Ordinary Thinking

Objective Questions

Units

1. Light year is a unit of **[MP PMT 1989; CPMT 1991; AFMC 1991,2005]**

(a) Time (b) Mass

(c) Distance (d) Energy

2. The magnitude of any physical quantity

(a) Depends on the method of measurement

(b) Does not depend on the method of measurement

(c) Is more in SI system than in CGS system

(d) Directly proportional to the fundamental units of mass, length and time

3. Which of the following is not equal to *watt* **[SCRA 1991; CPMT 1990]**

(a) *Joule/second* (b) *Ampere* × *volt*

(c) $(Ampere)^2 \times ohm$ (d) *Ampere/volt*

4. Newton–*second* is the unit of **[CPMT 1984, 85; MP PMT 1984]**

(a) Velocity (b) Angular momentum

(c) Momentum (d) Energy

5. Which of the following is not represented in correct unit **[NCERT 1984; MNR 1995]**

(a) $\frac{\text{Stress}}{\text{Strain}} = N/m^2$ (b) Surface tension $= N/m$

(c) Energy $= kg\text{-}m/\sec$ (d) Pressure $= N/m^2$

6. One *second* is equal to **[MNR 1986]**

(a) 1650763.73 time periods of Kr clock

(b) 652189.63 time periods of Kr clock

(c) 1650763.73 time periods of Cs clock

(d) 9192631770 time periods of Cs clock

7. One nanometre is equal to

(a) $10^9\, mm$ (b) $10^{-6}\, cm$

(c) $10^{-7}\, cm$ (d) $10^{-9}\, cm$

8. A *micron* is related to centimetre as

(a) $1\, micron = 10^{-8}\, cm$ (b) $1\, micron = 10^{-6}\, cm$

(c) $1\, micron = 10^{-5}\, cm$ (d) $1\, micron = 10^{-4}\, cm$

9. The unit of power is **[CPMT 1985]**

(a) *Joule*

(b) *Joule* per *second* only

(c) *Joule* per *second* and *watt* both

(d) Only *watt*

10. A suitable unit for gravitational constant is **[MNR 1988]**

(a) $kg\text{-}m \sec^{-1}$ (b) $N\, m^{-1} \sec$

(c) $N\, m^2\, kg^{-2}$ (d) $kg\, m \sec^{-1}$

11. SI unit of pressure is **[EAMCET 1980; DPMT 1984; CBSE PMT 1988; NCERT 1976; AFMC 1991; USSR MEE 1991]**

(a) *Pascal* (b) $Dynes/cm^2$

(c) cm of Hg (d) *Atmosphere*

12. The unit of angular acceleration in the SI system is **[SCRA 1980; EAMCET 1981]**

(a) $N\, kg^{-1}$ (b) $m\, s^{-2}$

(c) $rad\, s^{-2}$ (d) $m\, kg^{-1} K$

13. The unit of Stefan's constant σ is **[AFMC 1986; MP PET 1992; MP PMT 1992; CBSE PMT 2002]**

(a) $W\, m^{-2}\, K^{-1}$ (b) $W\, m^2\, K^{-4}$

(c) $W\, m^{-2}\, K^{-4}$ (d) $W\, m^{-2}\, K^4$

14. Which of the following is not a unit of energy **[AIIMS 1985]**

(a) $W\text{-}s$ (b) $kg\text{-}m/\sec$

(c) $N\text{-}m$ (d) *Joule*

15. In $S = a + bt + ct^2$. S is measured in metres and t in *seconds*. The unit of c is

(a) None (b) m

(c) ms^{-1} (d) ms^{-2}

16. *Joule-second* is the unit of **[CPMT 1990; CBSE PMT 1993; BVP 2003]**

(a) Work (b) Momentum

(c) Pressure (d) Angular momentum

17. Unit of energy in SI system is **[SCRA 1986; MNR 1986]**

(a) *Erg* (b) *Calorie*

(c) *Joule* (d) Electron *volt*

18. A cube has numerically equal volume and surface area. The volume of such a cube is

(a) 216 *units* (b) 1000 *units*

(c) 2000 *units* (d) 3000 *units*

19. Wavelength of ray of light is $0.00006\, m$. It is equal to

[CPMT 1977]

(a) 6 *microns* (b) 60 *microns*

(c) 600 *microns* (d) 0.6 *microns*

20. Electron *volt* is a unit of [MP PMT 1993]

(a) Charge (b) Potential difference

(c) Momentum (d) Energy

21. Temperature can be expressed as a derived quantity in terms of any of the following [MP PET 1993; UPSEAT 2001]

(a) Length and mass

(b) Mass and time

(c) Length, mass and time

(d) None of these

22. Unit of power is [NCERT 1972; CPMT 1971; DCE 1999]

(a) *Kilowatt* (b) *Kilowatt-hour*

(c) *Dyne* (d) *Joule*

23. Density of wood is $0.5\,gm/cc$ in the CGS system of units. The corresponding value in MKS units is [CPMT 1983; NCERT 1973; JIPMER 1993]

(a) 500 (b) 5

(c) 0.5 (d) 5000

24. Unit of energy is [NCERT 1974; CPMT 1975]

(a) $J/\sec$ (b) $Watt-day$

(c) *Kilowatt* (d) $gm\text{-}cm/\sec^2$

25. Which is the correct unit for measuring nuclear radii

(a) *Micron* (b) *Millimetre*

(c) *Angstrom* (d) *Fermi*

26. One Mach number is equal to

(a) Velocity of light

(b) Velocity of sound $(332\ m/\sec)$

(c) $1\ km/\sec$

(d) $1\,m/\sec$

27. The unit for nuclear dose given to a patient is

(a) *Fermi* (b) Rutherford

(c) Curie (d) Roentgen

28. *Volt/metre* is the unit of [AFMC 1991; CPMT 1984]

(a) Potential (b) Work

(c) Force (d) Electric intensity

29. $Newton/metre^2$ is the unit of [CPMT 1985; ISM Dhanbad 1994; AFMC 1995]

(a) Energy (b) Momentum

(c) Force (d) Pressure

30. The unit of surface tension in SI system is [MP PMT 1984; AFMC 1986; CPMT 1985, 87; CBSE PMT 1993; KCET 1999; DCE 2000, 01]

(a) $Dyne/cm^2$ (b) $Newton/m$

(c) $Dyne/cm$ (d) $Newton/m^2$

31. The unit of reduction factor of tangent galvanometer is [CPMT 1987; AFMC 2004]

(a) *Ampere* (b) *Gauss*

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

32. The unit of self inductance of a coil is [MP PMT 1983, 92; SCRA 1986; CBSE PMT 1993; CPMT 1984, 85, 87]

(a) *Farad* (b) *Henry*

(c) *Weber* (d) *Tesla*

33. *Henry/ohm* can be expressed in

(a) *Second* (b) *Coulomb*

(c) *Mho* (d) *Metre*

34. The SI unit of momentum is [SCRA 1986, 89; CPMT 1987]

(a) $\frac{kg}{m}$ (b) $\frac{kg.m}{\sec}$

(c) $\frac{kg.m^2}{\sec}$ (d) $kg \times Newton$

35. The velocity of a particle depends upon as $v = a + bt + ct^2$; if the velocity is in $m/\sec$, the unit of a will be [CPMT 1990]

(a) $m/\sec$ (b) $m/\sec^2$

(c) $m^2/\sec$ (b) $m/\sec^3$

36. One million electron *volt* $(1\,MeV)$ is equal to [JIPMER 1993, 97]

(a) $10^5\,eV$ (b) $10^6\,eV$

(c) $10^4\,eV$ (d) $10^7\,eV$

37. $Erg - m^{-1}$ can be the unit of measure for [DCE 1993]

(a) Force (b) Momentum

(c) Power (d) Acceleration

38. The unit of potential energy is

(a) $g(cm/\sec^2)$ (b) $g(cm/\sec)^2$

(c) $g(cm^2/\sec)$ (d) $g(cm/\sec)$

39. Which of the following represents a *volt* [CPMT 1990; AFMC 1991]

(a) *Joule/second* (b) *Watt/Ampere*

(c) *Watt/Coulomb* (d) *Coulomb/Joule*

40. $Kilowatt - hour$ is a unit of [NCERT 1975; AFMC 1991]

(a) Electrical charge (b) Energy

(c) Power (d) Force

41. What is the SI unit of permeability

(a) *Henry* per *metre*

(b) Tesla *metre* per *ampere*

(c) *Weber* per *ampere metre*

(d) All the above units are correct

42. In which of the following systems of unit, *Weber* is the unit of magnetic flux **[SCRA 1991; CBSE PMT 1993; DPMT 2005]**

(a) CGS (b) MKS

(c) SI (d) None of these

43. Tesla is a unit for measuring

(a) Magnetic moment (b) Magnetic induction

(c) Magnetic intensity (d) Magnetic pole strength

44. If the unit of length and force be increased four times, then the unit of energy is

(a) Increased 4 times (b) Increased 8 times

(c) Increased 16 times (d) Decreased 16 times

45. Oersted is a unit of **[SCRA 1989]**

(a) Dip (b) Magnetic intensity

(c) Magnetic moment (d) Pole strength

46. *Ampere – hour* is a unit of **[SCRA 1980, 89; ISM Dhanbad 1994]**

(a) Quantity of electricity

(b) Strength of electric current

(c) Power

(d) Energy

47. The unit of specific resistance is **[SCRA 1989; MP PET 1984; CPMT 1975]**

(a) Ohm/cm^2 (b) Ohm/cm

(c) $Ohm-cm$ (d) $(Ohm-cm)^{-1}$

48. The binding energy of a nucleon in a nucleus is of the order of a few **[SCRA 1979]**

(a) eV (b) *Ergs*

(c) MeV (d) *Volts*

49. *Parsec* is a unit of **[SCRA 1986; BVP 2003; AIIMS 2005]**

(a) Distance (b) Velocity

(c) Time (d) Angle

50. If u_1 and u_2 are the units selected in two systems of measurement and n_1 and n_2 their numerical values, then **[SCRA 1986]**

