha}{\beta}$

(c) $M = \alpha\beta$ **(d)** $M = \frac{1}{\alpha\beta}$

35. The magnifying power of a simple microscope is:

(a) $M = 1 + \frac{f}{d}$ **(b)** $M = 1 + \frac{d}{f}$

(c) $M = 1 + fd$ **(d)** None of these

36. An optical device used for the large magnification of a very minute object is called:

(a) Simple microscope **(b)** Compound microscope

(c) Convex lens **(d)** Telescope

37. The convex lens used in compound microscope as objective has focal length:

(a) Large **(b)** Short

(c) Same as eye-piece **(d)** None of these

38. If a single convex lens is placed close to the eye then it can be used as:

(a) Simple microscope **(b)** Compound microscope

(c) Spectrometer **(d)** Telescope

39. The final image produced by the eye-piece of compound microscope is:

(a) Real and inverted **(b)** Real and erect

(c) Virtual and inverted **(d)** Virtual and erect

40. The magnifying power of a compound microscope is:

(a) $M = \frac{p}{q}\left(1 + \frac{d}{f_e}\right)$ **(b)** $M = \frac{q}{p}\left(1 + \frac{d}{f_e}\right)$

(c) $M = \frac{q}{p}\left(1 - \frac{d}{f_e}\right)$ **(d)** $M = pq\left(1 + \frac{d}{f_e}\right)$

41. The magnifying power of a compound microscope is:

(a) Magnification of objective ÷ Magnification of eye-piece

(b) Magnification of objective + Magnification of eye-piece

(c) Magnification of objective × Magnification of eye-piece

(d) Magnification of objective − Magnification of eye-piece

42. In compound microscope, the focal length of eye-piece is:

(a) Large **(b)** Small

(c) Same as objective **(d)** None of these

43. The eye-piece of a compound microscope acts as:

(a) Converging mirror **(b)** Converging lens

(c) Diverging mirror **(d)** Diverging lens

44. If focal length of objective is increased:

(a) Magnifying power of compound microscope decreased

(b) Magnifying power of astronomical telescope increases

(c) Length of astronomical telescope increases

(d) All of above

45. The resolving power of a compound microscope depends upon:

(a) The refractive index of the medium in which the object is placed

(b) The angle subtended by the objective lens at the object

(c) The diameter of the objective lens

(d) None of these

46. It is an optical instrument used to very far off objects is called:

(a) Telescope **(b)** Microscope

(c) Convex lens **(d)** Spectrometer

47. A simple astronomical telescope consists of:

(a) Two convex lens **(b)** Two concave lens

(c) One convex and one concave **(d)** None of these

48. The image of a distant object viewed through telescope appears:

(a) Larger **(b)** Brighter

(c) Smaller **(d)** Dull

49. The distance between the objective and eye-piece of a telescope in normal adjustment is:

(a) $f_0 - f_e$ **(b)** $f_0 + f_e$

(c) $f_e - f_0$ **(d)** None of these

50. The magnifying power of astronomical telescope is:

(a) $M = \frac{f_e}{f_0}$ **(b)** $M = f_e f_0$

(c) $M = \frac{1}{f_e f_0}$ **(d)** $M = \frac{f_0}{f_e}$

51. The resolving power of an astronomical telescope depends upon:

(a) The focal length of the objective lens **(b)** The least distance of distinct vision of the observer

(c) The focal length of the eye-piece **(d)** The diameter of the objective lens

52. The magnifying power of an instrument is expressed in:

(a) Radians **(b)** Degrees

(c) No units **(d)** None of these

53. For an astronomical telescope $f_0 + f_e = 105$ cm, $\frac{f_0}{f_e} = 20$ the focal lengths of objective and eye-piece are:

(a) 50 cm, 5 cm **(b)** 210 cm, 25 cm

(c) 100 cm, 5 cm **(d)** None of these

54. The final image obtained by astronomical telescope is:

(a) Erect **(b)** Virtual

(c) Magnified **(d)** All of them

55. Lenses of focal lengths 100 cm and 5 cm are used as objective and eye-piece of an astronomical telescope, its length for normal adjustment is:

(a) 95 cm **(b)** 105 cm

(c) 20 cm **(d)** None of these

56. An optical instrument used to study the properties of light:

(a) Spectrometer **(b)** Simple microscope

(c) Telescope **(d)** None of these

57. A grating is placed on the turn table which is capable of rotating about a fixed:

(a) Vertical axis **(b)** Horizontal axis

(c) Both (a) and (b) **(d)** None of these

58. The component of the spectrometer which consists of a fixed metallic tube with a convex lens at one end and an adjustable slit is called:

