Exercise - I (ONLY ONE OPTION IS CORRECT)

SECTION A : UNITS

1. Which of the following sets cannot enter into the list of fundamental quantities in any system of units ?
(A) length, mass and velocity
(B) length, time and velocity
(C) mass, time and velocity
(D) length, time and mass
Sol.

2. Which of the following is not the name of a physical quantity ?
(A) kilogram (B) impulse
(C) energy (D) density
Sol.

3. Light year is the unit of
(A) speed (B) mass
(C) distance (D) time
Sol.

4. PARSEC is a unit of
(A) Time (B) Angle
(C) Distance (D) Velocity
Sol.

5. Which of the following is not the unit of time
(A) solar day (B) parallactic second
(C) leap year (D) lunar month
Sol.

6. Which of the following system of units is NOT based on the unit of mass, length and time alone
(A) FPS (B) SI
(C) CGS (D) MKS
Sol.

7. The SI unit of the universal gravitational constant G is
(A) $Nm\ kg^{-2}$ (B) Nm^2kg^{-2}
(C) $Nm^2\ kg^{-1}$ (D) $Nmkg^{-1}$
Sol.

8. The SI unit of the universal gas constant R is :
(A) erg $K^{-1}\ mol^{-1}$ (B) watt $K^{-1}\ mol^{-1}$
(C) newton $K^{-1}\ mol^{-1}$ (D) joule $K^{-1}\ mol^{-1}$
Sol.

9. The unit of impulse is the same as that of :
(A) moment force
(B) linear momentum
(C) rate of change of linear momentum
(D) force
Sol.

10. Which of the following is not the unit of energy?
(A) watt-hour (B) electron-volt
(C) N × m (D) kg × m/sec^2
Sol.

11. A physical quantity is measured and the result is expressed as nu where u is the unit used and n is the numerical value. If the result is expressed in various units then
(A) n ∝ size of u (B) n ∝ u^2
(C) n ∝ √u (D) n ∝ 1/u
Sol.

12. If the unit of length is micrometer and the unit of time is microsecond, the unit of velcoity will be :
(A) 100 m/s (B) 10 m/s
(C) micrometers (D) m/s
Sol.

13. One watt-hour is equivalent to
(A) 6.3 × 10^3 Joule (B) 6.3 × 10^{-7} Joule
(C) 3.6 × 10^3 Joule (D) 3.6 × 10^{-3} Joule
Sol.

SECTION : B DIMENSIONS

14. What are the dimensions of lenth in force × displacement/time
(A) –2 (B) 0 (C) 2 (D) none of these
Sol.

15. The angular frequency is measured in rad s^{-1}. Its dimension in length are :
(A) – 2 (B) –1 (C) 0 (D) 2
Sol.

16. A dimensionless quantity :
(A) never has a unit (B) always has a unit
(C) may have a unit (D) does not exit
Sol.

17. A unitless quantity :
(A) never has a nonzero dimension
(B) always has a nonzero dimension
(C) may have a nonzero dimension
(D) does not exit
Sol.

18. If a and b are two physical quantities having different dimensions then which of the following can denote a new physical quantity
(A) a + b (B) a – b
(C) a/b (D) $e^{a/b}$ (E) sin (a/b)
Sol.

19. Two physical quantities whose dimensions are not same, cannot be :
(A) multiplied with each other
(B) divided
(C) added or substracted in the same expression
(D) added together
Sol.

20. Choose the correct statement(s) :
(A) All quantities may be represented dimensionally in terms of the base quantities.
(B) A base quantity cannot be represented dimensionally in terms of the rest of the base quantities.
(C) The dimension of a base quantity in other base quantities is always zero.
(D) The dimension of a derived quantity is never zero in any base quantity.
Sol.

21. The dimensions of universal gravitational constant are
(A) $M^{-1} L^3 T^{-2}$ (B) $M^{-1} L^3 T^{-1}$
(C) $M^{-1} L^{-1} T^{-2}$ (D) $M^{-2} L^2 T^{-2}$
Sol.

22. The SI unit of Stefan's constant is :
(A) $Ws^{-1} m^{-2} K^{-4}$ (B) $J s m^{-1} K^{-1}$
(C) $J s^{-1} m^{-2} K^{-1}$ (D) $W m^{-2} K^{-4}$
Sol.

23. What are the dimensions of Boltzmann's constant?
(A) $MLT^{-2}K^{-1}$ (B) $ML^2T^{-2}K^{-1}$
(C) M^0LT^{-2} (D) $M^0L^2T^{-2}K^{-1}$
Sol.