(a) $n_1u_1 = n_2u_2$ (b) $n_1u_1 + n_2u_2 = 0$

(c) $n_1n_2 = u_1u_2$ (d) $(n_1 + u_1) = (n_2 + u_2)$

51. $1\,eV$ is **[SCRA 1986]**

(a) Same as one *joule* (b) $1.6 \times 10^{-19}\,J$

(c) $1V$ (d) $1.6 \times 10^{-19}\,C$

52. $1kWh$ = **[AFMC 1986; SCRA 1986, 91]**

(a) $1000\,W$ (b) $36 \times 10^5\,J$

(c) $1000\,J$ (d) $3600\,J$

53. Universal time is based on

(a) Rotation of the earth on its axis

(b) Earth's orbital motion around the earth

(c) Vibrations of cesium atom

(d) Oscillations of quartz crystal

54. The nuclear cross-section is measured in barn, it is equal to **[CBSE PMT 1993]**

(a) $10^{-20}\,m^2$ (b) $10^{-30}\,m^2$

(c) $10^{-28}\,m^2$ (d) $10^{-14}\,m^2$

55. Unit of moment of inertia in MKS system **[MP PMT 1984]**

(a) $kg-m^2$ **[Kerala PMT 2005]** (b) kg/cm^2

(c) $kg \times m^2$ (d) $Joule \times m$

56. Unit of stress is **[MP PMT 1984]**

(a) N/m (b) $N-m$

(c) N/m^2 (d) $N-m^2$

57. Unit of Stefan's constant is

(a) $J\,s^{-1}$ (b) $J\,m^{-2}s^{-1}K^{-4}$

(c) $J\,m^{-2}$ (d) $J\,s$

58. Unit of magnetic moment is **[MP PET 1989]**

(a) $Ampere-metre^2$ (b) $Ampere-metre$

(c) $Weber-metre^2$ (c) $Weber/metre$

59. Curie is a unit of **[CBSE PMT 1992; CPMT 1992]**

(a) Energy of γ-rays (b) Half life

(c) Radioactivity (d) Intensity of γ-rays

60. Hertz is the unit for **[MNR 1983; SCRA 1983; RPMT 1999]**

(a) Frequency (b) Force

(c) Electric charge (d) Magnetic flux

61. One pico *Farad* is equal to

(a) $10^{-24}\,F$ (b) $10^{-18}\,F$

(c) $10^{-12}\,F$ (d) $10^{-6}\,F$

62. In SI, *Henry* is the unit of **[MP PET 1984; CBSE PMT 1993; DPMT 1984]**

(a) Self inductance (b) Mutual inductance

(c) (a) and (b) both (d) None of the above

63. The unit of $e.m.f.$ is **[CPMT 1986; AFMC 1986]**

(a) *Joule* (b) *Joule-Coulomb*

(c) *Volt–Coulomb* (d) *Joule/Coulomb*

64. Which of the following is not the unit of time **[CPMT 1991; NCERT 1990; DPMT 1987; AFMC 1996]**

(a) Micro *second* (b) Leap year

(c) Lunar months (d) Parallactic *second*

(e) Solar day

65. Unit of self inductance is

(a) $\frac{Newton\ -second}{Coulomb\ \times Ampere}$ (b) $\frac{Joule/Coul\ omb \times Second}{Ampere}$

(c) $\frac{Volt \times metre}{Coulomb}$ (d) $\frac{Newton\ \times metre}{Ampere}$

66. To determine the Young's modulus of a wire, the formula is $Y = \frac{F}{A} \times \frac{L}{\Delta L}$; where L = length, A = area of cross-section of the wire, ΔL = change in length of the wire when stretched with a force F. The conversion factor to change it from CGS to MKS system is **[MP PET 1983]**

(a) 1 (b) 10

(c) 0.1 (d) 0.01

67. Young's modulus of a material has the same units as **[MP PMT 1994]**

(a) Pressure (b) Strain

(c) Compressibility (d) Force

68. One yard in SI units is equal

(a) 1.9144 *metre* (b) 0.9144 *metre*

(c) 0.09144 *kilometre* (d) 1.0936 *kilometre*

69. Which of the following is smallest unit **[AFMC 1996]**

(a) *Millimetre* (b) *Angstrom*

(c) *Fermi* (d) *Metre*

70. Which one of the following pairs of quantities and their units is a proper match

(a) Electric field – $Coulomb\ /m$

(b) Magnetic flux – *Weber*

(c) Power – *Farad*

(d) Capacitance – *Henry*

71. The units of modulus of rigidity are **[MP PMT 1997]**

(a) $N–m$ (b) N/m

(c) $N–m^2$ (d) N/m^2

72. The unit of absolute permittivity is

(a) Fm (*Farad*-meter) (b) Fm^{-1} (*Farad*/meter)

(c) Fm^{-2} (*Farad*/$metre^2$) (d) F (*Farad*)

(e) None of these

73. Match List-I with List-II and select the correct answer using the codes given below the lists

List-I	List-II
I. *Joule*	A. *Henry* × *Amp/sec*
II. *Watt*	B. *Farad* × *Volt*
III. *Volt*	C. *Coulomb* × *Volt*
IV. *Coulomb*	D. *Oersted* × *cm*
	E. *Amp* × *Gauss*
	F. Amp^2 × *Ohm*

Codes:

(a) $I-A, II-F, III-E, IV-D$

(b) $I-C, II-F, III-A, IV-B$

(c) $I-C, II-F, III-A, IV-E$

(d) $I-B, II-F, III-A, IV-C$

74. Which relation is wrong **[RPMT 1997]**

(a) 1 *Calorie* = 4.18 *Joules*

(b) $1\mathring{A} = 10^{-10}\ m$

(c) $1\ MeV = 1.6 \times 10^{-13}\ Joules$

(d) $1\ Newton = 10^{-5}\ Dynes$

75. If $x = at + bt^2$, where x is the distance travelled by the body in kilometres while t is the time in seconds, then the units of *b* are

(a) km/s (b) $km–s$

(c) km/s^2 (d) $km–s^2$

76. The equation $\left(P + \frac{a}{V^2}\right)(V-b)$ constant. The units of a are **[MP PMT 1995]**

(a) $Dyne \times cm^5$ (b) $Dyne \times cm^4$

(c) $Dyne/cm^3$ (d) $Dyne/cm^2$

77. Which of the following quantity is expressed as force per unit area **[AFMC 1995]**

(a) Work (b) Pressure

(c) Volume (d) Area

78. Match List-I with List-II and select the correct answer by using the codes given below the lists **[NDA 1995**

List-I	List-II
(a) Distance between earth and stars	1. Microns
(b) Inter-atomic distance in a solid	2. Angstroms
(c) Size of the nucleus	3. Light years
(d) Wavelength of infrared laser	4. *Fermi*
	5. Kilometres

[CMEET Bihar 1995]

Codes

	a	b	c	d		a	b	c	d
(a)	5	4	2	1	(b)	3	2	4	1
(c)	5	2	4	3	(d)	3	4	1	2

[SCRA 1994]

79. Unit of impulse is **[CPMT 1997]**

(a) Newton (b) $kg–m$

(c) $kg–m/s$ (d) *Joule*

80. Which is not a unit of electric field

(a) NC^{-1} (b) Vm^{-1}

(c) JC^{-1} (d) $JC^{-1}m^{-1}$

81. The correct value of 0^oC on the Kelvin scale is **[UPSEAT 2000]**

(a) $273.15\,K$ (b) $272.85\,K$

(c) $273\,K$ (d) $273.2\,K$

82. 'Torr' is the unit of **[RPMT 1999, 2000]**

(a) Pressure (b) Volume

(c) Density (d) Flux

83. Which of the following is a derived unit **[BHU 2000]**

(a) Unit of mass (b) Unit of length

(c) Unit of time (d) Unit of volume

84. *Dyne*/cm^2 is not a unit of

(a) Pressure (b) Stress

(c) Strain (d) Young's modulus

85. The units of angular momentum are **[MP PMT 2000]**

(a) $kg-m^2/s^2$ (b) $Joule-s$

(c) $Joule/s$ (d) $kg-m-s^2$

86. Which of the following is not the unit of energy **[MP PET 2000]**

(a) *Calorie* (b) *Joule*

(c) Electron *volt* (d) *Watt*

87. Which of the following is not a unit of time **[UPSEAT 2001]**

(a) *Leap year* (b) *Micro second*

(c) *Lunar month* (d) *Light year*

88. The S.I. unit of gravitational potential is **[AFMC 2001]**

(a) J (b) $J\text{-}kg^{-1}$

(c) $J\text{-}kg$ (d) $J\text{-}kg^{-2}$

89. Which one of the following is not a unit of young's modulus **[KCET 2005]**

(a) Nm^{-1} (b) Nm^{-2}

(c) $Dyne\ cm^{-2}$ (d) Mega Pascal

90. In C.G.S. system the magnitutde of the force is 100 *dynes*. In another system where the fundamental physical quantities are kilogram, *metre* and minute, the magnitude of the force is

(a) 0.036 (b) 0.36

(c) 3.6 (d) 36

91. The unit of L/R is (where L = inductance and R = resistance) **[Orissa JEE 2002]**

(a) sec (b) $\sec^{-1}$

(c) *Volt* (d) *Ampere*

92. Which is different from others by units **[Orissa JEE 2002]**

(a) Phase difference (b) Mechanical equivalent

(c) Loudness of sound (d) Poisson's ratio

93. Length cannot be measured by **[AIIMS 2002]**

(a) *Fermi* (b) Debye

(c) *Micron* (d) *Light year*

94. The value of Planck's constant is

(a) $6.63\times10^{-34}\ J\text{-sec}$ (b) $6.63\times10^{34}\ J/\sec$

(c) $6.63\times10^{-34}\ kg\text{-}m^2$ (d) $6.63\times10^{34}\ kg/\sec$

95. A physical quantity is measured and its value is found to be nu where $n=$ numerical value and $u=$ unit. Then which of the following relations is true **[RPET 2003]**

[RPET 2000]