(a) Telescope **(b)** Collimator

(c) Turntable **(d)** Grating

59. An instrument which consists of three parts that is collimator, telescope and turn table is called:

(a) Compound microscope **(b)** Spectrometer

(c) Telescope **(d)** None of these

60. In spectrometer, the function of collimator is to produce:

(a) Parallel beam of light **(b)** Converging beam of light

(c) Diverging beam of light **(d)** None of these

61. The ability of an instrument to reveal the minor details of the object under examination is its:

(a) Magnification **(b)** Resolution

(c) Resolving power **(d)** None of these

62. The formula $\alpha_{min} = 1.22\ \lambda/\Delta\lambda$ for resolving power was given by:

(a) Einstien **(b)** Newton

(c) Michelson **(d)** Raleigh

63. The scientist who correctly measured the speed of light was:

(a) Einstien **(b)** Michelson

(c) Gallileo **(d)** Newton

64. The scientist who made first attempt to measure the speed of light was:

(a) Huygen **(b)** Young

(c) Einstien **(d)** Gallileo

65. Michelson used the equation to find the speed of light is:

(a) $C = \frac{16}{fd}$ **(b)** $C = \frac{16f}{d}$

(c) $C = 16fd$ **(d)** $C = \frac{fd}{16}$

66. The speed of light in vacuum or in air is:

(a) 3×10^{10} m/s **(b)** 3×10^{7} m/s

(c) 3×10^{9} m/s **(d)** 3×10^{8} m/s

67. The speed of light in other materials is always:

(a) Less than C **(b)** Equal to C

(c) Greater than C **(d)** None of these

68. In Michelson experiment, the angle subtended by the side of eight sided mirror at the centre is:

(a) π **(b)** $\frac{\pi}{2}$

(c) $\frac{\pi}{8}$ **(d)** $\frac{\pi}{4}$

69. The speed at which light travels within the material depends upon:

(a) Refractive index **(b)** Frequency

(c) Wavelength **(d)** Velocity

70. Alexander Bell invented advice known as:

(a) Photo phone **(b)** Telescope

(c) Spectrometer **(d)** Microscope

71. Graham Bell was able to transmit a voice message via:

(a) Telescope **(b)** Beam of light

(c) Spectrometer **(d)** Simple microscope

72. The detector in photo-phone is made of:

(a) Selenium **(b)** Cadmium and Germinium

(c) Codmium and Silicon **(d)** None of these

73. For incident angles equal or greater than the critical angle, the glass air boundary will act as a:

(a) Mirror **(b)** Concave mirror

(c) Convex mirror **(d)** None of these

74. For glass air boundary, the value of critical angle is:

(a) 41° **(b)** 41.5°

(c) 41.8° **(d)** 41.2°

75. Optical fibres are of:

(a) One type **(b)** Two types

(c) Three types **(d)** None of these

76. A fibre optical communication system consists of:

(a) Two major components **(b)** Three major components

(c) Five major components **(d)** Four major components

77. An optical fibre with its protective core may be typically:

(a) 7 mm **(b)** 7.62 cm

(c) 6.0 cm **(d)** None of these

78. Types of optical fibres are:

(a) Single mode step index **(b)** Multimode step index

(c) Multimode graded index **(d)** All of these

79. Multimode step index fibre is useful for:

(a) Short distance **(b)** Long distance

(c) Neither long nor short **(d)** None above

80. Multimode graded index fibre core has diameter of:

(a) 50 – 2000 μm **(b)** 50 – 100 μm

(c) 50 – 1500 μm **(d)** 50 – 300 μm

81. How many phone calls can be carried by single mode step index fibre:

(a) 15000 **(b)** 12000

(c) 16000 **(d)** 14000

82. The optical fibre is covered for protection by a:

(a) Plastic jacket **(b)** Copper jacket

(c) Glass jacket **(d)** Rubber jacket

83. A layer of lower refractive index over the central core of high refractive index is called:

(a) Cladding **(b)** Multimode step index fibre

(c) Multimode graded index fibre **(d)** All of the above

84. Single mode step index fibre has a very thin core of about diameter:

(a) 2.5 μm **(b)** 3.5 μm

(c) 5.0 μm **(d)** None of these

85. Multimode step index fibre has a core of relatively larger diameter such as:

(a) 25 μm **(b)** 75 μm

(c) 100 μm **(d)** 50 μm

86. Light entering glass will not suffer change in:

(a) Velocity **(b)** Direction

(c) Frequency **(d)** Wavelength

87. Fibre optics system can be used for:

(a) Image transmitting **(b)** Word processing

(c) Image processing and receiving **(d)** All of above

88. Use of outer layer in optical fibres called cladding is mainly to:

(a) Produce total internal reflection **(b)** Scatter the light

(c) Transmit the light **(d)** None of these

89. Total internal reflection occurs when the angle of incidence is:

(a) Equal to critical angle **(b)** Greater than critical angle

(c) Less than critical angle **(d)** None of these

90. The disadvantages of step index fibre is:

(a) Quality of the fibre **(b)** Size of the cable

(c) Difference in the wavelength of signals **(d)** None of these

91. Loss of power in optical fibre results into:

(a) Accurate information at the receivers **(b)** Poor reception of signals

(c) Delay in time for reception of signals **(d)** All of these

92. In optical fibres, repeaters are usually laid down after every:

(a) 1000 km **(b)** 10,000 km

(c) 50,000 km **(d)** 100 km

93. Television signals are converted into light signals by:

(a) Optical fibre **(b)** Transistor

(c) Decoder **(d)** Photo diode

94. A convex lens acts as diverging lens when the object is placed:

(a) At 2F **(b)** Within focal length

(c) At forces **(d)** Between F and 2F

95. When the object is between F and 2F, the image formed by a convex lens is:

(a) Real **(b)** Virtual

(c) Erect **(d)** None of these

96. The ratio of the diameters of two convex lenses is ———— the ratio of their focal lengths:

(a) Less than **(b)** Greater than

(c) Equal to **(d)** None of these

97. Conventionally all the distances p, q, f are measured from ———— of the lens:

(a) Focus **(b)** Optical centre

(c) Edges **(d)** None of these

98. A lens of 2 cm focal length is to be used as a magnifying glass. Its magnification is:

(a) 13.5 **(b)** 2.5

(c) 0.5 **(d)** 12.5

99. The working of a compound microscope is based on the principle of:

(a) Reflection **(b)** Refraction

(c) Both (a) and (b) **(d)** None

100. In the formula, $\alpha_{min} = \frac{1.22\lambda}{D}$, where D denotes:

(a) Diameter of lens **(b)** Power of the lens

(c) Distance between source and the object **(d)** None of the

101. Maximum detail of an object can be seen by microscope when the object is illuminated by light of:

(a) Longer wavelength **(b)** Short wavelength

(c) Infrared light **(d)** None of these

102. The limit to which a microscope can be used to resolve details of an object depends upon:

(a) Narrow objective and light of short wavelength

(b) Narrow objective and light of short wavelength

(c) Narrow objective and light of longer wavelength

(d) None of these

103. Snell's law is described as:

(a) $n_1 \sin\theta_1 = n_2 \sin\theta_2$ **(b)** $n_2 \sin\theta_1 = n_1 \sin\theta_2$