24. Planck's constant has the dimensions of :
(A) force (B) energy
(C) linear momentum (D) angular momentum
Sol.

25. The velocity 'v' (in cm/s) of a particle is given in terms of time 't' (in s) by the equation

$$v = at + \frac{b}{t+c}$$

The dimensions of a, b and c are

	a	b	c		a	b	c
(A)	L^2	T	LT^2	(B)	LT^2	LT	L
(C)	LT^{-2}	L	T	(D)	L	LT	T^2

Sol.

26. The position of a particle at time 't' is given by the relation

$$x(t) = \frac{V_0}{\alpha}[1 - e^{-\alpha t}]$$

where V_0 is a constant and $\alpha > 0$. The dimensions of V_0 and α are respectively.
(A) $M^0L^1T^0$ and T^{-1} (B) $M^0L^1T^0$ and T^{-2}
(C) $M^0L^1T^{-1}$ and T^{-1} (D) $M^0L^1T^{-1}$ and T^{-2}
Sol.

27. The time dependence of a physical quantity ?

$$P = P_0\exp(-\alpha t^2)$$

where α is a constant and t is time
The constant α
(A) will be dimensionless
(B) will have dimensions of T^{-2}
(C) will have dimensions as that of P
(D) will have dimensions equal to the dimension of P multiplied by T^{-2}
Sol.

28. Force F is given in terms of time t and distance x by

$$F = A \sin C t + B \cos D x$$

Then the dimensions of $\frac{A}{B}$ and $\frac{C}{D}$ are given by
(A) MLT^{-2}, $M^0L^0T^{-1}$ (B) MLT^{-2}, $M^0L^{-1}T^0$
(C) $M^0L^0T^0$, $M^0L^1T^{-1}$ (D) $M^0L^1T^{-1}$, $M^0L^0T^0$
Sol.

29. The Van der Waal equation for 1 mole of a real gas is

$$\left(P+\frac{a}{V^2}\right)(V-b)=RT$$

where P is the pressure, V is the volume, T is the absolute temperature, R is the molar gas constant and a, b are Van dar Waal constants. The dimensions of a are the same as those of

(A) PV (B) PV^2 (C) P^2V (D) P/V

Sol.

30. In above question 29, the dimensions of b are the same as those of

(A) P (B) V (C) PV (D) nRT

Sol.

31. In above question 29, the dimensions of nRT are the same as those of

(A) energy (B) force

(C) pressure (D) specific heat

Sol.

32. In above question 29, the dimensional formula for ab is

(A) ML^2T^{-2} (B) ML^4T^{-2} (C) ML^6T^{-2} (D) ML^8T^{-2}

Sol.

33. Which pair of following quantities has dimensions different from each other.

(A) Impulse and linear momentum

(B) Plank's constant and angular momentum

(C) Moment of inertia and moment of force

(D) Young's modulus and pressure

Sol.

34. A pair of physical quantities having the same dimensional formula is :

(A) angular momentum and torque

(B) torque and energy

(C) force and power

(D) power and angular momentum

Sol.

35. If force (F) is given by $F = Pt^{-1} + \alpha t$, where t is time. The unit of P is same as that of

(A) velocity (B) displacement

(C) acceleration (D) momentum

Sol.

36. The product of energy and time is called action. The dimensional formula for action is same as that for
(A) power (B) angular energy
(C) force × velocity (D) impulse × distance
Sol.

37. Dimensions of pressure are the same as that of
(A) force per unit volume
(B) energy per unit volume
(C) force
(D) energy
Sol.

38. When a wave traverses a medium, the displacement of a particle located at x at time t is given by

$$y = a \sin (bt - cx)$$

where a, b and c are constants of the wave. The dimensions of b are the same as those of
(A) wave velocity (B) amplitude
(C) wavelength (D) wave frequency
Sol.

39. In the above question dimensions of $\frac{b}{c}$ are the same as those of
(A) wave velocity (B) wavelength
(C) wave amplitude (D) wave frequency
Sol.

40. What is the physical quantity whose dimensions are $M L^2 T^{-2}$?
(A) kinetic energy (B) pressure
(C) momentum (D) power
Sol.

41. Which one of the following has the dimensions of $ML^{-1}T^{-2}$?
(A) torque (B) surface tension
(C) viscosity (D) stress
Sol.

