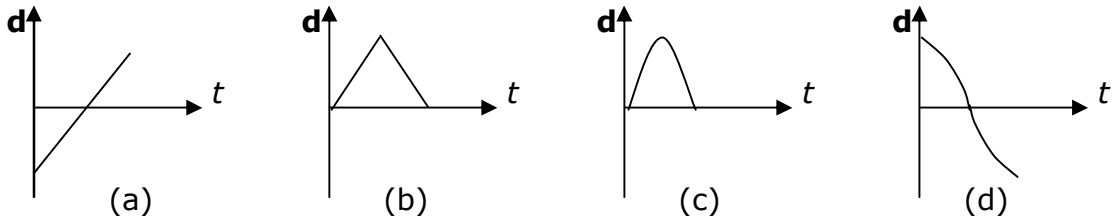
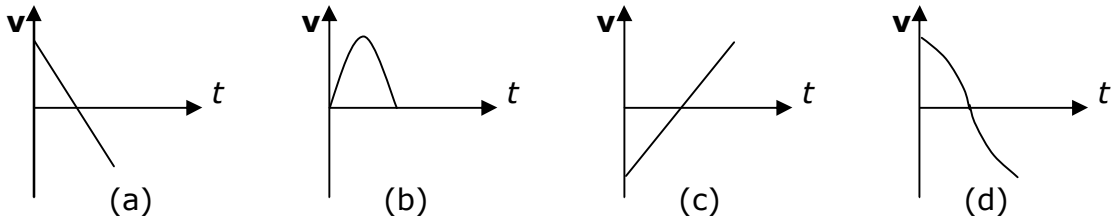
1. Which graph best represents how the displacement of a vertically thrown ball varies with time?



2. Which graph best shows how the velocity of a vertically thrown ball varies with time?



3. A body whose instantaneous and average velocities are equal is said to have

(a) constant acceleration (b) constant velocity
(c) variable velocity (d) variable acceleration

4. Inertia of a body is a measure of its

(a) mass (b) weight
(c) velocity (d) momentum

5. A body moving with velocity *v* has energy *E*. Its momentum is

(a) $\frac{E}{v}$ (b) $\frac{}{2}$
(c) $\frac{2E}{v}$ (d) Ev

6. An alternate unit to kg ms^{-1}

(a) J s (b) N s
(c) N m (d) N

7. Change of linear momentum of a body is called its

(a) acceleration (b) impulse

(c) force (d) energy

8. A trolley of mass 3 kg moving with a speed of 4 ms^{-1} collides with and remains attached to a stationary trolley of mass 1 kg. Their combined momentum, in kg ms^{-1}, after the collision is

(a) 4 (b) 7
(c) 8 (d) 12

9. Forces in nature always occur in

(a) single form (b) pair form
(c) triple form (d) any form

10. When two bodies move like a single body after colliding each other, the collision is said to be

(a) perfectly elastic (b) partially elastic
(c) perfectly inelastic (d) partially inelastic

11. As a result of an elastic collision between two masses m_1 and m_2 an exchange of velocity takes place. For collision of this type

(a) $m_1 >> m_2$
(b) $m_1 = m_2$
(c) $m_1 << m_2$
(c) one of the masses must be initially at rest

12. If a shell is fired from a canon and explodes in air, then the total

(a) momentum increases (b) momentum decreases
(c) kinetic energy increases (d) kinetic energy decreases

13. A ball thrown up with a velocity of 19.6 ms^{-1} returns back into the thrower's hand after

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

14. Lead balls each of mass *m* kg fall on a horizontal plate at the rate of *n* balls per second. If they strike the plate with a velocity of *v* ms^{-1}, the force exerted on the plate in N is

(a) mvn (b) $\frac{mv}{n}$

(c) $\frac{mn}{v}$ (d) $\frac{m}{nv}$

15. From the top of a building a ball A is dropped while another ball B is thrown horizontally at the same instant. Which ball will strike the ground first?

(a) A (b) B
(c) Both at the same time (d) Nothing can be predicted

16. In case of projectile motion, the maximum height attained by a body is equal to its range. The angle of projection with the horizontal is

(a) $\tan^{-1}(1)$ (b) $\tan^{-1}(2)$

(c) $\tan^{-1}(3)$ (d) $\tan^{-1}(4)$

17. The height *H* gained by a projectile is related to its maximum range R_{max} by

(a) $H = 4\,R_{max}$ (b) $H = \frac{R_{max}}{4}$

(c) $H = 2\,R_{max}$ (d) $H = \frac{R_{max}}{2}$

18. The horizontal range of a projectile is the same for the angles

(a) 60^0 and 80^0 (b) 40^0 and 70^0

(c) 45^0 and 55^0 (d) 40^0 and 50^0

19. The time taken by a projectile to reach maximum height is

(a) $\frac{v_i \sin\theta}{2g}$ (b) $\frac{2v_i \sin\theta}{g}$

(c) $\frac{v_i \sin\theta}{g}$ (d) $\frac{v_i \cos\theta}{g}$

20. A ballistic trajectory is the path followed by

(a) an un-powered and unguided missile

(b) a powered and guided missile

(c) an un-powered but guided missile

(d) a powered and guided missile

21. A snooker ball moving with velocity *v* collides head-on with another snooker ball of same mass at rest. If the collision is elastic, the velocity of the second snooker ball is

(a) zero (b) uncertain

(c) v (d) $2v$

22. The time of flight of a projectile is

(a) $\frac{v_i \sin\theta}{g}$ (b) $\frac{2v_i \sin\theta}{g}$

(c) $\frac{v_i \sin\theta}{2g}$ (d) $\frac{2v_i \cos\theta}{g}$

23. The velocity of a projectile at the maximum height is

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

(c) maximum (d) zero

24. With increasing angle of projection, the vertical height gained by a projectile

(a) decreases gradually

(b) increases gradually

(c) first increases and then decreases

(d) remains the same.

