UNITS AND DIMENSIONS SHEET 2

Q.1 Two physical quantities of which one is a vector and the other is a scalar having the same dimensional formula are-

(1) Work and energy
(2) Troque and work
(3) Impulse and momentum
(4) Power and pressure

Q.2 The fundamental unit which has same power in the dimensional formula of surface tension and viscosity is-

(1) Mass (2) Length
(3) Time (4) None

Q.3 The ratio of one micron to one nanometre is-

(1) 10^3 (2) 10^{-3}
(3) 10^{-6} (4) 10^{-1}

Q.4 The equation of a wave is given by Y = Asin $\omega\left(\frac{x}{v}-k\right)$ where ω is the angular velocity and v is the linear velocity. The dimension of k is-

(1) LT (2) T
(3) T^{-1} (4) T^2

Q.5 Temperature can be expressed as a derived quantity in terms of which of the following-

(1) Length and mass
(2) Mass and time
(3) Length, mass and time
(4) In terms of none of these

Q.6 The time dependence of a physical quantity P is given by $P = P_0 \exp(-\alpha t^2)$, where α is a constant and t is time. The constant α

(1) dimensionless
(2) has dimensions T^{-2}
(3) has dimensions of P
(4) has dimensions T^2

Q.7 Density of wood is 0.5 gm/cc in the CGS system of units. The corresponding value in MKS units is-

(1) 500 (2) 5
(3) 0.5 (4) 5000

Q.8 Joule × s is the unit of-

(1) Energy
(2) Momentum
(3) Angular momentum
(4) Power

Q.9 In a particular system the units of length mass and time are chosen to be 10 cm, 10 g and 0.1 s respectively. The unit of force in this system will be equal to-

(1) 0.1 N (2) 1 N
(3) 10 N (4) 100 N

Q.10 Match list I with list II and select the correct answer by using the codes given below the lists

List I (Item)	**List-II (Units of length)**
A. Distance between earth & stars	1. Micron
B. Inter atomic distance in a solid	2. Angstrom
C. Size of nucleus	3. Light year
D. Wavelength of infrared laser	4. Fermi
	5. Kilometre

Codes	A	B	C	D
(1)	5	4	2	1
(2)	3	2	4	1
(3)	5	2	4	3
(4)	3	4	1	2

Q.11 Which one of the following quantities has not been expressed in proper units ?

(1) Stress/Strain = N/m^2
(2) Surface tension = N/m
(3) Energy = kg - m/s
(4) Pressure = N/m^2

Q.12 Which of the following is not the unit of time ?

(1) Micro second (2) Leap year
(3) Lunar months (4) Parallactic second

Q.13 Which of the following is smallest unit ?

(1) Milimetre (2) Angstrom
(3) Fermi (4) Metre

Q.14 Which the following functions of A and B may be performed if A and B possess different dimensions?

(1) A/B (2) A + B
(3) A – B (4) None

Q.15 Which relation is wrong ?

(1) 1 Calorie = 4.18 Joules
(2) 1Å = 10^{-10} m
(3) 1 MeV = 1.6×10^{-13} Joules
(4) 1 Newton = 10^{-5} Dynes

Q.16 The dimensional formula of angular velocity is-

(1) $M^0L^0T^{-1}$ (2) MLT^{-1}
(3) $M^0L^0T^{-1}$ (4) ML^0T^{-2}

Q.17 Which of the following is not the unit of length ?

(1) micron (2) light year
(3) angstrom (4) radian

Q.18 Parsec is the unit of-

(1) Speed (2) Time
(3) Distance (4) None of the above

Q.19 From the following pairs, choose the pair that does not have identical dimensions-

(1) Impulse and momentum
(2) Work and torque
(3) Moment of inertia and moment of force
(4) Angular momentum and Planck's constant

Q.20 A force F is given by $F = at + bt^2$, where t is time. The dimension of 'a' and 'b' are

(1) [M L T^{-3}] and [M L T^{-4}]
(2) [M L T^{-4}] and [M L T^{-3}]
(3) [M L T^{-1}] and [M L T^{-2}]
(4) [M L T^{-2}] and [M L T^0]

Q.21 The mechanical equivalent of heat J is-

(1) constant
(2) a physical quantity
(3) a conversion factor
(4) none of the above

Q.22 If the energy $E = G^ph^qc^r$ where G is the universal gravitational constant, h is the Planck's constant and c is the velocity of light, then the values of p, q and r are, respectively-

(1) –1/2, 1/2 and 5/2
(2) 1/2, –1/2 and –5/2
(3) –1/2, 1/2 and 3/2
(4) 1/2, 1/2 and –3/2

Q.23 Match list I with II and select the correct answer:

(A) spring constant	(1) $M^1L^2T^{-2}$
(B) pascal	(2) $M^0L^0T^{-1}$
(C) hertz	(3) $M^1L^0T^{-2}$
(D) joule	(4) $M^1L^{-1}T^{-2}$

	A	B	C	D
(1)	3	4	2	1
(2)	4	3	1	2
(3)	4	3	2	1
(4)	3	4	1	2

Q.24 Match the following -

(a) Angular momentum	(1) $M^{-1}L^2T^{-2}$
(b) Torque	(2) MT^{-2}
(c) Gravitational constant	(3) ML^2T^{-2}
(d) Tension	(4) ML^2T^{-1}

(1) (c) → 2, (d) → 1
(2) (a) → 4, (b) → 3
(3) (a) → 3, (c) → 1
(4) (b) → 2, (a) → 1

Q.25 A kilowatt hour is equal to-

(1) 3.6×10^6 joule (2) 3.6×10^4 joule
(3) 3.6×10^3 joule (4) 6×10^{-4} joule

Q.26 The value of Planck's constant is-

(1) 6.63×10^{-34} J/s (2) 6.63×10^{-34} kg-m^2/s
(3) 6.63×10^{-34} kg-m^2 (4) 6.63×10^{-34} J-s^{-2}

Q.27 Units of Stefan constant is-

(1) watt-m^2-K^4 (2) watt-m^2/K^4
(3) watt/m^2-K (4) watt/m^{2}K^4

Q.28 Dimension of relative density is-

(1) kg m^{-3} (2) ML^{-3}
(3) dimensionless (4) M^{2}L^{-6}

Q.29 Planck's constant has dimensions of-

(1) Energy (2) Momentum
(3) Frequency (4) Angular momentum

Q.30 The equation of state of some gases can be expressed as $\left(P+\frac{a}{V^2}\right)(V-b)=RT$, where P is the pressure, V is the volume, T is the absolute temperature and a, b and R are constants. The dimension of 'a' are-

(1) [ML^{5}T^{-2}] (2) [ML^{-1}T^{-2}]
(3) [L^3] (4) [L^6]

Q.31 Which of the following does not have the same unit as others **?**

(1) watt-sec (2) kilowatt-hour
(3) eV (4) J-sec

Q.32 Which of the following pairs does not have similar dimensions ?

(1) Planck's constant & angular momentum
(2) Tension and surface tension
(3) Angle and strain
(4) Stress and pressure

Q.33 If dimensions of A and B are different, then which of the following operation is valid ?

(1) $\frac{A}{B}$ (2) $e^{-A/B}$
(3) A – B (4) A + B

Q.No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	2	1	1	2	4	2	1	3	1	2	3	4	3	1	4	1	4	3	3	1
Q.No.	21	22	23	24	25	26	27	28	29	30	31	32	33							
Ans.	3	1	1	2	1	2	4	3	4	1	4	2	1							