42. If force, acceleration and time are taken as fundamental quantities, then the dimensions of length will be :
(A) FT^2 (B) $F^{-1} A^2 T^{-1}$ (C) FA^2T (D) AT^2
Sol.

43. The dimensions $ML^{-1}T^{-2}$ can correspond to
(A) moment of a force or torque
(B) surface tension
(C) pressure
(D) co-efficient of viscosity
(useful relation are $\vec{\tau} = \vec{r} \times \vec{F}$, S = F/$l$, F = 6 $\pi \eta$ r v, where symbols have usual meaning)
Sol.

44. Which of the following can be a set of fundamental quantities
(A) length, velocity, time
(B) momentum, mass, velocity
(C) force, mass, velocity
(D) momentum, time, frequency
Sol.

45. If area (A) velocity (v) and density (ρ) are base units, then the dimensional formula of force can be represented as
(A) $Av\rho$ (B) $Av^2\rho$ (C) $Av\rho^2$ (D) $A^2v\rho$
Sol.

46. The pressure of 10^6 dyne/cm^2 is equivalent to
(A) 10^5 N/m^2 (B) 10^6 N/m^2
(C) 10^7 N/m^2 (D) 10^8 N/m^2
Sol.

47. In a certain system of units, 1 unit of time is 5 sec, 1 unit of mass is 20 kg and unit of length is 10m. In this system, one unit of power will correspond to
(A) 16 watts (B) 1/16 watts
(C) 25 watts (D) none of these
Sol.

48. In a book, the answer for a particular question is expressed as $b = \frac{ma}{k}\left[\sqrt{1+\frac{2kl}{ma}}\right]$ here m represents mass, a represents accelerations, l represents length. The unit of b should be
(A) m/s (B) m/s^2 (C) meter (D) /sec
Sol.

49. ρ = 2 g/cm^3 convert it into MKS system -
(A) $2 \times 10^{-3}\ \frac{kg}{m^3}$ (B) $2 \times 10^{3}\ \frac{kg}{m^3}$
(C) $4 \times 10^{3}\ \frac{kg}{m^3}$ (D) $2 \times 10^{6}\ \frac{kg}{m^3}$
Sol.

50. $\alpha = \frac{F}{V^2}\sin(\beta t)$ (here V = velocity, F = force, t = time) : Find the dimension of α and β -
(A) $\alpha = [M^1L^1T^0]$, $\beta = [T^{-1}]$
(B) $\alpha = [M^1L^1T^{-1}]$, $\beta = [T^1]$
(C) $\alpha = [M^1L^1T^{-1}]$, $\beta = [T^{-1}]$
(D) $\alpha = [M^1L^{-1}T^0]$, $\beta = [T^{-1}]$
Sol.

51. Given that v is the speed, r is radius and g is acceleration due to gravity. Which of the following is dimension less

(A) $\frac{v^2g}{r}$ (B) v^2rg (C) vr^2g (D) $\frac{v^2}{rg}$
Sol.

52. If E, M, J and G denote energy, mass, angular momentum and gravitational constant respectively, then $\frac{EJ^2}{M^5G^2}$ has the dimensions of
(A) length (B) angle (C) mass (D) time
Sol.

53. The dimensions $ML^{-1}T^{-2}$ may correspond to
(A) work done by a force (B) linear momentum
(C) pressure (D) energy per unit volume
Sol.

54. The velocity of water waves may dpend on 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
(A) $v^2 = k\lambda^{-1} g^{-1} \rho^{-1}$
(B) $v^2 = k\, g\, \lambda$
(C) $v^2 = k\, g\, \lambda \rho$
(D) $v^2 = k\, \lambda^3 g^{-1} \rho^{-1}$ where k is a dimensionless constant
Sol.

55. If the unit of force is 1 kilonewton, the length is 1 km and time is 100 second, what will be the unit of mass :
(A) 1000 kg (B) 10 kg
(C) 10000 kg (D) 100 kg
Sol.

56. A body moving through air at a high speed 'v' experiences a retarding force 'F' given by $F = K A d v^x$ where 'A' is the surface area of the body, 'd' is the density of air and 'K' is a numerical constant. The value of 'x' is :
(A) 1 (B) 2 (C) 3 (D) 4
Sol.

57. 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 :

(A) 1, $\frac{1}{2}$ (B) $\frac{1}{2}$, $\frac{1}{2}$

(C) $\frac{1}{2}$, 1 (D) 1, 1

Sol.

