UNITS AND DIMENSIONS SHEET 3

Q.1 The unit of power is-
(1) kilowatt (2) kilowatt-hour
(3) dyne (4) joule

Q.2 The unit of energy is-
(1) J/s (2) watt-day
(3) kilowatt (4) g-cm/s^2

Q.3 In the S.I. system, the unit of temperature is-
(1) degree centigrade
(2) Kelvin
(3) degree Celsius
(4) degree Fahrenheit

Q.4 In the S.I. system the unit of energy is-
(1) erg (2) calorie
(3) joule (4) electron volt

Q.5 Unit of pressure in S.I. system is-
(1) atmosphere
(2) dynes per square cm
(3) pascal
(4) bar

Q.6 Which of the following is not a unit for energy ?
(1) Kilo watt hour (2) Newton- meter
(3) (weber) (ampere) (4) None of these

Q.7 In SI unit the angular acceleration has unit of-
(1) $Nmkg^{-1}$ (2) ms^{-2}
(3) $rad.s^{-2}$ (4) Nkg^{-1}

Q.8 Surface tension has unit of-
(1) Joule.m^2 (2) Joule.m^{-2}
(3) Joule.m (4) Joule.m^3

Q.9 The M.K.S. units of coefficient of viscosity is-
(1) kg $m^{-1}s^{-1}$ (2) kg m s^{-2}
(3) kg m^2 s^{-1} (4) kg^{-1} m^{-1} s^2

Q.10 A dimensionless quantity-
(1) never has a unit (2) always has a unit
(3) may have a unit (4) does not exist

Q.11 [M L T^{-1}] are the dimensions of-
(1) power (2) momentum
(3) force (4) couple

Q.12 The dimensions of impulse are equal to that of-
(1) force
(2) angular momentum
(3) pressure
(4) linear momentum

Q.13 Which of the following pairs have same dimensions –
(a) Torque and work
(b) Angular momentum and work
(c) Energy and moment of inertia
(d) Light year and wavelengths
(1) a and b (2) a and d
(3) b and c (4) a , b, and d

Q.14 Which of the following does not have dimensions of length ?
(1) Fermi (2) Micro
(3) Angstrom (4) Radian

Q.15 The dimensional formula for angular momentum is –
(1) ML^2T^{-2} (2) ML^2T^{-1}
(3) MLT^{-1} (4) $M^0L^2T^{-2}$

Q.16 Which of the following statement is wrong ?
(1) Unit of K.E. is Newton-metre
(2) Unit of viscosity is poise
(3) Work and energy have same dimensions
(4) Unit of surface tension is Newton metre

Q.17 Which of the following is different from other with a point of view of dimension ?
(1) Planck's constant
(2) Coefficient of viscosity
(3) Force constant
(4) Poisson's ratio

Q.18 Dimensions of magnetic flux density is -
(1) $M^1 L^0 T^{-1} A^{-1}$ (2) $M^1 L^0 T^{-2} A^{-1}$
(3) $M^1 L^1 T^{-2} A^{-1}$ (4) $M^1 L^0 T^{-1} A^{-2}$

Q.19 The dimensions of the quantity $\frac{L}{RCV}$ are -
(1) $M^0 L^0 T^1 A^1$ (2) $M^0 L^0 T^{-1} A^{-1}$
(3) $M^0 L^0 T^0 A^1$ (4) $M^0 L^0 T^0 A^{-1}$

Q.20 A and B are two physical quantities having different dimensions. Then which of the following operation is dimensionally correct ?
(1) A + B (2) $\log \frac{A}{B}$
(3) $\frac{A}{B}$ (4) $e^{A/B}$

Q.21 Vander waal's gas equation is $\left(P+\frac{a}{V^2}\right)(V-b) = RT$. The dimensions of constant **a** as given above are –
(1) $M L^4 T^{-2}$ (2) $ML^5 T^{-2}$
(3) $M L^3 T^{-2}$ (4) $M L^2 T^{-2}$

Q.22 For $10^{(at+3)}$, the dimension of a is-
(1) $M^0 L^0 T^0$ (2) $M^0 L^0 T^1$
(3) $M^0 L^0 T^{-1}$ (4) None of these

Q.23 The velocity of a moving particle depends upon time t as $v = at + \frac{b}{t+c}$. Then dimensional formula for b is –
(1) $[M^0 L^0 T^0]$ (2) $[M^0 L^1 T^0]$
(3) $[M^0 L^1 T^{-1}]$ (4) $[M^0 L^1 T^{-2}]$

Q. 24 The SI unit of length is the meter. Suppose we adopt a new unit of length which equals to x meters. The area $1m^2$ expressed in terms of the new unit has a magnitude-
(1) x (2) x^2
(3) $\frac{1}{x}$ (4) $\frac{1}{x^2}$

Q.25 The units nanometre, fermi, angstrom and attometre, arranged in decreasing order will read as-
(1) angstrom, nanometre, fermi, attometre
(2) fermi, attometre, angstrom, nanometre
(3) nanometre, angstrom, fermi, attometre
(4) attometre, angstrom, fermi, nanometre

Q.26 Which of the following pairs of physical quantities has different dimensions ?
(1) stress, pressure
(2) Young's modulus, energy density
(3) density, relative density
(4) energy, torque

Q.27 If the unit of length is micrometre and the unit of time is microsecond, the unit of velocity will be-
(1) 100 m/s (2) 10 m/s
(3) micrometre/s (4) m/s

Q.28 A wave is represented by-
$y = a \sin (At - Bx + C)$
where A, B, C are constants. The Dimensions of A, B, C are
(1) T^{-1}, L, $M^0L^0T^0$ (2)T^{-1}, L^{-1}, $M^0L^0T^0$
(3) T, L, M (4) T^{-1}, L^{-1}, M^{-1}

Q.29 Which of the following is a dimensional constant ?
(1) Refractive index
(2) Dielectric constant
(3) Relative density
(4) Gravitational constant

Q.30 Two quantities whose dimensions are not same, cannot be-

(1) multiplied with each other

(2) divided

(3) added or subtracted in the same expression

(4) added together

Q.31 If force, length and time would have been the fundamental units, what would have been the dimensional formula for mass ?