(a) $n\propto u^2$ (b) $n\propto u$

(c) $n\propto\sqrt{u}$ (d) $n\propto\frac{1}{u}$

96. *Faraday* is the unit of **[AFMC 2003]**

(a) Charge (b) emf

(c) Mass (d) Energy

97. *Candela* is the unit of **[UPSEAT 1999; CPMT 2003]**

(a) Electric intensity (b) Luminous intensity

(c) Sound intensity (d) None of these

98. The unit of reactance is **[MP PET 2003]**

(a) *Ohm* (b) *Volt*

(c) *Mho* (d) *Newton*

99. The unit of Planck's constant is **[RPMT 1999; MP PET 2003; Pb. PMT 2004]**

(a) *Joule* (b) *Joule*/s

(c) *Joule*/*m* (d) *Joule*-s

100. Number of base SI units is

(a) 4 (b) 7

(c) 3 (d) 5

101. SI unit of permittivity is **[KCET 2004]**

(a) $C^2m^2N^{-1}$ (b) $C^{-1}m^2N^{-2}$

(c) $C^2m^2N^2$ (d) $C^2m^{-2}N^{-1}$

102. Which does not has the same unit as others **[Orissa PMT 2004]**

(a) *Watt-sec* (b) *Kilowatt-hour*

(c) *eV* (d) *J-sec*

[EAMCET 2001]

103. Unit of surface tension is **[Orissa PMT 2004]**

(a) Nm^{-1} (b) Nm^{-2}

(c) N^2m^{-1} (d) Nm^{-3}

104. Which of the following system of units is not based on units of mass, length and time alone

(a) SI (b) MKS

(c) FPS (d) CGS

105. The unit of the coefficient of viscosity in S.I. system is **[J & K CET 2004]**

(a) *N-s/m*^{2} (b) *m-s/kg*^{2}

(c) $kg/m\text{-}s^2$ (d) $kg/m\text{-}s$

106. The unit of Young's modulus is

(a) Nm^{2} (b) Nm^{-2}

(c) Nm (d) Nm^{-1}

107. One femtometer is equivalent to

(a) $10^{15}\ m$ (b) $10^{-15}\ m$

(c) $10^{-12}\ m$ (d) $10^{12}\ m$

108. How many wavelength of Kr^{86} are there in one *metre*

[MNR 1985; UPSEAT 2000; Pb. PET 2004]

(a) 1553164.13 (b) 1650763.73

(c) 652189.63 (d) 2348123.73

109. Which of the following pairs is wrong **[AFMC 2003]**

(a) Pressure-Baromter

(b) Relative density-Pyrometer

(c) Temperature-Thermometer

(d) Earthquake-Seismograph

Dimensions

1. Select the pair whose dimensions are same

(a) Pressure and stress

(b) Stress and strain

(c) Pressure and force

(d) Power and force

2. Dimensional formula $ML^{-1}T^{-2}$ does not represent the physical quantity **[Manipal MEE 1995]**

(a) Young's modulus of elasticity

(b) Stress

(c) Strain

(d) Pressure

3. Dimensional formula $ML^{2}T^{-3}$ represents

[EAMCET 1981; MP PMT 1996, 2001]

(a) Force (b) Power

(c) Energy (d) Work

4. The dimensions of *calorie* are

(a) $ML^{2}T^{-2}$ (b) MLT^{-2}

(c) $ML^{2}T^{-1}$ (d) $ML^{2}T^{-3}$

5. Whose dimensions is $ML^{2}T^{-1}$

(a) Torque (b) Angular momentum

(c) Power (d) Work

6. If L and R are respectively the inductance and resistance, then the dimensions of $\frac{L}{R}$ will be

[CPMT 1986; CBSE PMT 1988; Roorkee 1995; MP PET/PMT 1998; DCE 2002]

(a) $M^{0}L^{0}T^{-1}$

(b) $M^{0}L^{0}T^{0}$ **[Pb. PET 2001]**

(c) $M^{0}L^{0}T$

(d) Cannot be represented in terms of M, L and T **[DCE 2004]**

7. Which pair has the same dimensions

[EAMCET 1982; CPMT 1984, 85; Pb. PET 2002; MP PET 1985]

(a) Work and power

(b) Density and relative density

(c) Momentum and impulse

(d) Stress and strain

8. If C and R represent capacitance and resistance respectively, then the dimensions of RC are

[CPMT 1981, 85; CBSE PMT 1992, 95; Pb. PMT 1999]

(a) $M^{0}L^{0}T^{2}$ (b) $M^{0}L^{0}T$

(c) ML^{-1} (d) None of the above

9. Dimensions of one or more pairs are same. Identify the pairs **[IIT 1986]**

(a) Torque and work

(b) Angular momentum and work

(c) Energy and Young's modulus

(d) Light year and wavelength

10. Dimensional formula for latent heat is

[MNR 1987; CPMT 1978, 86; IIT 1983, 89; RPET 2002]

(a) $M^{0}L^{2}T^{-2}$ (b) MLT^{-2}

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

11. Dimensional formula for volume elasticity is

[MP PMT 1991, 2002; CPMT 1991; MNR 1986]

(a) $M^{1}L^{-2}T^{-2}$ (b) $M^{1}L^{-3}T^{-2}$

(c) $M^{1}L^{2}T^{-2}$ (d) $M^{1}L^{-1}T^{-2}$

12. The dimensions of universal gravitational constant are

[MP PMT 1984, 87, 97, 2000; CBSE PMT 1988, 92; 2004 MP PET 1984, 96, 99; MNR 1992; DPMT 1984; CPMT 1985; CPMT 1978, 84, 89, 90, 92, 96; AFMC 1999; NCERT 1975; DPET 1993; AIIMS 2000; RPET 2001; Pb. PMT 2002, 03; UPSEAT 1999; BCECE 2003, 05;]

(a) $M^{-1}L^{2}T^{-2}$ **[CPMT 1989]** (b) $M^{-1}L^{3}T^{-2}$

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

13. The dimensional formula of angular velocity is

[JIPMER 1993; AFMC 1996; AIIMS 1998]

(a) $M^{0}L^{0}T^{-1}$ (b) MLT^{-1}

(c) $M^{0}L^{0}T^{1}$ (d) $ML^{0}T^{-2}$

14. The dimensions of power are **[CPMT 1974, 75; SCRA 1989]**

(a) $M^1L^2T^{-3}$ (b) $M^2L^1T^{-2}$

(c) $M^1L^2T^{-1}$ (d) $M^1L^1T^{-2}$

15. The dimensions of couple are **[CPMT 1972; JIPMER 1993]**

(a) ML^2T^{-2} (b) MLT^{-2}

(c) $ML^{-1}T^{-3}$ (d) $ML^{-2}T^{-2}$

16. Dimensional formula for angular momentum is **[CBSE PMT 1988, 92; EAMCET 1995; DPMT 1987; CMC Vellore 1982; CPMT 1973, 82, 86; MP PMT 1987; BHU 1995; IIT 1983; Pb. PET 2000]**

(a) ML^2T^{-2} (b) ML^2T^{-1}

(c) MLT^{-1} (d) $M^0L^2T^{-2}$

17. The dimensional formula for impulse is **[EAMCET 1981; CBSE PMT 1991; CPMT 1978; AFMC 1998; BCECE 2003]**

(a) MLT^{-2} (b) MLT^{-1}

(c) ML^2T^{-1} (d) M^2LT^{-1}

18. The dimensional formula for the modulus of rigidity is **[MNR 1984; IIT 1982; MP PET 2000]**

(a) ML^2T^{-2} (b) $ML^{-1}T^{-3}$

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

19. The dimensional formula for *r.m.s.* (root mean square) velocity is

(a) M^0LT^{-1} (b) $M^0L^0T^{-2}$

(c) $M^0L^0T^{-1}$ (d) MLT^{-3}

20. The dimensional formula for Planck's constant (h) is **[DPMT 1987; MP PMT 1983, 96; IIT 1985; MP PET 1995; AFMC 2003; RPMT 1999; Kerala PMT 2002]**

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

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

21. Out of the following, the only pair that does not have identical dimensions is **[MP PET/PMT 1998; BHU 1997]**

(a) Angular momentum and Planck's constant

(b) Moment of inertia and moment of a force

(c) Work and torque

(d) Impulse and momentum

22. The dimensional formula for impulse is same as the dimensional formula for **[CPMT 1982, 83; CBSE PMT 1993; UPSEAT 2001]**

(a) Momentum

(b) Force

(c) Rate of change of momentum

(d) Torque

23. Which of the following is dimensionally correct

(a) Pressure = Energy per unit area

(b) Pressure = Energy per unit volume

(c) Pressure = Force per unit volume

(d) Pressure = Momentum per unit volume per unit time

24. Planck's constant has the dimensions (unit) of **[CPMT 1983, 84, 85, 90, 91; AIIMS 1985; MP PMT 1987; EAMCET 1990; RPMT 1999; CBSE PMT 2001; MP PET 2002; KCET 2004]**

(a) Energy (b) Linear momentum

(c) Work (d) Angular momentum

25. The equation of state of some gases can be expressed as $\left(P+\frac{a}{V^2}\right)(V-b)=RT$. Here P is the pressure, V is the volume, T is the absolute temperature and a, b, R are constants. The dimensions of 'a' are **[CBSE PMT 1991, 96; NCERT 1984; MP PET 1992; CPMT 1974, 79, 87, 97; MP PMT 1992, 94; MNR 1995; AFMC 1995]**

(a) ML^5T^{-2} (b) $ML^{-1}T^{-2}$

(c) $M^0L^3T^0$ (d) $M^0L^6T^0$

26. If V denotes the potential difference across the plates of a capacitor of capacitance C, the dimensions of CV^2 are **[CPMT 1982]**

(a) Not expressible in MLT (b) MLT^{-2}

(c) M^2LT^{-1} (d) ML^2T^{-2}

27. If L denotes the inductance of an inductor through which a current i is flowing, the dimensions of Li^2 are **[CPMT 1982, 85, 87]**

(a) ML^2T^{-2} (b) Not expressible in MLT

(c) MLT^{-2} (d) $M^2L^2T^{-2}$

28. Of the following quantities, which one has dimensions different from the remaining three **[AIIMS 1987; CBSE PMT 1993]**