(c) $n_1 \sin\theta_2 = n_2 \sin\theta_1$ **(d)** None of these

104. When $\theta_2 = 90°$ and $\theta = \theta_c$ then Snell's law becomes:

(a) $\sin\theta_c = n_1 n_2$ **(b)** $\sin\theta_c = \frac{n_2}{n_1}$

(c) $\sin\theta_c = \frac{n_1}{n_2}$ **(d)** None of these

105. Power of any lens would be one dipotre when its focal length is:

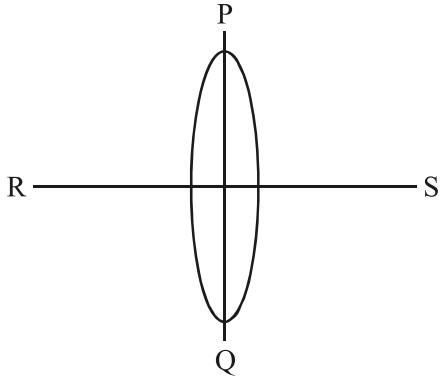
(a) 1.0 m **(b)** 1 cm

(c) 10 cm **(d)** 2 m

106. The figure shows an equi-convex lens of focal length f. If the lens is cut along PQ. The focal length of each help will be:

(a) $\frac{f}{2}$ **(b)** f

(c) 2f **(d)** $\frac{3f}{2}$



107. A spectrometer is used to measure:

(a) Refractive index of material of glass prism

(b) Deviation of light by a glass prism

(c) Wavelength of light

(d) All of the above

108. The unit of power of a lens is:

(a) Metre **(b)** Watt

(c) Newton **(d)** Dioptre

109. The minimum distance between an object and its real image in a convex lens is:

(a) 2f **(b)** 2.5f

(c) 3f **(d)** 4f

110. An object is placed at 18 cm from a converging lens of focal length 6 cm. The image formed is:

(a) Real and inverted **(b)** Real and erect

(c) Virtual and erect **(d)** Virtual and inverted

111. The image formed by a convex lens of focal length 10 cm is twice the size of the object. The position of the object will be:

(a) 20 cm **(b)** 30 cm

(c) 50 cm **(d)** 15 cm

112. In Michelson's experiment, the equation used to find the speed of light is:

(a) $c = 16\ fd$ **(b)** $c = 16\ f/d$

(c) $c = 16d/f$ **(d)** $c = fd/16$

113. The diameter of single mode step fibre core is:

(a) 10 μm **(b)** 30 μm

(c) 5 μm **(d)** 100 μm

114. The focal length 'f' and radius of curvature are related by:

(a) $f = 2R$ **(b)** $R = 2f$

(c) $R = f$ **(d)** None of the above

115. The focal length of objective of telescope is 60 cm. To obtain magnification of 20 focal length of eye piece should be:

(a) 5 cm **(b)** 4 cm

(c) 3 cm **(d)** 2 cm

116. In compound microscope the magnification of object is M_o and magnification of eyepiece is Me. The magnifying power of compound microscope is:

(a) $M_o + M_e$ **(b)** $M_o \times M_e$

(c) $M_e - M_e$ **(d)** M_o/M_e

117. To increase the resolving power of telescope we should use:

(a) Wider objective **(b)** Wider eyepiece

(c) Shorter objective **(d)** Shorter eyepiece

118. An observer moves towards a stationary plane minor at a peed of 4 ms^{-1}, with what speed will what speed will his image move towards him?

(a) 2 ms^{-1} **(b)** 4 ms^{-1}

(c) 8 ms^{-1} **(d)** Image will stay at rest

119. Which mirror should be used to obtain a parallel beam of light from a small lamp?

(a) Plane mirror **(b)** Convex mirror

(c) Concave mirror **(d)** Any one of the above

120. An object of 2 cm tall is placed 15 cm from concave mirror of focal length 10 cm. How far is the image from the mirror?