(1) $F\,L^{-1}\,T^{2}$ (2) $F\,L\,T^{-2}$

(3) $F\,L\,T^{-1}$ (4) F

Q.32 If $x = at + bt^2$, where x is in metre and t in hour (hr), then unit of b will be-

(1) m^2/hr (2) m

(3) m/hr (4) m/hr^2

Q.33 The equation of the stationary wave is

$$y = 2A \sin\left(\frac{2\pi ct}{\lambda}\right)\cos\left(\frac{2\pi x}{\lambda}\right)$$

Which of the following statements is wrong ?

(1) the unit of ct is same as that of λ

(2) the unit of x is same as that of λ

(3) the unit of $2\pi\, c/\lambda$ is same as that of $2\pi x/\lambda t$

(4) the unit of c/λ is same as that of x/λ

Q.34 The dimension of which quantity is different from the remaining three quantities-

(1) Elastic constants

(2) Pressure

(3) Stress

(4) Angular momentum per unit mass

Q.35 Temperature can be represented as derived unit from which of the combination of units given below –

(1) mass and length

(2) mass and time

(3) mass, length and time

(4) none of these

Q.36 The unit of temperature in SI system is-

(1) degree Celsius

(2) degree Fahrenheit

(3) degree Kelvin

(4) degree Reaumur

Q.37 If the units of length and force are increased four times, then the unit of energy will-

(1) becomes 8 times

(2) becomes 16 times

(3) decrease 16 times

(4) increase 4 times

Q.38 If Force = (x/density) + C is dimensionally correct, the dimension of x are –

(1) MLT^{-2} (2) MLT^{-3}

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

Q.39 If the units of length , velocity and force are half, then the units of Power will be –

(1) doubled

(2) halved

(3) quadrupled

(4) remain unaffected

Q.40 The distance covered by a particle in time t is given by $x = a + bt + ct^2 + dt^3$. The dimensions of a and d are –

(1) L, T^{-3} (2) L, LT^{-3}

(3) L^0, T^3 (4) none of these

Q.41 Choose the wrong statement-

(1)all quantities can be expressed dimensionally in terms of the fundamental quantities

(2) a fundamental quantity cannot be represented dimensionally in terms of the rest of fundamental quantities

(3) the dimension of a fundamental quantity, in other fundamental quantities is always zero

(4) the dimension of a derived quantity is never zero in any fundamental quantity

Q.42 The period of a body under S.H.M. is represented by : $T \propto P^a D^b S^c$, where P is pressure, D is density and S is surface tension, then the values of a, b, and c are-

(1) –3/2, 1/2, 1 (2) –1, –2, 3

(3) 1/2, –3/2, –1/2 (4) 1, 2, 1/3

Q.43 When a wave transverses in a medium, the displacement of a particle located at distance x at time t is given by y = a sin(bt – cx) where a, b and c are constants of the wave. The dimension of b/c are same as that of-

(1) wave velocity (2) wavelength

(3) wave amplitude (4) wave frequency

Q.44 Which of the following system of units is not based on units of mass, length and time alone ?

(1) SI (2) MKS

(3) FPS (4) CGS

Q.45 Which of the following quantity is unitless ?

(1) Velocity gradient

(2) Pressure gradient

(3) Displacement gradient

(4) Force gradient

Q.46 The method of dimensional analysis can be used to derive which of the following relations ?

(1) $N_0 e^{-\lambda t}$ (2) A sin(ωt + kx)

(3) $\frac{1}{2}mv^2 + \frac{1}{2}I\omega^2$ (4) None of the above

Q.47 Which of the following does not have the dimensions of force ?

(1) Potential gradient

(2) Energy gradient

(3) Weight

(4) Rate of change of momentum

Q.48 Which of the following is incorrect statement?

(1) A dimensionally correct equation may be correct

(2) A dimensionally correct equation may be incorrect

(3) A dimensionally incorrect equation may be correct

(4) A dimensionally incorrect equation is incorrect

Q.49 A dimensionless quantity -

(1) Never has a unit

(2) Always has a unit

(3) May have a unit

(4) Does not exist

Q.50 A unitless quantity-

(1) Does not exist

(2) Always has a nonzero dimension

(3) Never has a nonzero dimension

(4) May have a nonzero dimension

Q.No.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Ans.	1	2	2	3	3	4	3	2	1	3	2	4	1	4	2	4	4	2	4	3
Q.No.	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**30**	**31**	**32**	**33**	**34**	**35**	**36**	**37**	**38**	**39**	**40**
Ans.	2	3	2	4	3	3	4	2	4	3	2	4	4	4	4	3	2	4	3	2
Q.No.	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**										
Ans.	4	1	1	1	3	4	1	3	3	3										