(a) Energy per unit volume

(b) Force per unit area

(c) Product of voltage and charge per unit volume

(d) Angular momentum per unit mass

29. A spherical body of mass m and radius r is allowed to fall in a medium of viscosity η. The time in which the velocity of the body increases from zero to 0.63 times the terminal velocity (v) is called time constant (τ). Dimensionally τ can be represented by **[AIIMS 1987]**

(a) $\frac{mr^2}{6\pi\eta}$ (b) $\sqrt{\left(\frac{6\pi mr\eta}{g^2}\right)}$

(c) $\frac{m}{6\pi\eta rv}$ (d) None of the above

30. The frequency of vibration f of a mass m suspended from a spring of spring constant K is given by a relation of this type $f = C m^x K^y$; where C is a dimensionless quantity. The value of x and y are **[CBSE PMT 1990]**

(a) $x = \frac{1}{2}, y = \frac{1}{2}$ (b) $x = -\frac{1}{2}, y = -\frac{1}{2}$

(c) $x = \frac{1}{2}, y = -\frac{1}{2}$ (d) $x = -\frac{1}{2}, y = \frac{1}{2}$

31. The quantities A and B are related by the relation, $m = A/B$, where m is the linear density and A is the force. The dimensions of B are of

(a) Pressure (b) Work

(c) Latent heat (d) None of the above

32. The velocity of water waves v may depend upon their wavelength λ, the density of water ρ and the acceleration due to gravity g. The method of dimensions gives the relation between these quantities as **[NCERT 1979; CET 1992; MP PET 2001; UPSEAT 2000]**

(a) $v^2 \propto \lambda g^{-1}\rho^{-1}$ (b) $v^2 \propto g\lambda\rho$

(c) $v^2 \propto g\lambda$ (d) $v^2 \propto g^{-1}\lambda^{-3}$

33. The dimensions of *Farad* are

(a) $M^{-1}L^{-2}T^2Q^2$ (b) $M^{-1}L^{-2}TQ$

(c) $M^{-1}L^{-2}T^{-2}Q$ (d) $M^{-1}L^{-2}TQ^2$

34. The dimensions of resistivity in terms of M, L, T and Q where Q stands for the dimensions of charge, is **[MP PET 1993]**

(a) $ML^3T^{-1}Q^{-2}$ (b) $ML^3T^{-2}Q^{-1}$

(c) $ML^2T^{-1}Q^{-1}$ (d) $MLT^{-1}Q^{-1}$

35. The equation of a wave is given by

$$Y = A\sin\omega\left(\frac{x}{v} - k\right)$$

where ω is the angular velocity and v is the linear velocity. The dimension of k is

(a) LT (b) T

(c) T^{-1} (d) T^2

36. The dimensions of coefficient of thermal conductivity is **[MP PMT 1993]**

(a) $ML^2T^{-2}K^{-1}$ (b) $MLT^{-3}K^{-1}$

(c) $MLT^{-2}K^{-1}$ (d) $MLT^{-3}K$

37. Dimensional formula of stress is

(a) M^0LT^{-2} (b) $M^0L^{-1}T^{-2}$

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

38. Dimensional formula of velocity of sound is

(a) M^0LT^{-2} (b) LT^0

(c) M^0LT^{-1} (d) $M^0L^{-1}T^{-1}$

39. Dimensional formula of capacitance is **[CPMT 1978; MP PMT 1979; IIT 1983]**

(a) $M^{-1}L^{-2}T^4A^2$ (b) $ML^2T^4A^{-2}$

(c) $MLT^{-4}A^2$ (d) $M^{-1}L^{-2}T^{-4}A^{-2}$

40. MLT^{-1} represents the dimensional formula of **[CPMT 1975]**

(a) Power (b) Momentum

(c) Force (d) Couple

41. Dimensional formula of heat energy is **[CPMT 1976, 81, 86, 91]**

(a) ML^2T^{-2} (b) MLT^{-1}

(c) $M^0L^0T^{-2}$ (d) None of these

42. If C and L denote capacitance and inductance respectively, then the dimensions of LC are **[CPMT 1981; MP PET 1997]**

(a) $M^0L^0T^0$ (b) $M^0L^0T^2$

(c) $M^2L^0T^2$ (d) MLT^2

43. Which of the following quantities has the same dimensions as that of energy **[AFMC 1991; CPMT 1976; DPMT 1993; MP PET 1993]**

(a) Power (b) Force

(c) Momentum (d) Work

44. The dimensions of "time constant" $\frac{L}{R}$ during growth and decay of current in all inductive circuit is same as that of **[MP PET 1993; EAMCET 1994]**

(a) Constant (b) Resistance

(c) Current (d) Time

45. The period of a body under SHM *i.e.* presented by $T = P^a D^b S^c$; where P is pressure, D is density and S is surface tension. The value of a, b and c are **[CPMT 1981]**

(a) $-\frac{3}{2}, \frac{1}{2}, 1$ (b) $-1, -2, 3$

[MP PMT 1993]

(c) $\frac{1}{2}, -\frac{3}{2}, -\frac{1}{2}$ (d) $1, 2, \frac{1}{3}$

46. Which of the following pairs of physical quantities has the same dimensions **[CPMT 1978; NCERT 1**

(a) Work and power (b) Momentum and energy

(c) Force and power (d) Work and energy

47. The velocity of a freely falling body changes as $g^p h^q$ where g is acceleration due to gravity and h is the height. The values of p and q are **[NCERT 1983; EAMCET 1994]**

(a) $1, \frac{1}{2}$ (b) $\frac{1}{2}, \frac{1}{2}$

(c) $\frac{1}{2}, 1$ (d) $1, 1$

48. Which one of the following does not have the same dimensions **[CPMT 1985]**

(a) Work and energy

(b) Angle and strain

(c) Relative density and refractive index

(d) Planck constant and energy

49. Dimensions of frequency are

(a) $M^0 L^{-1} T^0$ (b) $M^0 L^0 T^{-1}$

(c) $M^0 L^0 T$ (d) MT^{-2}

50. Which one has the dimensions different from the remaining three **[CBSE PMT 1988]**

(a) Power (b) Work

(c) Torque (d) Energy

51. A small steel ball of radius r is allowed to fall under gravity through a column of a viscous liquid of coefficient of viscosity η. After some time the velocity of the ball attains a constant value known as terminal velocity v_T. The terminal velocity depends on (i) the mass of the ball m, (ii) η, (iii) r and (iv) acceleration due to gravity g. Which of the following relations is dimensionally correct **[CPMT 1992; CBSE PMT 1992; NCERT 1983; MP PMT 2001]**

(a) $v_T \propto \frac{mg}{\eta r}$ (b) $v_T \propto \frac{\eta r}{mg}$

(c) $v_T \propto \eta r mg$ (d) $v_T \propto \frac{mgr}{\eta}$

52. The quantity $X = \frac{\varepsilon_0 LV}{t}$: ε_0 is the permittivity of free space, L is length, V is potential difference and t is time. The dimensions of X are same as that of **[IIT 2001]**

(a) Resistance (b) Charge

(c) Voltage (d) Current

53. μ_0 and ε_0 denote the permeability and permittivity of free space, the dimensions of $\mu_0 \varepsilon_0$ are

(a) LT^{-1} (b) $L^{-2} T^2$

(c) $M^{-1} L^{-3} Q^2 T^2$ (d) $M^{-1} L^{-3} I^2 T^2$

54. The expression $[ML^2 T^{-2}]$ represents **[JIPMER 1993, 97]**

(a) Pressure (b) Kinetic energy

(c) Momentum (d) Power

55. The dimensions of physical quantity X in the equation Force $= \frac{X}{\text{Density}}$ is given by

(a) $M^1 L^4 T^{-2}$ (b) $M^2 L^{-2} T^{-1}$

(c) $M^2 L^{-2} T^{-2}$ (d) $M^1 L^{-2} T^{-1}$

56. The dimensions of CV^2 matches with the dimensions of **[CPMT 1988]** **[DCE 1993]**

(a) $L^2 I$ (b) $L^2 I^2$

(c) LI^2 (d) $\frac{1}{LI}$

57. The Martians use force (F), acceleration (A) and time (T) as their fundamental physical quantities. The dimensions of length on Martians system are

(a) FT^2 (b) $F^{-1} T^2$

(c) $F^{-1} A^2 T^{-1}$ (d) AT^2

58. The dimension of $\frac{1}{\sqrt{\varepsilon_0 \mu_0}}$ is that of **[SCRA 1986]**

(a) Velocity (b) Time

(c) Capacitance (d) Distance

59. An athletic coach told his team that muscle times speed equals power. What dimensions does he view for muscle

(a) MLT^{-2} (b) $ML^2 T^{-2}$

(c) MLT^2 (d) L

60. The foundations of dimensional analysis were laid down by

(a) Gallileo (b) Newton

(c) Fourier (d) Joule

61. The dimensional formula of wave number is

(a) $M^0 L^0 T^{-1}$ (b) $M^0 L^{-1} T^0$

(c) $M^{-1} L^{-1} T^0$ (d) $M^0 L^0 T^0$

62. The dimensions of stress are equal to **[MP PET 1991, 2003]**

(a) Force (b) Pressure

(c) Work (d) $\frac{1}{\text{Pressure}}$

63. The dimensions of pressure are

[CPMT 1977; MP PMT 1994]

(a) MLT^{-2} (b) $ML^{-2}T^{2}$

(c) $ML^{-1}T^{-2}$ (d) MLT^{2}

64. Dimensions of permeability are **[CBSE PMT 1991; AIIMS 2003]**

(a) $A^{-2}M^{1}L^{1}T^{-2}$ (b) MLT^{-2}

(c) $ML^{0}T^{-1}$ (d) $A^{-1}MLT^{2}$

65. Dimensional formula of magnetic flux is **[DCE 1993; IIT 1982; CBSE PMT 1989, 99; DPMT 2001; Kerala PMT 2005]**

(a) $ML^{2}T^{-2}A^{-1}$ (b) $ML^{0}T^{-2}A^{-2}$

(c) $M^{0}L^{-2}T^{-2}A^{-3}$ (d) $ML^{2}T^{-2}A^{3}$

66. If P represents radiation pressure, c represents speed of light and Q represents radiation energy striking a unit area per *second*, then non-zero integers x, y and z such that $P^{x}Q^{y}c^{z}$ is dimensionless, are **[AFMC 1991; CBSE PMT 1992; CPMT 1981, 92; MP PMT 1992]**