(a) 10 cm **(b)** –20 cm

(c) –30 cm **(d)** –40 cm

121. Which one of the following phenomena cannot be explained by the wave theory of light?

(a) Refraction **(b)** Total internal reflection

(c) Diffraction **(d)** Photoelectric effect

122. What will be the colour of the sky as seem from the earth if there were no atmosphere?

(a) Black **(b)** Blue

(c) Orange **(d)** Red

123. In vacuum light travels at a speed of 3×10^8 ms^{-1}, what is the speed of light in glass of refractive index 1.5?

(a) 1.5×10^8 ms^{-1} **(b)** 2×10^8 ms^{-1}

(c) 3×10^8 ms^{-1} **(d)** 4.5×10^8 ms^{-1}

124. An object is placed between two parallel mirrors. The number of image formed is:

(a) 2 **(b)** 4

(c) 8 **(d)** Infinite

ANSWERS

1.	(a)	**2.**	(b)	**3.**	(a)	**4.**	(d)
5.	(a)	**6.**	(b)	**7.**	(a)	**8.**	(b)
9.	(b)	**10.**	(a)	**11.**	(a)	**12.**	(b)
13.	(c)	**14.**	(d)	**15.**	(a)	**16.**	(a)
17.	(c)	**18.**	(a)	**19.**	(b)	**20.**	(a)
21.	(a)	**22.**	(a)	**23.**	(a)	**24.**	(b)
25.	(a)	**26.**	(b)	**27.**	(a)	**28.**	(b)
29.	(c)	**30.**	(b)	**31.**	(a)	**32.**	(c)
33.	(a)	**34.**	(a)	**35.**	(b)	**36.**	(b)
37.	(b)	**38.**	(a)	**39.**	(c)	**40.**	(b)
41.	(c)	**42.**	(a)	**43.**	(b)	**44.**	(d)
45.	(c)	**46.**	(a)	**47.**	(a)	**48.**	(a)
49.	(b)	**50.**	(d)	**51.**	(d)	**52.**	(c)
53.	(c)	**54.**	(d)	**55.**	(b)	**56.**	(a)
57.	(a)	**58.**	(b)	**59.**	(b)	**60.**	(a)
61.	(c)	**62.**	(d)	**63.**	(b)	**64.**	(d)
65.	(c)	**66.**	(d)	**67.**	(a)	**68.**	(b)
69.	(a)	**70.**	(a)	**71.**	(b)	**72.**	(a)
73.	(a)	**74.**	(c)	**75.**	(c)	**76.**	(b)
77.	(a)	**78.**	(d)	**79.**	(a)	**80.**	(b)
81.	(d)	**82.**	(a)	**83.**	(a)	**84.**	(c)
85.	(d)	**86.**	(c)	**87.**	(d)	**88.**	(a)
89.	(b)	**90.**	(c)	**91.**	(d)	**92.**	(d)
93.	(c)	**94.**	(b)	**95.**	(a)	**96.**	(c)
97.	(b)	**98.**	(a)	**99.**	(c)	**100.**	(a)
101.	(b)	**102.**	(a)	**103.**	(a)	**104.**	(c)
105.	(a)	**106.**	(c)	**107.**	(d)	**108.**	(d)
109.	(d)	**110.**	(a)	**111.**	(d)	**112.**	(a)
113.	(c)	**114.**	(b)	**115.**	(c)	**116.**	(b)
117.	(a)	**118.**	(c)	**119.**	(c)	**120.**	(c)
121.	(d)	**122.**	(a)	**123.**	(b)	**124.**	(d)

HEAT AND THERMODYNAMICS

Each question has four possible answers, encircled the correct answer:

1. The degree of hotness or coldness of an object is called:

(a) Temperature **(b)** Chemical energy

(c) Mechanical energy **(d)** Heat

2. Temperature is a property that determines:

(a) The ability of a body to transfer heat **(b)** A body with lower thermal conductivity

(c) A body with higher thermal conductivity **(d)** How much energy is present in the body

3. Something which flows from a hot body to a cold body is known as:

(a) Heat **(b)** Internal energy

(c) Temperature **(d)** None of these

4. The direction of the flow of heat between two bodies depends upon:

(a) Thermal conductivity **(b)** Internal energies

(c) Temperature **(d)** Specific heat

5. The branch of physics which deals with the transfer of heat into other form of energy is called:

(a) Heat and temperature **(b)** Thermodynamics

(c) Mechanics **(d)** All of above

6. Sum of all forms of molecular energies of a substance is called its:

(a) External energy **(b)** Kinetic energy

(c) Potential energy **(d)** Internal energy

7. A relationship between the mechanical work and heat energy has derived by:

(a) Joule **(b)** Newton

(c) Kelvin **(d)** Einstien

8. The pressure of a gas is defined as:

(a) Force per unit area **(b)** Mass per unit volume

(c) Energy per unit volume **(d)** Energy per unit area

9. Pressure of a gas depends upon:

(a) The mass of molecules **(b)** Molecular speed

(c) Number of molecules **(d)** All of above

10. When a gas is compressed:

(a) Its temperature decreases **(b)** Its internal energy decreases

(c) Its temperature increases **(d)** None of these

11. The pressure exerted by the gas molecules on the walls of the vessel is due to:

(a) Continuous collision of its molecules **(b)** Free motion of its molecules

(c) Momentum of its molecules **(d)** All of above

12. Select the statement that agrees the kinetic molecular theory of gases:

(a) Molecules of a gas suffer elastic collisions

(b) There are large number of molecules in a finite volume

(c) Molecules do not exert force except during collision

(d) All of the above

13. The expression for pressure exerted by an ideal gas is given by:

(a) $P = \frac{1}{3} N_0 < \frac{1}{2} mv^2 >$ **(b)** $P = \frac{1}{2} N_0 < \frac{1}{2} mv^2 >$

(c) $P = \frac{2}{3} N_0 < \frac{1}{2} mv^2 >$ **(d)** $P = \frac{2}{3} N_A < \frac{1}{2} mv^2 >$

14. Mean square velocity of gas molecules moving along x-direction is represented by:

(a) $< V_y^2 >$ **(b)** $< V_x^2 >$

(c) $< V_z^2 >$ **(d)** None of these

15. The Boltzman constant K in terms of universal gas constant R and Avogadro's number N_A is:

(a) $K = \frac{R}{N_A}$ **(b)** $K = \frac{N_A}{R}$

(c) $K = \frac{NR}{N_A}$ **(d)** None of these

16. The value of Boltzman gas constant K is:

(a) $1.38 \times 10^{-34}\ J.K^{-1}$ **(b)** $1.38 \times 10^{-23}\ JK^{-1}$

(c) $1.38 \times 10^{-32}\ J\text{-}K^{-1}$ **(d)** $1.38 \times 10^{-27}\ J\ .\ K^{-1}$

17. The average translational kinetic energy per molecule of an ideal gas is given by:

(a) $\frac{3RT}{2N_A}$ **(b)** $\frac{2RT}{3N_A}$

(c) $\frac{2N_AT}{3R}$ **(d)** $\frac{3N_AT}{2R}$

18. Pressure of an ideal gas in terms of its density can be written as:

(a) $P = \rho v^2$ **(b)** $P = \frac{1}{3} \rho v^2$

(c) $P = \frac{2}{3} \rho v^2$ **(d)** $P = \frac{1}{2} \rho v^2$

19. According to the kinetic molecular theory which of the following relation is correct:

(a) $T = \frac{2N_A}{R} < \frac{1}{2} mv^2 >$ **(b)** $T = \frac{3N_A}{2R} < \frac{1}{2} mv^2 >$

(c) $T = \frac{N_A}{3R} < mv^2 >$ **(d)** $T = \frac{2N_A}{3R} < \frac{1}{2} mv^2 >$