58. Choose the correct statement(s) :
(A) A dimensionally correct equation must be correct.
(B) A dimensionally correct equation may be correct.
(C) A dimensionally incorrect equation may be correct.
(D) A dimensionally incorrect equation may be incorrect.
Sol.

59. The value of $G = 6.67 \times 10^{-11}$ N m^2 $(kg)^{-2}$. Its numerical value in CGS system will be :
(A) 6.67×10^{-8} (B) 6.67×10^{-6}
(C) 6.67 (D) 6.67×10^{-5}
Sol.

60. The density of mercury is 13600 kg m^{-3}. Its value of CGS system will be :
(A) 13.6 g cm^{-3} (B) 1360 g cm^{-3}
(C) 136 g cm^{-3} (D) 1.36 g cm^{-3}
Sol.

61. If the acceleration due to gravity is 10 ms^{-2} and the units of length and time are changed to kilometre and hour, respectively, the numerical value of the acceleration is :
(A) 360000 (B) 72000
(C) 36000 (D) 129600
Sol.

62. If 'c' the velocity of light 'g' the acceleration due to gravity and 'P" the atmospheric pressure are fundamental units, then the dimensions of length will be
(A) c/g (B) P × c × g (C) c/P (D) c^2/g
Sol.

63. The units of length, velocity and force are doubled. Which of the following is the correct change in the other units ?
(A) unit of time is doubled
(B) unit of mass is doubled
(C) unit of momentum is doubled
(D) unit of energy is doubled
Sol.

64. If the units of force and that of length are doubled, the unit of energy will be :
(A) 1/4 times (B) 1/2 times
(C) 2 times (D) 4 times
Sol.

65. If the units of M, L are doubled then the unit of kinetic energy will become
(A) 2 times (B) 4 times
(C) 8 times (D) 16 times
Sol.

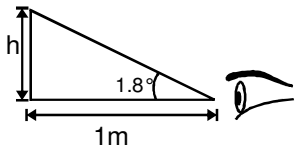
BASIC MATHEMATICS

66. The radius of two circles are r and 4r what will be the ratio of their Area and perimeter.
Sol.

67. Internal radius of a ball is 3 cm and external radius is 4 cm. What will be the volume of the material used.
Sol.

68. Binomial
(a) $(99)^{1/2}$ (b) $(120)^{1/2}$ (c) $(126)^{1/3}$
Sol.

69. A normal human eye can see an object making an angle of 1.8° at the eye. What is the approximate height of object which can be seen by an eye placed at a distance of 1 m from the eye.



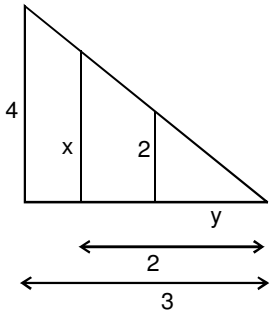
Sol.

70. Draw graph for following equations :

(i) $v = v_0 - at$ (ii) $x = 4t - 3$

(iii) $x = 4\ at^2$ (iv) $v = - gt$

Sol.

71. 

Find x and y :

Sol.

Exercise - II

1*. Which of the following is not the unit length :
(A) micron (B) light year
(C) angstrom (D) radian
Sol.

2. A particle is in a uni-directional potential field where the potential energy (U) of a particle depends on the x-coordinate given by $U_x = k(1 - \cos ax)$ & k and 'a' are constants. Find the physical dimensions of 'a' & k.
Sol.

3. The time period (T) of a spring mass system depends upon mass (m) & spring constant (k) & length of the spring (l) $\left[k = \frac{\text{Force}}{\text{length}}\right]$. Find the relation among, (T), (m), (l) & (k) using dimensional method.
Sol.

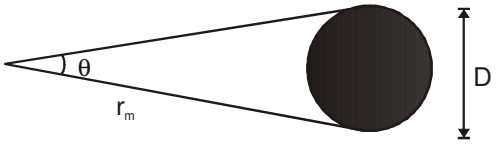
4. The equation of state for a real gas at high temperature is given by $P = \frac{nRT}{V-b} - \frac{a}{T^{1/2}V(V+b)}$ where n, P V & T are number of moles, pressure, volume & temperature respectively & R is the universal gas constant. Find the dimensions of constant 'a' in the above equation.
Sol.

5. The distance moved by a particle in time t from centre of a ring under the influence of its gravity is given by $x = a \sin \omega t$ where a & ω are constants. If ω is found to depend on the radius of the ring (r), its mass (m) and universal gravitational constant (G), find using dimensional analysis an expression for ω in terms of r, m and G.
Sol.