(a) $x=1,\ y=1,\ z=-1$

(b) $x=1, y=-1, z=1$

(c) $x=-1, y=1, z=1$

(d) $x=1, y=1, z=1$

67. Inductance L can be dimensionally represented as **[CBSE PMT 1989, 92; IIT 1983; CPMT 1992; DPMT 1999; KCET 2004; J&K CET 2005]**

(a) $ML^{2}T^{-2}A^{-2}$ (b) $ML^{2}T^{-4}A^{-3}$

(c) $ML^{-2}T^{-2}A^{-2}$ (d) $ML^{2}T^{4}A^{3}$

68. Dimensions of strain are **[MP PET 1984; SCRA 1986]**

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

(c) MLT^{-2} (d) $M^{0}L^{0}T^{0}$

69. Dimensions of time in power are

(a) T^{-1} (b) T^{-2}

(c) T^{-3} (d) T^{0}

70. Dimensions of kinetic energy are **[Bihar PET 1983; DPET 1993; AFMC 1991]**

(a) $ML^{2}T^{-2}$ (b) $M^{2}LT^{-1}$

(c) $ML^{2}T^{-1}$ (d) $ML^{3}T^{-1}$

71. Dimensional formula for torque is **[DPMT 1984; IIT 1983; CBSE PMT 1990; MNR 1988; AIIMS 2002; BHU 1995, 2001; RPMT 1999; RPET 2003; DCE 1999, 2000; DCE 2004]**

(a) $L^{2}MT^{-2}$ (b) $L^{-1}MT^{-2}$

(c) $L^{2}MT^{-3}$ (d) LMT^{-2}

72. Dimensions of coefficient of viscosity are **[AIIMS 1993; CPMT 1992; Bihar PET 1984; MP PMT 1987, 89, 91; AFMC 1986; CBSE PMT 1992; KCET 1994; DCE 1999; AIEEE 2004; DPMT 2004]**

(a) $ML^{2}T^{-2}$ (b) $ML^{2}T^{-1}$

(c) $ML^{-1}T^{-1}$ (d) MLT

73. The dimension of quantity (L/RCV) is **[Roorkee 1994]**

(a) $[A]$ (b) $[A^{2}]$

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

74. The dimension of the ratio of angular to linear momentum is **[MNR 1994]**

(a) $M^{0}L^{1}T^{0}$ (b) $M^{1}L^{1}T^{-1}$

(c) $M^{1}L^{2}T^{-1}$ (d) $M^{-1}L^{-1}T^{-1}$

75. The pair having the same dimensions is **[MP PET 1994; CPMT 1996]**

(a) Angular momentum, work

(b) Work, torque

(c) Potential energy, linear momentum

(d) Kinetic energy, velocity

76. The dimensions of surface tension are **[MP PMT 1994, 99; UPSEAT 1999]**

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

(c) $ML^{-1}T^{-1}$ (d) MT^{-2}

77. In the following list, the only pair which have different dimensions, is **[Manipal MEE 1995]**

(a) Linear momentum and moment of a force

(b) Planck's constant and angular momentum

(c) Pressure and modulus of elasticity

(d) Torque and potential energy

78. If R and L represent respectively resistance and self inductance, which of the following combinations has the dimensions of frequency **[EAMCET 1982] [MP PMT 1996, 2000, 02; MP PET 1999]**

(a) $\frac{R}{L}$ (b) $\frac{L}{R}$

(c) $\sqrt{\frac{R}{L}}$ (d) $\sqrt{\frac{L}{R}}$

79. If velocity v, acceleration A and force F are chosen as fundamental quantities, then the dimensional formula of angular momentum in terms of v, A and F would be

(a) $FA^{-1}v$ (b) $Fv^{3}A^{-2}$

(c) $Fv^{2}A^{-1}$ (d) $F^{2}v^{2}A^{-1}$

80. The dimensions of permittivity ε_0 are **[MP PET 1997; AIIMS-2004; DCE-2003]**

(a) $A^{2}T^{2}M^{-1}L^{-3}$ (b) $A^{2}T^{4}M^{-1}L^{-3}$

(c) $A^{-2}T^{-4}ML^3$ (d) $A^2T^{-4}M^{-1}L^{-3}$

81. Dimensions of the following three quantities are the same **[MP PET 1997]**

(a) Work, energy, force

(b) Velocity, momentum, impulse

(c) Potential energy, kinetic energy, momentum

(d) Pressure, stress, coefficient of elasticity

82. The dimensions of Planck's constant and angular momentum are respectively **[CPMT 1999; BCECE 2004]**

(a) ML^2T^{-1} and MLT^{-1} (b) ML^2T^{-1} and ML^2T^{-1}

(c) MLT^{-1} and ML^2T^{-1} (d) MLT^{-1} and ML^2T^{-2}

83. Let $[\varepsilon_0]$ denotes the dimensional formula of the permittivity of the vacuum and $[\mu_0]$ that of the permeability of the vacuum. If $M = \text{mass}$, $L = \text{length}$, $T = \text{Time}$ and $I = \text{electric current}$, then

(a) $[\varepsilon_0] = M^{-1}L^{-3}T^2I$ (b) $[\varepsilon_0] = M^{-1}L^{-3}T^4I^2$

(c) $[\mu_0] = MLT^{-2}I^{-2}$ (d) $[\mu_0] = ML^2T^{-1}I$

84. Dimensions of CR are those of **[EAMCET (Engg.) 1995; AIIMS 1999]**

(a) Frequency (b) Energy

(c) Time period (d) Current

85. The physical quantity that has no dimensions **[EAMCET (Engg.) 1995]**

(a) Angular Velocity (b) Linear momentum

(c) Angular momentum (d) Strain

86. $ML^{-1}T^{-2}$ represents **[EAMCET (Med.) 1995; Pb. PMT 2001]**

(a) Stress

(b) Young's Modulus

(c) Pressure

(d) All the above three quantities

87. Dimensions of magnetic field intensity is **[RPMT 1997; EAMCET (Med.) 2000; MP PET 2003]**

(a) $[M^0L^{-1}T^0A^1]$ (b) $[MLT^{-1}A^{-1}]$

(c) $[ML^0T^{-2}A^{-1}]$ (d) $[MLT^{-2}A]$

88. The force F on a sphere of radius 'a' moving in a medium with velocity 'v' is given by $F = 6\pi\eta av$. The dimensions of η are **[CBSE PMT 1997; DPMT 2000]**

(a) $ML^{-1}T^{-1}$ (b) MT^{-1}

(c) MLT^{-2} (d) ML^{-3}

89. Which physical quantities have the same dimension **[CPMT 1997]**

(a) Couple of force and work

(b) Force and power

(c) Latent heat and specific heat

(d) Work and power

90. Two quantities A and B have different dimensions. Which mathematical operation given below is physically meaningful **[CPMT 1997]**

(a) A/B (b) $A+B$

(c) $A-B$ (d) None

91. Given that v is speed, r is the radius and g is the acceleration due to gravity. Which of the following is dimensionless

(a) v^2/rg (b) v^2r/g

(c) v^2g/r (d) v^2rg **[IIT 1998]**

92. The physical quantity which has the dimensional formula M^1T^{-3} is **[CET 1998]**

(a) Surface tension (b) Solar constant

(c) Density (d) Compressibility

93. A force F is given by $F = at + bt^2$, where t is time. What are the dimensions of a and b **[AFMC 2001; BHU 1998, 2005]**

(a) MLT^{-3} and ML^2T^{-4} (b) MLT^{-3} and MLT^{-4}

(c) MLT^{-1} and MLT^0 (d) MLT^{-4} and MLT^1

94. The dimensions of inter atomic force constant are **[UPSEAT 1999]**

(a) MT^{-2} (b) MLT^{-1}

(c) MLT^{-2} (d) $ML^{-1}T^{-1}$

95. If the speed of light (c), acceleration due to gravity (g) and pressure (p) are taken as the fundamental quantities, then the dimension of gravitational constant is **[AMU (Med.) 1999]**

(a) $c^2g^0p^{-2}$ (b) $c^0g^2p^{-1}$

(c) cg^3p^{-2} (d) $c^{-1}g^0p^{-1}$

96. If the time period (T) of vibration of a liquid drop depends on surface tension (S), radius (r) of the drop and density (ρ) of the liquid, then the expression of T is **[AMU (Med.) 2000]**

(a) $T = k\sqrt{\rho r^3/S}$ (b) $T = k\sqrt{\rho^{1/2}r^3/S}$

(c) $T = k\sqrt{\rho r^3/S^{1/2}}$ (d) None of these

97. $ML^3T^{-1}Q^{-2}$ is dimension of **[RPET 2000]**

(a) Resistivity (b) Conductivity

(c) Resistance (d) None of these

98. Dimension of electric current is

(a) $[M^0L^0T^{-1}Q]$ (b) $[ML^2T^{-1}Q]$

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

99. The fundamental physical quantities that have same dimensions in the dimensional formulae of torque and angular momentum are

(a) Mass, time (b) Time, length

(c) Mass, length (d) Time, mole

100. If pressure P, velocity V and time T are taken as fundamental physical quantities, the dimensional formula of force is

(a) PV^2T^2 (b) $P^{-1}V^2T^{-2}$

(c) PVT^2 (d) $P^{-1}VT^2$

101. The physical quantity which has dimensional formula as that of $\frac{\text{Energy}}{\text{Mass} \times \text{Length}}$ is

(a) Force (b) Power

(c) Pressure (d) Acceleration

102. If energy (E), velocity (v) and force (F) be taken as fundamental quantity, then what are the dimensions of mass

[AMU 2000]

(a) Ev^2 (b) Ev^{-2}

(c) Fv^{-1} (d) Fv^{-2}

103. Dimensions of luminous flux are

(a) ML^2T^{-2} (b) ML^2T^{-3}

(c) ML^2T^{-1} (d) MLT^{-2}

104. A physcial quantity x depends on quantities y and z as follows: $x = Ay + B\tan Cz$, where A, B and C are constants. Which of the following do not have the same dimensions