20. The average translational kinetic energy of the molecules show itself in the form of:

(a) Viscosity **(b)** Density

(c) Velocity **(d)** Temperature

21. At constant temperature, the volume of a gas is inversely proportional to the pressure is called:

(a) Charle's law **(b)** Boyle's law

(c) Heat law **(d)** None of these

22. At constant pressure, the volume of a gas is directly proportional to the absolute temperature is called:

(a) Charle's law **(b)** Boyle's law

(c) Heat law **(d)** None of these

23. Under the same conditions of temperature and pressure, equal volume of all gases contains the same number of kilo moles is called:

(a) Charle's law **(b)** Boyle's law

(c) Avogadro's law **(d)** Law of pressure

24. The mathematical form of an ideal gas laws is:

(a) $PV = nRT$ **(b)** $PT = nRv$

(c) $PV = \frac{nR}{T}$ **(d)** $TV = nRP$

25. The value of universal gas constant R is:

(a) 8314 J / mole-K **(b)** 83.10 J/mole-K

(c) 8314 J / K-mole K **(d)** 8.314 J/K mole-K

26. The unit of pressure of gas is:

(a) N/m^2 **(b)** Pascal

(c) Atmosphere **(d)** All of these

27. Avogadro's number is known as the number of molecules in:

(a) One mole of a substance **(b)** Total volume of a substance

(c) Unit volume of substance **(d)** One kg of a substance

28. At constant pressure, the graph between volume and absolute temperature is:

(a) Parabola **(b)** Straight line

(c) Hyperbola **(d)** None of these

29. At constant temperature, the graph between volume and pressure is:

(a) Parabola **(b)** Straight line

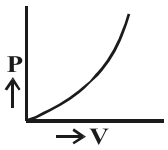
(c) Hyperbola **(d)** None of these

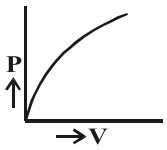
30. For a gas obeying Boyle's law if pressure is doubled, the volume of a gas becomes:

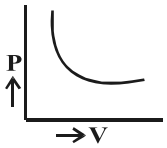
(a) One half **(b)** No change

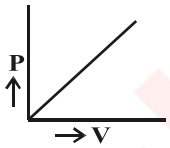
(c) Double **(d)** None of these

31. Which of the following curves represents Boyle's law:

(a) 

(b) 

(c) 

(d) 

32. Mathematically Boyle's law can be written as:

(a) PV = Constant **(b)** $\frac{P}{V}$ = Constant

(c) $\frac{V}{P}$ = Constant **(d)** None of these

33. Mathematically, Charle's law can be written as:

(a) T.V = Constant **(b)** $\frac{V}{T}$ = Constant

(c) $\frac{T}{V}$ = Constant **(d)** None of these

34. A diatomic gas contains only:

(a) Translational K.E **(b)** Rotational K.E

(c) Vibrational K.E **(d)** All of these

35. Boyle's law is an example of:

(a) Isothermal process **(b)** Adiabatic process

(c) Mechanical process **(d)** None of these

36. The pressure of a gas is directly proportional to:

(a) Root mean square velocity of the molecules

(b) Mean square velocity of the molecules

(c) Mean velocity of the molecules

(d) None of these

37. Gas law PV^{γ} = Constant is for:

(a) Isothermal process **(b)** Adiabotic process

(c) Isobaric process **(d)** Iso choric process

38. The ratio of universal gas constant and Avogadro's number is called:

(a) Universal constant **(b)** Boltzmann constant

(c) Equilibrium constant **(d)** None of these

39. Which one of the following gases is the nearest approach to an ideal gas:

(a) Oxygen **(b)** Nitrogen

(c) Hydrogen **(d)** Carbon dioxide

40. Real gases strictly obey gas laws:

(a) At high pressure and low temperature **(b)** At low pressure and high temperature

(c) At high pressure and high temperature **(d)** At low pressure and low temperature

41. Gas constant per molecule of the gas is called:

(a) Rydberg's constant **(b)** Boltzmann's constant

(c) Stefan's constant **(d)** Molar gas constant

42. If some quantity of water put in a shallow vessel allowed to evaporate, its temperature:

(a) Decreases **(b)** Increases

(c) Remains constant **(d)** None of these

43. When we heat a substance the energy associated with its atoms / molecules is:

(a) Increased **(b)** Decreased

(c) Remains constant **(d)** Becomes zero

44. When a substance is heated, then heat is converted into:

(a) Internal energy **(b)** Initial energy

(c) External energy **(d)** Chemical energy

45. The internal energy of an ideal gas depends upon only on its:

(a) Pressure **(b)** Volume

(c) Temperature **(d)** All of above

46. Work done by the system on its environment is considered as:

(a) Zero **(b)** Positive

(c) Negative **(d)** None of these

47. Work done on the system by its environment is taken as:

(a) Zero **(b)** Positive

(c) Negative **(d)** None of these

48. Which statement about internal energy is correct:

(a) The internal energy of a system can be increased without transfer of energy by heating

(b) The internal energy of a system depends only on its temperature

(c) When the internal energy of a system is increased, its temperature always increased

(d) When two systems have the same internal energy, they must be at the same temperature