6. If the velocity of light c, Gravitational constant G & Plank's constant h be chosen as fundamental units, find the dimension of mass, length & time in the new system.
Sol.

7. A satellite is orbiting around a planet. Its orbital velocity (v_0) is found to depend upon
(a) Radius of orbit (R)
(b) Mass of planet (M)
(c) Universal gravitation constant (G)
Using dimensional analysis find an expression relating orbital velocity (v_0) to the above physical quantities.
Sol.

8. The angle subtended by the moon's diameter at a point on the earth is about 0.50°. Use this and the act that the moon is about 384000 km away to find the approximate diameter of the moon.



(A) 192000 km (B) 3350 km
(C) 1600 km (D) 1920 km
Sol.

9. Use the approximation $(1 + x)^n \approx 1 + nx$, $|x| << 1$, to find approximate value for

(a) $\sqrt{99}$ (b) $\frac{1}{1.01}$
Sol.

10. Use the small angle approximations to find approximate values for

(a) sin 8° and (b) tan 5°
Sol.

Exercise - III (JEE QUESTIONS)

Note : (*) means not for speed batch

1*. The pairs of physical quantities that have the same dimensions are :
(A) Raynolds number and coefficient of friction
(B) Latent heat and gravitational potential
(C) curie and frequency of light wave
(D) Planck's constant and torque
[JEE - 1995'2/100]

Sol.

2*. In the formula $X = 3YZ^2$, X and Z have dimensions of capacitance and magnetic induction respectively. What are the dimensions of Y in MKSQ system ?
[JEE-1995,2/100]
(A) $[M^{-3} L^{-1} T^3 Q^4]$ (B) $[M^{-3} L^{-2} T^4 Q^4]$
(C) $[M^{-2} L^{-2} T^4 Q^4]$ (D) $[M^{\beta} L^{-2} T^4 Q^1]$

Sol.

3*. Which of the following pairs have same dimensions :
(A) Torque and work
(B) Angular momentum and work
(C) Energy and young's modulus
(D) Light year and wavelength **[JEE-1996' 2/100]**

Sol.

4*. The SI unit of inductance, the henry can be written as : **[JEE-1998' 2/200]**
(A) weber/ampere (B) volt-second/ampere
(C) joule/(ampere)^2 (D) ohm-second

Sol.

5*. Let $[\varepsilon_0]$ denote the dimensional formula of the permittivity of the vaccum, and $[\mu_0]$ that of the permeability of the vacuum. If M = mass, L = length, T = time and I = electric current : **[JEE-1998' 2/200]**

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

(C) $[\mu_0] = M L T^{-2} I^{-2}$ (D) $[\mu_0] = M L^2 T^{-1} I$

Sol.

6*. The dimensions of $\left(\frac{1}{2}\right) \varepsilon_0 E^2$ (ε_0 : permittivity of free space, E : electric field) is : **[JEE Sc 2000' 2/200]**

(A) MLT^{-1} (B) ML^2T^{-2} (C) $ML^{-1}T^{-2}$ (D) ML^2T^{-1}

Sol.

7*. A quantity X is given by $\varepsilon_0 L \frac{\Delta V}{\Delta t}$. where ε_0 is the permittivity of free space, L is length, ΔV is potential difference and Δt is time interval. The dimensional formula for X is the same as that of **[JEE Sc.2000'3/105]**

(A) resistance (B) charge

(C) voltage (D) current

Sol.

8*. Pressure depends on distance as, $P = \frac{\alpha}{\beta} \exp\left(-\frac{\alpha z}{k\beta}\right)$, where α, β are constants, z is distance, k is Boltzmann's constant and θ is temperature. The dimension of β are **[JEE-2004s '3/84]**

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

(C) $M^0 L^2 T^0$ (D) $M^{-1} L^1 T^2$

Sol.

9*. Which of the following set have different dimensions ? **[JEE-2005s ; 3/60]**

(A) Pressure, Young's modulus, Stress

(B) Emf, Potential difference, Electric potential

(C) Heat, Work done, Energy

(D) Dipole moment, Electric flux, Electric field

Sol.