(a) x and B (b) C and z^{-1}

(c) y and B/A (d) x and A

105. Which of the following pair does not have similar dimensions **[AIIMS 2001]**

(a) Stress and pressure

(b) Angle and strain

(c) Tension and surface tension

(d) Planck's constant and angular momentum

106. Out of the following which pair of quantities do not have same dimensions

(a) Planck's constant and angular momentum

(b) Work and energy

(c) Pressure and Young's modulus

(d) Torque & moment of inertia

107. Identify the pair which has different dimensions

[KCET 2001]

[CBSE PMT 2000]

(a) Planck's constant and angular momentum

(b) Impulse and linear momentum

(c) Angular momentum and frequency

(d) Pressure and Young's modulus

108. The dimensional formula $M^0L^2T^{-2}$ stands for **[KCET 2001]**

[EAMCET (Eng.) 2000]

(a) Torque

(b) Angular momentum

(c) Latent heat

(d) Coefficient of thermal conductivity

109. Which of the following represents the dimensions of *Farad*

[EAMCET (Eng.) 2000]

[AMU (Med.) 2002]

(a) $M^{-1}L^{-2}T^4A^2$ (b) $ML^2T^2A^{-2}$

(c) $ML^2T^2A^{-1}$ (d) $MT^{-2}A^{-1}$

110. If L, C and R denote the inductance, capacitance and resistance respectively, the dimensional formula for C^2LR is **[EAMCET (Eng.) 2000]**

(a) $[ML^{-2}T^{-1}I^0]$ (b) $[M^0L^0T^3I^0]$

(c) $[M^{-1}L^{-2}T^6I^2]$ (d) $[M^0L^0T^2I^0]$

111. If the velocity of light (c), gravitational constant (G) and Planck's constant (h) are chosen as fundamental units, then the dimensions of mass in new system is **[UPSEAT 2002]**

[UPSEAT 2001]

(a) $c^{1/2}G^{1/2}h^{1/2}$ (b) $c^{1/2}G^{1/2}h^{-1/2}$

(c) $c^{1/2}G^{-1/2}h^{1/2}$ (d) $c^{-1/2}G^{1/2}h^{1/2}$

[AMU (Engg.) 2001]

[RPET 2001]

112. Dimensions of charge are

(a) $M^0L^0T^{-1}A^{-1}$ (b) $MLTA^{-1}$

(c) $T^{-1}A$ (d) TA

113. According to Newton, the viscous force acting between liquid layers of area A and velocity gradient $\Delta v/\Delta z$ is given by $F = -\eta A\frac{\Delta v}{\Delta z}$ where η is constant called coefficient of viscosity. The dimension of η are **[JIPMER 2001, 02]**

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

(c) $[ML^{-2}T^{-2}]$ (d) $[M^0L^0T^0]$

114. Identify the pair whose dimensions are equal **[AIEEE 2002]**

(a) Torque and work (b) Stress and energy

(c) Force and stress (d) Force and work

115. The dimensions of pressure is equal to **[AIEEE 2002]**

(a) Force per unit volume

(b) Energy per unit volume

(c) Force

(d) Energy

116. Which of the two have same dimensions **[AIEEE 2002]**

(a) Force and strain

(b) Force and stress

(c) Angular velocity and frequency

(d) Energy and strain

117. An object is moving through the liquid. The viscous damping force acting on it is proportional to the velocity. Then dimension of constant of proportionality is **[Orissa JEE 2002]**

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

(c) M^0LT^{-1} (d) ML^0T^{-1}

118. The dimensions of emf in MKS is **[CPMT 2002]**

(a) $ML^{-1}T^{-2}Q^{-2}$ (b) $ML^2T^{-2}Q^{-2}$

(c) $MLT^{-2}Q^{-1}$ (d) $ML^2T^{-2}Q^{-1}$

119. Which of the following quantities is dimensionless **[MP PET 2002]**

(a) Gravitational constant (b) Planck's constant

(c) Power of a convex lens (d) None

120. The dimensional formula for Boltzmann's constant is **[MP PET 2002; Pb. PET 2001]**

(a) $[ML^2T^{-2}\theta^{-1}]$ (b) $[ML^2T^{-2}]$

(c) $[ML^0T^{-2}\theta^{-1}]$ (d) $[ML^{-2}T^{-1}\theta^{-1}]$

121. The dimensions of K in the equation $W = \frac{1}{2}Kx^2$ is **[Orissa JEE 2003]**

(a) $M^1L^0T^{-2}$ (b) $M^0L^1T^{-1}$

(c) $M^1L^1T^{-2}$ (d) $M^1L^0T^{-1}$

122. The physical quantities not having same dimensions are **[DPMT 2002]** **[AIEEE 2003]**

(a) Speed and $(\mu_0\varepsilon_0)^{-1/2}$

(b) Torque and work

(c) Momentum and Planck's constant

(d) Stress and Young's modules

123. Dimension of R is **[AFMC 2003; AIIMS 2005]**

(a) ML^2T^{-1} (b) $ML^2T^{-3}A^{-2}$

(c) $ML^{-1}T^{-2}$ (d) None of these

124. The dimensional formula of relative density is **[CPMT 2003]**

(a) ML^{-3} (b) LT^{-1}

(c) MLT^{-2} (d) Dimensionless

125. The dimensional formula for young's modulus is **[BHU 2003; CPMT 2004]**

(a) $ML^{-1}T^{-2}$ (b) M^0LT^{-2}

(c) MLT^{-2} (d) ML^2T^{-2}

126. Frequency is the function of density (ρ), length (a) and surface tension (T). Then its value is **[BHU 2003]**

(a) $k\rho^{1/2}a^{3/2}/\sqrt{T}$ (b) $k\rho^{3/2}a^{3/2}/\sqrt{T}$

(c) $k\rho^{1/2}a^{3/2}/T^{3/4}$ (d) $k\rho^{1/2}a^{1/2}/T^{3/2}$

127. The dimensions of electric potential are **[UPSEAT 2003]**

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

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

128. Dimensions of potential energy are

(a) MLT^{-1} (b) ML^2T^{-2}

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

129. The dimension of $\frac{R}{L}$ are **[MP PET 2003]**

(a) T^2 (b) T

(c) T^{-1} (d) T^{-2}

130. The dimensions of shear modulus are **[MP PMT 2004]**

(a) MLT^{-1} (b) ML^2T^{-2}

(c) $ML^{-1}T^{-2}$ (d) MLT^{-2}

131. Pressure gradient has the same dimension as that of **[AFMC 2004]**

(a) Velocity gradient (b) Potential gradient

(c) Energy gradient (d) None of these

132. If force (F), length (L) and time (T) are assumed to be fundamental units, then the dimensional formula of the mass will be

(a) $FL^{-1}T^2$ (b) $FL^{-1}T^{-2}$

(c) $FL^{-1}T^{-1}$ (d) FL^2T^2

133. The dimensions of universal gas constant is **[Pb. PET 2003]**

(a) $[ML^2T^{-2}\theta^{-1}]$ (b) $[M^2LT^{-2}\theta]$

(c) $[ML^3T^{-1}\theta^{-1}]$ (d) None of these

134. In the relation $y = a\cos(\omega t - kx)$, the dimensional formula for k is **[BHU 2004]**

(a) $[M^0L^{-1}T^{-1}]$ (b) $[M^0LT^{-1}]$

(c) $[M^0L^{-1}T^0]$ (d) $[M^0LT]$

135. Position of a body with acceleration 'a' is given by $x = Ka^m t^n$, here t is time. Find dimension of m and n.

[Orissa JEE 2005]

(a) $m = 1$, $n = 1$ (b) $m = 1, n = 2$

(c) $m = 2, n = 1$ (d) $m = 2, n = 2$

136. "Pascal-Second" has dimension of **[AFMC 2005]**

(a) Force (b) Energy

(c) Pressure (d) Coefficient of viscosity

137. In a system of units if force (F), acceleration (A) and time (T) are taken as fundamental units then the dimensional formula of energy is

(a) FA^2T (b) FAT^2

(c) F^2AT (d) FAT

138. Out of the following pair, which one does not have identical dimensions

(a) Moment of inertia and moment of force

(b) Work and torque

(c) Angular momentum and Planck's constant

(d) Impulse and momentum

139. The ratio of the dimension of Planck's constant and that of moment of inertia is the dimension of **[CBSE PMT 2005]**

(a) Frequency (b) Velocity

(c) Angular momentum (d) Time

140. Which of the following group have different dimension

[IIT JEE 2005]

(a) Potential difference, EMF, voltage

(b) Pressure, stress, young's modulus

(c) Heat, energy, work-done

(d) Dipole moment, electric flux, electric field

141. Out of following four dimensional quantities, which one quantity is to be called a dimensional constant **[KCET 2005]**

(a) Acceleration due to gravity

(b) Surface tension of water

(c) Weight of a standard kilogram mass

(d) The velocity of light in vacuum

142. Density of a liquid in CGS system is 0.625 g/cm^3. What is its magnitude in SI system

(a) 0.625 (b) 0.0625

(c) 0.00625 (d) 625

Errors of Measurement

1. The period of oscillation of a simple pendulum is given by $T = 2\pi\sqrt{\frac{l}{g}}$ where l is about 100 cm and is known to have 1mm accuracy. The period is about 2s. The time of 100 oscillations is measured by a stop watch of least count 0.1 s. The percentage error in g is

(a) 0.1% (b) 1%

(c) 0.2% (d) 0.8%

2. The percentage errors in the measurement of mass and speed are 2% and 3% respectively. How much will be the maximum error in the estimation of the kinetic energy obtained by measuring mass and speed **[BHU 2005]**

(a) 11% (b) 8%

(c) 5% (d) 1%

3. The random error in the arithmetic mean of 100 observations is x; then random error in the arithmetic mean of 400 observations would be **[AIEEE 2005]**

(a) $4x$ (b) $\frac{1}{4}x$

(c) $2x$ (d) $\frac{1}{2}x$

4. What is the number of significant figures in 0.310×10^3

(a) 2 (b) 3

(c) 4 (d) 6

5. Error in the measurement of radius of a sphere is 1%. The error in the calculated value of its volume is **[AFMC 2005]**