49. The sum of total energy of all the molecules of a substance is called:

(a) Heat energy **(b)** Efficiency

(c) Internal energy **(d)** Power

50. The first law of thermodynamics is a special case of the:

(a) Charle's law **(b)** Law of conservation of momentum

(c) Boyle's law **(d)** Law of conservation of energy

51. The principles which deals with the heat energy and its transformation into mechanical energy is called:

(a) Laws of thermodynamics **(b)** Law of conservation of mass

(c) Law of conservation of energy **(d)** First law of thermodynamics

52. First law of thermodynamics is the restatement of:

(a) Law of conservation of mass **(b)** Law of conservation of energy

(c) Both (a) and (b) **(d)** None of these

53. Mathematically the first law of thermodynamics can be expressed as:

(a) $Q = \Delta U + W$ **(b)** $Q = W - \Delta U$

(c) $Q = \Delta U - W$ **(d)** $W = Q + \Delta U$

54. In thermodynamics, the change in the internal energy depends upon:

(a) The initial state of temperature only

(b) The final state of temperature only

(c) The initial and final states of the temperature

(d) None of these

55. The process under which the system undergoes a change of state at constant volume is called:

(a) Adiabatic process **(b)** Isothermal process

(c) Isochoric process **(d)** Isobaric process

56. The process in which the pressure of a system remains constant is called:

(a) Isochoric process **(b)** Isobaric process

(c) Adiabatic process **(d)** Isothermal process

57. The temperature of the system remains constant is called:

(a) Isochoric process **(b)** Isothermal process

(c) Adiabatic process **(d)** Isobaric process

58. That process in which no heat enters or leaves the system is called:

(a) Isochoric process **(b)** Isothermal process

(c) Isoboric process **(d)** Adiabatic process

59. Any thing which have distinct boundaries is called:

(a) Environment **(b)** System

(c) Both (a) and (b) **(d)** None of these

60. Any thing which have no distinct boundaries is called:

(a) Environment **(b)** System

(c) Both (a) and (b) **(d)** None of these

61. A system in which there is no transfer of mass and energy across the boundary is called:

(a) An isolated system **(b)** An open system

(c) A closed system **(d)** None of these

62. A system in which there is no transfer of mass across the boundary is called:

(a) An isolated system **(b)** An open system

(c) A closed system **(d)** None of these

63. In isothermal process:

(a) $\Delta U = W$ **(b)** $\Delta U = -W$

(c) $Q = \Delta U$ **(d)** $Q = W$

64. In an adiabatic process:

(a) $\Delta Q = 0$ **(b)** $Q = W$

(c) $\Delta U = Q$ **(d)** None of these

65. An isothermal process is represented by the mathematical equation:

(a) $\frac{P}{T}$ = Constant **(b)** $\frac{V}{T}$ = Constant

(c) PV = Constant **(d)** PV^{γ} = Constant

66. The expression PV^{γ} = Constant holds good in:

(a) Adiabatic process **(b)** Isothermal process

(c) Isobaric process **(d)** None of these

67. In an isothermal process, internal energy of the system:

(a) Decreases **(b)** Increases

(c) Remains constant **(d)** None of these

68. The amount of heat required to raise the temperature of one kg of a substance through 1°C is called:

(a) Specific heat **(b)** Molar heat capacity

(c) Heat of fusion **(d)** All of above

69. The amount of heat required to raise the temperature of 1 mole of a substance through 1 K is called:

(a) Heat capacity **(b)** Molar heat capacity

(c) Specific heat **(d)** None of these

70. The difference between C_P and C_V is equal to:

(a) Molar gas constant **(b)** Boltzmann constant

(c) Universal gas constant **(d)** None of these

71. The ratio $\frac{C_P}{C_V} = \gamma$ for diatomic gas like air is:

(a) 1.40 **(b)** 1.30

(c) 1.29 **(d)** 1.67

72. 1 kilo calorie is equal to:

(a) 1.17 watt-hour **(b)** 117.0 watt-hour

(c) 11.7 watt-hour **(d)** None of these

73. Mark the correct statement:

(a) Specific heat of mono-atomic gases is greater than those of poly-atomic gases

(b) Specific heat of mono-atomic gases is less than those of poly-atomic gases

(c) Specific heat of mono-atomic gases is equal to those of poly-atomic gases

(d) None of these

74. The amount of heat energy required to evaporise one kg of a liquid at its boiling without change of temperature is called:

(a) Heat of fusion **(b)** Heat capacity

(c) Heat of vaporization **(d)** Latent heat of vaporization

75. Specific heat of different substances varies because of:

(a) Different K.E of molecules of unit mass **(b)** Different number of molecules in unit mass

(c) Same number of molecules in unit mass **(d)** Same K.E of molecules of unit mass

76. A process which can be retraced in reverse order without produces any change in the environment is called:

(a) Irreversible process **(b)** Reversible process

(c) Isothermal process **(d)** Adiabatic process

77. A process which cannot be retraced in the reverse order is called:

(a) Irreversible process **(b)** Reversible process

(c) Isothermal process **(d)** Isochoric process

78. Which one is the example of irreversible process:

(a) Compton effect **(b)** Melting ice

(c) Heat engine **(d)** Work done against friction

79. Which one is the example of reversible process:

(a) Compton **(b)** Melting ice

(c) Heat engine **(d)** Workdone against friction

80. For diatomic gas $C_V = \frac{5R}{2}$ therefore γ for this gas is:

(a) $\frac{35}{4}$ **(b)** $\frac{5}{7}$

(c) $\frac{4}{35}$ **(d)** $\frac{7}{5}$

81. For mono-atomic gas $C_V = \frac{3R}{2}$ therefore γ for this gas is:

(a) $\frac{15}{4}$ **(b)** $\frac{4}{15}$

(c) $\frac{5}{3}$ **(d)** $\frac{3}{5}$

82. A device which convert heat energy into mechanical energy is called:

(a) Heat engine **(b)** Pettier engine

(c) Carnot engine **(d)** All of above

83. An ideal heat engine has 100% efficiency only if its exhaust temperature is:

(a) Less than input temperature **(b)** Greater than input temperature

(c) Equal to input temperature **(d)** OK

84. It is impossible for heat engine to convert all heat into useful work, the law called:

(a) Second law of thermodynamics **(b)** First law of thermodynamics

(c) Law of conservation of energy **(d)** None of these

85. The statement, it is impossible for a self-acting machine, to transfer heat from a lower to higher temperature refers to:

(a) First law of thermodynamics **(b)** Law of conservation of mass

(c) Second law of thermodynamics **(d)** None of these

86. When the temperatures of source and sink of a heat engine become equal, the entropy change will be:

(a) Maximum **(b)** Minimum

(c) Zero **(d)** None of these

87. The efficiency of heat engine whose lower temperature is 17°C and the high temperature of 200°C is:

(a) 35% **(b)** 80%

(c) 90% **(d)** 25%

88. The formula for the efficiency of heat engine is:

(a) $\eta = \left(1 - \frac{Q_1}{Q_2}\right) \times 100\%$ **(b)** $\eta = \left(\frac{1 - Q_1}{Q_2}\right) \times 100\%$