Paragraph for Question No. 10-11

A dense collection of equal number of electrons and positive ions is called neutral plasma. Certain solids containing fixed positive ions surrounded by free electrons can be treated as neutral plasma. Let 'N' be the number density of free electrons, each of mass 'm'. When the electrons are subjected to an electric field, they are displaced relatively away from the heavy positive ions. If the electric field becomes zero, the electrons begin to oscillate about the positive ions with a natural angular frequency 'ω_p' which is called the plasma frequency. To sustain the oscillations, a time varying electric field needs to be applied that has an angular frequency ω, where a part of the energy is absorbed and a part of it is reflected. As ω approaches ω_p, all the free electrons are set to resonance together and all the energy is reflected. This is the explanation of high reflectivity of metals.

10. Taking the electronic charge as 'e' and the permittivity as 'ε_0', use dimensional analysis to determine the correct expression for ω_p. **[JEE-2011]**

(A) $\sqrt{\frac{Ne}{m\varepsilon_0}}$ (B) $\sqrt{\frac{m\varepsilon_0}{Ne}}$ (C) $\sqrt{\frac{Ne^2}{m\varepsilon_0}}$ (D) $\sqrt{\frac{m\varepsilon_0}{Ne^2}}$

11. Estimate the wavelength at which plasma reflection will occur for a metal having the density of electrons $N \approx 4 \times 10^{27}\ m^{-3}$. Take $\varepsilon_0 = 10^{-11}$ and $m = 10^{-30}$, where these quantities are in proper SI units **[JEE-2011]**

(A) 800 nm (B) 600 nm (C) 300 nm (D) 200 nm

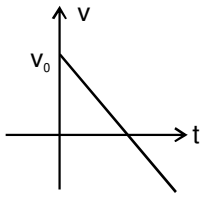
ANSWER KEY — EXERCISE-1

1.	B	**2.**	A	**3.**	C	**4.**	C	**5.**	B	**6.**	B	**7.**	B	**8.**	D
9.	B	**10.**	D	**11.**	D	**12.**	D	**13.**	C	**14.**	C	**15.**	C	**16.**	C
17.	A	**18.**	C	**19.**	C	**20.**	ABC	**21.**	A	**22.**	D	**23.**	B	**24.**	D
25.	C	**26.**	C	**27.**	B	**28.**	C	**29.**	B	**30.**	B	**31.**	A	**32.**	D
33.	C	**34.**	B	**35.**	D	**36.**	D	**37.**	B	**38.**	D	**39.**	A	**40.**	A
41.	D	**42.**	D	**43.**	C	**44.**	C	**45.**	B	**46.**	A	**47.**	A	**48.**	C
49.	B	**50.**	D	**51.**	D	**52.**	B	**53.**	CD	**54.**	B	**55.**	C	**56.**	B
57.	B	**58.**	ABD	**59.**	A	**60.**	A	**61.**	D	**62.**	D	**63.**	C	**64.**	D

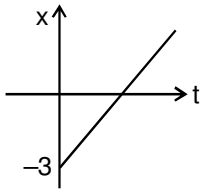
65. C

66. $\frac{1}{16}, \frac{1}{4}$ **67.** $\frac{148\pi}{3}$ **68.** (a) 9.9498 (b) 10.954 (c) 5.0132 **69.** π cm

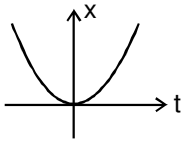
70. (i)



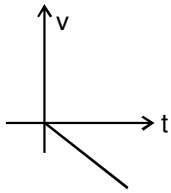
(ii)



(iii)



(iv)



71. $x = \frac{8}{3}, y = \frac{3}{2}$

ANSWER KEY — EXERCISE-2

1. D **2.** L^{-1}, ML^2T^{-2} **3.** $T = a\sqrt{\frac{m}{k}}$ **4.** $ML^5T^{-2}K^{1/2}$ **5.** $\omega = K\sqrt{\frac{Gm}{r^3}}$

6. $[M] = [h^{1/2}.c^{1/2}.G^{-1/2}]$; $[L] = [h^{1/2}.c^{-3/2}.G^{1/2}]$; $[T] = [h^{1/2}.c^{-5/2}.G^{1/2}]$ **7.** $v_0 = k\sqrt{\frac{Gm}{R}}$

8. B **9.** (a) 9.95, (b) 0.99 **10.** 0.14, 0.09

ANSWER KEY — EXERCISE-3 (JEE PROBLEMS)

1.	A,B,C	**2.**	B	**3.**	A,D	**4.**	A,B,C,D	**5.**	B,C
6.	C	**7.**	D	**8.**	C	**9.**	D	**10.**	C

11. B