(a) 1% (b) 3%

(c) 5% (d) 7%

6. The mean time period of *second*'s pendulum is 2.00s and mean absolute error in the time period is 0.05s. To express maximum estimate of error, the time period should be written as

(a) $(2.00 \pm 0.01)\ s$ (b) $(2.00 + 0.025)\ s$

(c) $(2.00 \pm 0.05)\ s$ (d) $(2.00 \pm 0.10)\ s$

7. A body travels uniformly a distance of (13.8 ± 0.2) m in a time (4.0 ± 0.3) s. The velocity of the body within error limits is

(a) $(3.45 \pm 0.2)\ ms^{-1}$ (b) $(3.45 \pm 0.3)\ ms^{-1}$

(c) $(3.45 \pm 0.4)\ ms^{-1}$ (d) $(3.45 \pm 0.5)\ ms^{-1}$

8. The percentage error in the above problem is **[J&K CET 2005]**

(a) 7% (b) 5.95%

(c) 8.95% (d) 9.85%

9. The unit of percentage error is

(a) Same as that of physical quantity

(b) Different from that of physical quantity

(c) Percentage error is unit less

(d) Errors have got their own units which are different from that of physical quantity measured

10. The decimal equivalent of 1/20 upto three significant figures is

(a) 0.0500 (b) 0.05000

(c) 0.0050 (d) 5.0×10^{-2}

11. Accuracy of measurement is determined by

(a) Absolute error (b) Percentage error

(c) Both (d) None of these

12. The radius of a sphere is (5.3 ± 0.1) *cm*. The percentage error in its volume is

(a) $\frac{0.1}{5.3} \times 100$ (b) $3 \times \frac{0.1}{5.3} \times 100$

(c) $\frac{0.1 \times 100}{3.53}$ (d) $3 + \frac{0.1}{5.3} \times 100$

13. A thin copper wire of length *l metre* increases in length by 2% when heated through 10°C. What is the percentage increase in area when a square copper sheet of length *l metre* is heated through 10°*C*

(a) 4% (b) 8%

(c) 16% (d) None of the above

14. In the context of accuracy of measurement and significant figures in expressing results of experiment, which of the following is/are correct

(1) Out of the two measurements 50.14 *cm* and 0.00025 *ampere*, the first one has greater accuracy

(2) If one travels 478 *km* by rail and 397 *m*. by road, the total distance travelled is 478 *km*.

(a) Only (1) is correct (b) Only (2) is correct

(c) Both are correct (d) None of them is correct.

15. A physical parameter *a* can be determined by measuring the parameters b, c, d and e using the relation $a = b^{\alpha}c^{\beta}/d^{\gamma}e^{\delta}$. If the maximum errors in the measurement of b, c, d and e are b_1%, c_1%, d_1% and e_1%, then the maximum error in the value of *a* determined by the experiment is

(a) $(b_1 + c_1 + d_1 + e_1)$%

(b) $(b_1 + c_1 - d_1 - e_1)$%

(c) $(\alpha b_1 + \beta c_1 - \gamma d_1 - \delta e_1)$%

(d) $(\alpha b_1 + \beta c_1 + \gamma d_1 + \delta e_1)$%

16. The relative density of material of a body is found by weighing it first in air and then in water. If the weight in air is (5.00 ± 0.05) *Newton* and weight in water is (4.00 ± 0.05) *Newton*. Then the relative density along with the maximum permissible percentage error is

(a) 5.0 ± 11% (b) 5.0 ± 1%

(c) 5.0 ± 6% (d) 1.25 ± 5%

17. The resistance $R = \frac{V}{i}$ where V= 100 ± 5 *volts* and i = 10 ± 0.2 *amperes*. What is the total error in *R*

(a) 5% (b) 7%

(c) 5.2% (d) $\frac{5}{2}$%

18. The period of oscillation of a simple pendulum in the experiment is recorded as 2.63 s, 2.56 s, 2.42 s, 2.71 s and 2.80 s respectively. The average absolute error is

(a) 0.1 s (b) 0.11 s

(c) 0.01 s (d) 1.0 s

19. The length of a cylinder is measured with a meter rod having least count 0.1 *cm*. Its diameter is measured with vernier calipers having least count 0.01 *cm*. Given that length is 5.0 *cm*. and radius is 2.0 *cm*. The percentage error in the calculated value of the volume will be

(a) 1% (b) 2%

(c) 3% (d) 4%

20. In an experiment, the following observation's were recorded : L = 2.820 *m*, M = 3.00 *kg*, l = 0.087 *cm*, Diameter D = 0.041 *cm* Taking g = 9.81 m/s^2 using the formula , $Y = \frac{4MgL}{\pi D^2 l}$, the maximum permissible error in Y is

(a) 7.96% (b) 4.56%

(c) 6.50% (d) 8.42%

21. According to *Joule*'s law of heating, heat produced $H = I^2 Rt$, where I is current, R is resistance and t is time. If the errors in the measurement of I, R and t are 3%, 4% and 6% respectively then error in the measurement of H is

(a) ± 17% (b) ± 16%

(c) ± 19% (d) ± 25%

22. If there is a positive error of 50% in the measurement of velocity of a body, then the error in the measurement of kinetic energy is

(a) 25% (b) 50%

(c) 100% (d) 125%

23. A physical quantity P is given by $P=\frac{A^3B^{\frac{1}{2}}}{C^{-4}D^{\frac{3}{2}}}$. The quantity which brings in the maximum percentage error in P is

(a) A (b) B

(c) C (d) D

24. If $L = 2.331\ cm, B = 2.1\ cm$, then $L + B =$ **[DCE 2003]**

(a) 4.431 cm (b) 4.43 cm

(c) 4.4 cm (d) 4 cm

25. The number of significant figures in all the given numbers 25.12, 2009, 4.156 and 1.217×10^{-4} is **[Pb. PET 2003]**

(a) 1 (b) 2

(c) 3 (d) 4

26. If the length of rod A is 3.25 ± 0.01 cm and that of B is 4.19 ± 0.01 cm then the rod B is longer than rod A by **[J&K CET 2005]**

(a) 0.94 ± 0.00 cm (b) 0.94 ± 0.01 cm

(c) 0.94 ± 0.02 cm (d) 0.94 ± 0.005 cm

27. A physical quantity is given by $X = M^aL^bT^c$. The percentage error in measurement of M, L and T are α, β and γ respectively. Then maximum percentage error in the quantity X is

(a) $a\alpha + b\beta + c\gamma$ (b) $a\alpha + b\beta - c\gamma$

(c) $\frac{a}{\alpha}+\frac{b}{\beta}+\frac{c}{\gamma}$ (d) None of these

28. A physical quantity A is related to four observable a, b, c and d as follows, $A = \frac{a^2b^3}{c\sqrt{d}}$, the percentage errors of measurement in a, b, c and d are 1%,3%,2% and 2% respectively. What is the percentage error in the quantity A **[Kerala PET 2005]**

(a) 12% (b) 7%

(c) 5% (d) 14%

Critical Thinking

Objective Questions

1. If the acceleration due to gravity is $10\ ms^{-2}$ and the units of length and time are changed in kilometer and hour respectively, the numerical value of the acceleration is **[Kerala PET 2002]**

(a) 360000 (b) 72,000

(c) 36,000 (d) 129600

2. If L, C and R represent inductance, capacitance and resistance respectively, then which of the following does not represent dimensions of frequency **[IIT 1984]**

(a) $\frac{1}{RC}$ (b) $\frac{R}{L}$

(c) $\frac{1}{\sqrt{LC}}$ (d) $\frac{C}{L}$

3. Number of particles is given by $n = -D\frac{n_2 - n_1}{x_2 - x_1}$ crossing a unit area perpendicular to X-axis in unit time, where n_1 and n_2 are number of particles per unit volume for the value of x meant to x_2 and x_1. Find dimensions of D called as diffusion constant **[CPMT 1979]**

(a) M^0LT^2 (b) $M^0L^2T^{-4}$

(c) M^0LT^{-3} (d) $M^0L^2T^{-1}$

4. With the usual notations, the following equation $S_t = u + \frac{1}{2}a(2t-1)$ is

(a) Only numerically correct

(b) Only dimensionally correct

(c) Both numerically and dimensionally correct

(d) Neither numerically nor dimensionally correct

5. If the dimensions of length are expressed as $G^xc^yh^z$; where G, c and h are the universal gravitational constant, speed of light and Planck's constant respectively, then **[Orissa JEE 2005] [IIT 1992]**

(a) $x = \frac{1}{2}, y = \frac{1}{2}$ (b) $x = \frac{1}{2}, z = \frac{1}{2}$

(c) $y = \frac{1}{2}, z = \frac{3}{2}$ (d) $y = -\frac{3}{2}, z = \frac{1}{2}$

6. A highly rigid cubical block A of small mass M and side L is fixed rigidly onto another cubical block B of the same dimensions and of low modulus of rigidity η such that the lower face of A completely covers the upper face of B. The lower face of B is rigidly held on a horizontal surface. A small force F is applied perpendicular to one of the side faces of A. After the force is withdrawn block A executes small oscillations. The time period of which is given by **[IIT 1992]**

(a) $2\pi\sqrt{\frac{M\eta}{L}}$ (b) $2\pi\sqrt{\frac{L}{M\eta}}$

(c) $2\pi\sqrt{\frac{ML}{\eta}}$ (d) $2\pi\sqrt{\frac{M}{\eta L}}$

7. The pair(s) of physical quantities that have the same dimensions, is (are)

(a) Reynolds number and coefficient of friction

(b) Latent heat and gravitational potential

(c) Curie and frequency of a light wave

(d) Planck's constant and torque

8. The speed of light (c), gravitational constant (G) and Planck's constant (h) are taken as the

fundamental units in a system. The dimension of time in this new system should be

(a) $G^{1/2}h^{1/2}c^{-5/2}$ (b) $G^{-1/2}h^{1/2}c^{1/2}$

(c) $G^{1/2}h^{1/2}c^{-3/2}$ (d) $G^{1/2}h^{1/2}c^{1/2}$

9. If the constant of gravitation (G), Planck's constant (h) and the velocity of light (c) be chosen as fundamental units. The dimension of the radius of gyration is **[AMU (Eng.) 1999]**