(c) $h = \left(\frac{Q_2}{Q_1} - 1\right) \times 100\%$ **(d)** $\eta = \left(1 - \frac{Q_2}{Q_1}\right) \times 100\%$

89. An engine which convert heat energy into useful work upto 35% to 40% is:

(a) Petrol engine **(b)** Heat engine

(c) Deisel engine **(d)** Carnot engine

90. An engine which gives maximum efficiency is called:

(a) Carnot engine **(b)** Heat engine

(c) Petrol engine **(d)** All of above

91. The efficiency of carnot engine working between lower temperature T_L and higher temperature T_H is:

(a) $\eta = \left(1 - \frac{T_H}{T_L}\right) \times 100\%$ **(b)** $\eta = \left(1 - \frac{T_L}{T_H}\right) \times 100\%$

(c) $\eta = \left(\frac{T_H}{T_L} - 1\right) \times 100\%$ **(d)** $\eta = \left(\frac{T_L}{T_H} - 1\right) \times 100\%$

92. In carnot engine at the end of the cyclic path, the temperature of working substance is:

(a) Zero **(b)** Less than intital temperature

(c) Greater than initial temperature **(d)** Equal to initial temperature

93. If the temperature of the source increases, then the efficiency of carnot engine is:

(a) Remains constant **(b)** Increases

(c) Decrease **(d)** None of these

94. The efficiency of carnot engine depend upon:

(a) Sink temperature **(b)** Source temperature

(c) Both source and sink **(d)** The working substance

95. Carnot's cycle is an example of:

(a) Irreversible process **(b)** Reversible process

(c) Both (a) and (b) **(d)** None of these

96. Entropy is the measure of:

(a) Disorder of the system **(b)** Order of the system

(c) Internal energy **(d)** Potential energy of the system

97. The change in entropy of the system is given mathematical form:

(a) $\Delta S = -\frac{\Delta Q}{T}$ **(b)** $\Delta S = \frac{T}{\Delta Q}$

(c) $\Delta S = \Delta Q \times T$ **(d)** $\Delta Q = \frac{\Delta S}{T}$

98. Entropy of the universe is increasing due to:

(a) Use of energy into work **(b)** Depletion of ozone

(c) Power generation process **(d)** All of above

99. The concept of entropy was introduced by the scientist:

(a) R Clausius **(b)** Newton

(c) Kelvin **(d)** Carnot Sadi

100. No entropy change is associated with:

(a) Isobaric process **(b)** Isochoric process

(c) Isothermal process **(d)** Adiabatic process

101. The petrol engine is based on the principle of:

(a) Kelvin cycle **(b)** Carnot cycle

(c) Clausius cycle **(d)** Cyclic process

102. Four stroke petrol engine has the following process:

(a) 1 **(b)** 4

(c) 2 **(d)** 3

103. The number of spark plugs needed in the diesel engine is:

(a) 2 **(b)** 3

(c) 0 **(d)** 4

104. The temperature scale which is independent of the nature of the substance used in the thermometer is called:

(a) Absolute or Kelvin scale **(b)** Fahrenheit scale

(c) Centigrade scale **(d)** Thermodynamics scale

105. The relation between centigrade scale and Fahrenheit scale of temperature is:

(a) $\frac{C}{5} = \frac{F - 32}{9}$ **(b)** $\frac{C}{9} = \frac{F - 32}{5}$

(c) $\frac{C}{5} = \frac{F + 32}{9}$ **(d)** $\frac{C}{9} = \frac{F + 32}{5}$

106. The centigrade and Fahrenheit scales will have the same reading when the temperature is:

(a) 70° **(b)** –80°

(c) –40° **(d)** 120°

107. The Fahrenheit and Kelvin scale will have the same reading when temperature is:

(a) 370° **(b)** 574.25°

(c) 414.5° **(d)** 388°

108 Mercury thermometer was constructed by:

(a) Rutherford **(b)** Ampere

(c) Lord Kelvin **(d)** Einstien

109. Fahrenheit scale was originally used in:

(a) Meteorology **(b)** Clinical thermometer

(c) Clinical thermometer and meteorology **(d)** None of these

110. Mercury is used as a thermometric substance because:

(a) It does not stick to glass **(b)** Its specific heat is low

(c) Its expansion is uniform **(d)** All of above

111. A gas which strictly obeys the gas laws under all conditions of temperature and pressure is called:

(a) Real gas **(b)** Ideal gas

(c) Inert gas **(d)** None of these

112. Real gases strictly obey gas laws at:

(a) Low pressure and high temperature **(b)** High pressure and low temperature

(c) High pressure and high temperature **(d)** None of these

113. If the volume of a given mass of a gas is doubled at constant temperature then the density of gas becomes:

(a) Remains constant **(b)** Half

(c) Double **(d)** None of these

114. The temperature scale approved in SI units:

(a) Celsius scale **(b)** Fahrenheit scale

(c) Kelvin scale **(d)** None of these

115. Which of the following does not have the same units:

(a) Work **(b)** Heat

(c) Kinetic energy **(d)** Power

116. The motion of molecules in gases:

(a) Random **(b)** Orderly

(c) Circular **(d)** All of these

117. For an ideal gas, the molecules have:

(a) K.E only **(b)** P.E only

(c) Both K.E and P.E **(d)** None of these

118. At constant temperature, if the density of the gas is increased, its pressure will:

(a) Increase **(b)** Decrease

(c) Remains constant **(d)** None of these

119. Truth of kinetic theory is confirmed by:

(a) Brownian motion **(b)** Diffusion of gases

(c) Both (a) and (b) **(d)** None of these

120. When a gas is compressed:

(a) Its temperature decreases **(b)** Its internal energy decreases

(c) Its temperature increases **(d)** None of these

121. If an amount of heat Q enters, the system:

(a) Work is done **(b)** Increase in internal energy

(c) Both (a) and (b) **(d)** None of these

122. The equation $W = -\Delta U$ represents:

(a) Isothermal process **(b)** Adiabatic process

(c) Isobaric process **(d)** Isochoric process

123. Consider volume in a cylinder is 4 c.c. If the piston is kept fixed and gas is heated from 10°C to 15°C then the work done is:

(a) 4.3 J **(b)** 20 J

(c) 15 J **(d)** Zero

124. If C_v is the molar heat capacity at constant volume and ΔT is the change in temperature then $C_v \Delta T$ gives:

(a) Area **(b)** Energy

(c) Volume **(d)** Density

125. When a gas is compressed isothermally, the product of its pressure and volume during the process is:

(a) Remains constant **(b)** Zero

(c) Proportional to energy **(d)** None of these

126. If the temperature difference between hot and cold body is greater than the heat engine is:

(a) Not efficient **(b)** Less efficient

(c) More efficient **(d)** None of these

127. As the working substances of a heat engine completes a cycle, there is no change in:

(a) Internal energy **(b)** Volume

(c) Pressure **(d)** All of these

128. What will be the efficiency of a carnot engine if it is operated between the temperatures 47°C and 127°C:

(a) 25% **(b)** 20%

(c) 50% **(d)** 10%

129. One degree of thermodynamic scale is equal to ———— of the temperature of triple point of water:

(a) $\frac{1}{273.16}$ th **(b)** $\frac{1}{273}$ th

(c) $\frac{1}{100}$ th **(d)** $\frac{1}{32}$ th

130. The unknown temperature T on thermodynamic scale in Kalvin is given by formula:

(a) $T = 273.16 \frac{Q}{Q_3}$ **(b)** $T = 32 \frac{Q}{Q_3}$

(c) $T = 100 \frac{Q}{Q_3}$ **(d)** $T = 273 \frac{Q}{Q_3}$

131. One degree of thermodynamics scale of temperature is called:

(a) Celsius **(b)** Fahrenheit

(c) Kelvin **(d)** Meter

132. At constant pressure, the graph between V and T is:

(a) Hyperbola **(b)** Parabola

(c) Straight line **(d)** Ellipse

133. In reversible process, the entropy:

(a) Remains constant **(b)** Increases

(c) Decreases **(d)** Both (a) and (b)

134. Temperature of –273°C on Kelvin scale is:

(a) +273 K **(b)** +373 K

(c) –273 K **(d)** 0 K

135. In the isothermal process, one of the following is constant:

(a) Pressure **(b)** Volume

(c) Temperature **(d)** Heat energy

136. If a given mass of gas occupies a volume of 100 cc at one atmospheric pressure and temperature of 100°C (373.15 K), what will be its volume at 4 atmospheric pressure, the temperature being the same?

(a) 25 cc **(b)** 100 cc

(c) 104 cc **(d)** 400 cc

137. 'P' is the pressure and 'd' is the density of gas at constant temperature, then:

(a) $P \propto \frac{1}{d}$ **(b)** $P \propto \frac{1}{d^2}$

(c) $P \propto d$ **(d)** $P \propto d^2$

138. Some gas at 300 K is enclosed in a container. Now the container is placed on a fast moving train. While the train is in motion, the temperature of the gas?

(a) Rises above 300°K **(b)** Falls below 300°K

(c) Remains unchanged **(d)** Becomes unsteady

139. Triple point of water is:

(a) 273.16°C **(b)** 273.16 K

(c) 273.16°F **(d)** 373.16 K

140. A diesel locomotive has an efficiency of nearly:

(a) 28% **(b)** 38%

(c) 48% **(d)** 58%

141. A steel tape gives correct measurement at 20°C. The length of a piece of wood is being measured with steel tape at 0°C. The reading is 25 cm on this tape. The real length must be:

(a) 25 cm **(b)** Less than 25 cm

(c) More than 25 cm **(d)** 5 cm

142. A gas performs the most work when it expands:

(a) Isothermally **(b)** Adiabatically

(c) Isoberically **(d)** At a non-uniform rate

143. The following expression represent:

$$\Delta U = -W$$

(a) Isothermal expansion **(b)** Adiabatic compression

(c) Isobaric process **(d)** None

144. In which stroke of petrol engine fuel is ignited?

(a) First **(b)** Second

(c) Third **(d)** Fourth

145. Which of the following process is irreversible?

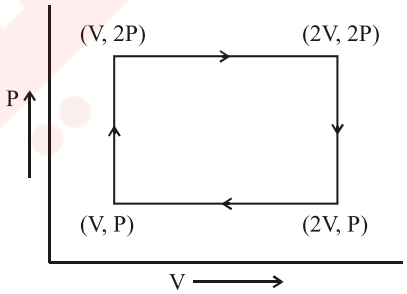
(a) Rapid liquefactions **(b)** Rapid compression of a gas

(c) Explosion **(d)** All

146. The work done during the cycle is:

(a) 1 PV **(b)** 2 PV

(c) 1/2 PV **(d)** Zero



147. The value of Boltzmann's constant is:

(a) 1.38×10^{-23} J/K **(b)** $1.38 \times 10^{+23}$ J/K

(c) 1.38×10^{-23} J/mole-K **(d)** 1.38×10^{-23} J/K mole-K

148. Fahrenheit and centigrade (Celsius) thermometers have the same reading at:

(a) −100°C **(b)** 60°

(c) 40°C **(d)** −40°C

149. If co-efficient of linear expansion of a solid body is α, its co-efficient of cubical expansion will be approximately:

(a) 2α **(b)** 3α

(c) 2.5α **(d)** 4α

150. A system does 600 J of work and at the same time has its internal energy increased by 320 J. How much heat has been supplied?

(a) 280 J **(b)** 920 J

(c) 600 J **(d)** 20 J

151. No entropy change takes place in:

(a) Isothermal process **(b)** Adiabatic process

(c) Isobaric process **(d)** Isochoric process

ANSWERS

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