(a) $h^{1/2}c^{-3/2}G^{1/2}$ (b) $h^{1/2}c^{3/2}G^{1/2}$

(c) $h^{1/2}c^{-3/2}G^{-1/2}$ (d) $h^{-1/2}c^{-3/2}G^{1/2}$

10. $X = 3YZ^2$ find dimension of Y in (MKSA) system, if X and Z are the dimension of capacity and magnetic field respectively

(a) $M^{-3}L^{-2}T^{-4}A^{-1}$ (b) ML^{-2}

(c) $M^{-3}L^{-2}T^{4}A^{4}$ (d) $M^{-3}L^{-2}T^{8}A^{4}$

11. In the relation $P = \frac{\alpha}{\beta}e^{-\frac{\alpha Z}{k\theta}}$ P is pressure, Z is the distance, k is Boltzmann constant and θ is the temperature. The dimensional formula of β will be

(a) $[M^0L^2T^0]$ (b) $[M^1L^2T^1]$

(c) $[M^1L^0T^{-1}]$ (d) $[M^0L^2T^{-1}]$

12. The frequency of vibration of string is given by $\nu = \frac{p}{2l}\left[\frac{F}{m}\right]^{1/2}$. Here p is number of segments in the string and l is the length. The dimensional formula for m will be **[BHU 2004]**

(a) $[M^0LT^{-1}]$ (b) $[ML^0T^{-1}]$

(c) $[ML^{-1}T^0]$ (d) $[M^0L^0T^0]$

13.

Column I	Column II
(i) Curie	(A) MLT^{-2}
(ii) Light year	(B) M
(iii) Dielectric strength	(C) Dimensionless
(iv) Atomic weight	(D) T
(v) Decibel	(E) ML^2T^{-2}
	(F) MT^{-3}
	(G) T^{-1}
	(H) L
	(I) $MLT^{-3}I^{-1}$
	(J) LT^{-1}

Choose the correct match

(a) (i) G, (ii) H, (iii) C, (iv) B, (v) C

(b) (i) D, (ii) H, (iii) I, (iv) B, (v) G

(c) (i) G, (ii) H, (iii) I, (iv) B, (v) G

(d) None of the above

14. A wire has a mass $0.3 \pm 0.003\ g$, radius $0.5 \pm 0.005\ mm$ and length $6 \pm 0.06\ cm$. The maximum percentage error in the measurement of its density is **[IIT (Screening) 2004]**

(a) 1 (b) 2

(c) 3 **[AMU 1995]** (d) 4

15. If 97.52 is divided by 2.54, the correct result in terms of significant figures is

(a) 38.4 (b) 38.3937

(c) 38.394 (d) 38.39

Assertion & Reason

For AIIMS Aspirants

Choose any one of the following four responses : **[MP PMT 2003]**

(a) If both assertion and reason are true and the reason is the correct explanation of the assertion.

(b) If both assertion and reason are true but reason is not the correct explanation of the assertion.

(c) If assertion is true but reason is false.

(d) If the assertion and reason both are false.

(e) If assertion is false but reason is true.

1. Assertion : '*Light year*' and 'Wavelength' both measure distance.

Reason : Both have dimensions of time.

2. Assertion : Light year and year, both measure time.

Reason : Because light year is the time that light takes to reach the earth from the sun.

3. Assertion : Force cannot be added to pressure.

Reason : Because their dimensions are different.

4. Assertion : Linear mass density has the dimensions of $[M^1L^{-1}T^0]$.

Reason : Because density is always mass per unit volume.

5. Assertion : Rate of flow of a liquid represents velocity of flow.

Reason : The dimensions of rate of flow are $[M^0L^1T^{-1}]$.

6. Assertion : Units of Rydberg constant R are m^{-1}

Reason : It follows from Bohr's formula $\bar{\nu} = R\left(\frac{1}{n_1^2} - \frac{1}{n_2^2}\right)$, where the symbols have their usual meaning. **[IIT 1992]**

7. Assertion : Parallex method cannot be used for measuring distances of stars more than 100 light years away.

Reason : Because parallex angle reduces so much that it cannot be measured accurately.

8. Assertion : Number of significant figures in 0.005 is one and that in 0.500 is three.

Reason : This is because zeros are not significant.

9. Assertion : Out of three measurements l = 0.7 *m;* l = 0.70 *m* and l = 0.700 *m*, the last one is most accurate.

Reason : In every measurement, only the last significant digit is not accurately known.

10. Assertion : Mass, length and time are fundamental physical quantities.

Reason : They are independent of each other.

11. Assertion : Density is a derived physical quantity.

Reason : Density cannot be derived from the fundamental physical quantities.

12. Assertion : Now a days a standard *metre* is defined as in terms of the wavelength of light.

Reason : Light has no relation with length.

13. Assertion : Radar is used to detect an aeroplane in the sky

Reason : Radar works on the principle of reflection of waves.

14. Assertion : Surface tension and surface energy have the same dimensions.

Reason : Because both have the same S.I. unit

15. Assertion : In $y = A\sin(\omega t - kx)$, $(\omega t - kx)$ is dimensionless.

Reason : Because dimension of $\omega = [M^0 L^0 T]$.

16. Assertion : Radian is the unit of distance.

Reason : One radian is the angle subtended at the centre of a circle by an arc equal in length to the radius of the circle.

17. Assertion : A.U. is much bigger than Å.

Reason : A.U. stands for astronomical unit and Å stands from *Angstrom*.

18. Assertion : When we change the unit of measurement of a quantity, its numerical value changes.

Reason : Smaller the unit of measurement smaller is its numerical value.

19. Assertion : Dimensional constants are the quantities whose value are constant.

Reason : Dimensional constants are dimensionless.

20. Assertion : The time period of a pendulum is given by the formula, $T = 2\pi\sqrt{g/l}$.

Reason : According to the principle of homogeneity of dimensions, only that formula is correct in which the dimensions of L.H.S. is equal to dimensions of R.H.S.

21. Assertion : In the relation $f = \frac{1}{2l}\sqrt{\frac{T}{m}}$, where symbols have standard meaning, m represent linear mass density.

Reason : The frequency has the dimensions of inverse of time.

22. Assertion : The graph between P and Q is straight line, when P/Q is constant.

Reason : The straight line graph means that P proportional to Q or P is equal to constant multiplied by Q.

23. Assertion : Avogadro number is the number of atoms in one gram mole.

Reason : Avogadro number is a dimensionless constant.

24. Assertion : L/R and CR both have same dimensions.

Reason : L/R and CR both have dimension of time.

25. Assertion : The quantity $(1/\sqrt{\mu_0 \varepsilon_0})$ is dimensionally equal to velocity and numerically equal to velocity of light.

Reason : μ_0 is permeability of free space and ε_0 is the permittivity of free space.

Answers

Units

1	c	2	b	3	d	4	c	5	c
6	d	7	c	8	d	9	c	10	c
11	a	12	c	13	c	14	b	15	d
16	d	17	c	18	a	19	b	20	d
21	d	22	a	23	a	24	b	25	d
26	b	27	d	28	d	29	d	30	b
31	a	32	b	33	a	34	b	35	a
36	b	37	a	38	b	39	b	40	b
41	d	42	c	43	c, b	44	c	45	b
46	a	47	c	48	c	49	a	50	a
51	b	52	b	53	c	54	c	55	c
56	c	57	b	58	a	59	c	60	a
61	c	62	c	63	d	64	d	65	b
66	c	67	a	68	b	69	c	70	b
71	d	72	b	73	b	74	d	75	c

76	b	77	b	78	b	79	c	80	c
81	a	82	a	83	d	84	c	85	b
86	d	87	d	88	b	89	a	90	c
91	a	92	d	93	b	94	a	95	d
96	a	97	b	98	a	99	d	100	b
101	d	102	d	103	a	104	a	105	d
106	b	107	b	108	b	109	b		

Dimensions

1	a	2	c	3	b	4	a	5	b
6	c	7	c	8	b	9	ad	10	a
11	d	12	b	13	a	14	a	15	a
16	b	17	b	18	d	19	a	20	c
21	b	22	a	23	b	24	d	25	a
26	d	27	a	28	d	29	d	30	d
31	c	32	c	33	a	34	a	35	b
36	b	37	c	38	c	39	a	40	b
41	a	42	b	43	d	44	d	45	a
46	d	47	b	48	d	49	b	50	a
51	a	52	d	53	b	54	b	55	c
56	c	57	d	58	a	59	a	60	c
61	b	62	b	63	c	64	a	65	a
66	b	67	a	68	d	69	c	70	a
71	a	72	c	73	c	74	a	75	b
76	d	77	a	78	a	79	b	80	b
81	d	82	b	83	bc	84	c	85	d
86	d	87	c	88	a	89	a	90	a
91	a	92	b	93	b	94	a	95	b
96	a	97	a	98	a	99	c	100	a
101	d	102	b	103	b	104	d	105	c
106	d	107	c	108	c	109	a	110	b
111	c	112	d	113	b	114	a	115	b
116	c	117	d	118	d	119	d	120	a
121	a	122	c	123	b	124	d	125	a
126	a	127	a	128	b	129	c	130	c
131	d	132	a	133	a	134	c	135	b
136	d	137	b	138	a	139	a	140	d
141	d	142	d						

Errors of Measurement

1	c	2	b	3	b	4	b	5	b
6	c	7	b	8	c	9	c	10	a
11	b	12	b	13	a	14	c	15	d
16	a	17	b	18	b	19	c	20	c
21	b	22	d	23	c	24	c	25	d
26	c	27	a	28	d				

Critical Thinking Questions

1	d	2	d	3	d	4	c	5	bd
6	d	7	abc	8	a	9	a	10	d
11	a	12	c	13	a	14	d	15	a

Assertion and Reason

1	c	2	d	3	a	4	c	5	d
6	a	7	a	8	c	9	b	10	a
11	c	12	c	13	a	14	c	15	c
16	e	17	b	18	c	19	c	20	e
21	b	22	a	23	c	24	a	25	b