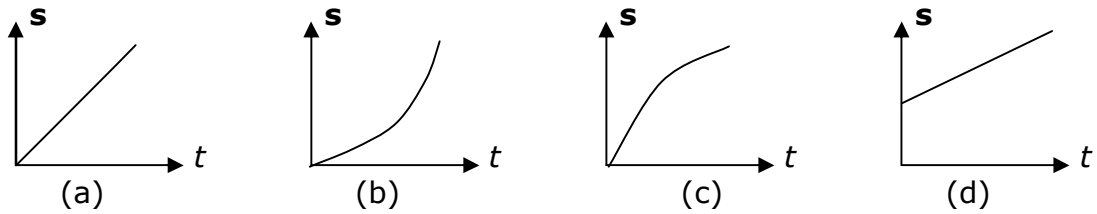
25. The horizontal component of the velocity of a projectile moving with initial velocity of 500 ms^{-1} at an angle of 60^0 to the x-axis is

(a) 500 ms^{-1} (b) 1000 ms^{-1}
(c) 250 ms^{-1} (d) zero

26. A car is decelerating uniformly, its velocity changing from 30 ms^{-1} to 15 ms^{-1} in 75 m. How much further will it travel before coming to rest?

(a) 25 m (b) 50 m
(c) 75 m (d) 100 m

27. A body starts from rest at t = 0 and moves with constant acceleration. Which graph below best represents how the displacement s of the body varies with time?

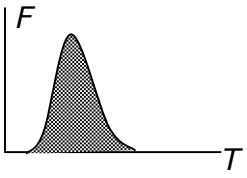


(a) (b) (c) (d)

28. Laws of motion are valid in those systems which

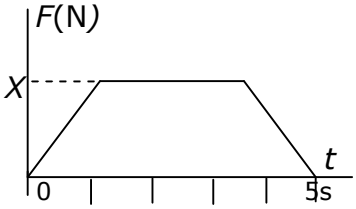
(a) are non-inertial (b) are inertial
(c) are at rest (d) are in space

29. The force F exerted on a body colliding with another body changes with time as shown. The area under the $F - t$ graph represents the body's change of



(a) velocity (b) acceleration
(c) momentum (d) kinetic energy

30. The graph shows a varying force F applied on a body of 10 kg mass. If the gain in momentum in 5 s is 40 $kgms^{-1}$, X is equal to



(a) 4 (b) 8
(c) 10 (d) 15

31. Neutron (mass = 1 u) undergoes elastic collision with stationary nitrogen nucleus (mass = 14 u). The velocity of neutron after the collision is

(a) 0
(b) less than the velocity of nitrogen atom after collision
(c) equal in magnitude to its initial velocity but opposite direction
(d) less in magnitude than its initial velocity but with changed direction

32. Area under the velocity – time graph represents

(a) speed (b) momentum
(c) velocity (d) distance covered

33. A body thrown up with a velocity of 9.8 ms^{-1} reaches a maximum height of

(a) 9.8 m (b) 4.9 m
(c) 19.6 m (d) 44.1 m

34. A force of 4 N acting on a body of mass 2 kg for 2 s produces a rate of change of momentum of

(a) 1 $kgms^{-1}$ (b) 2 $kgms^{-1}$
(c) 4 $kgms^{-1}$ (d) 8 $kgms^{-1}$

35. Dimensions of impulse are

(a) [MLT] (b) $[MLT^{-1}]$
(c) $[MLT^{2}]$ (d) $[MLT^{-2}]$

36. Collisions of gas molecules with the walls of the container are the example of

(a) inelastic collisions (b) elastic collisions
(c) partially elastic collisions (d) partially inelastic collisions

37. Gas molecules inside a container constitute

(a) an isolated system (b) a non-isolated system
(c) a conservative system (d) a non-conservative system

38. A ball bouncing off a wall

(a) obeys law of conservation of energy
(b) does not obey law of conservation of energy
(c) obeys law of conservation of momentum
(d) does not obey law of conservation of momentum.

39. Speed of a projectile is minimum at the

(a) point of landing (b) point of projection
(c) maximum height (d) none of these

40. What happens when a system of two bodies undergoes an elastic collision?

(a) The momentum of the system changes
(b) The momentum of the system does not change
(c) The bodies come to rest after collision
(d) The energy conservation law is violated.

Key to Test Chapter 3

1	**c**	21	**c**
2	**a**	22	**b**
3	**b**	23	**b**
4	**a**	24	**b**
5	**c**	25	**c**
6	**b**	26	**a**
7	**b**	27	**b**
8	**d**	28	**b**
9	**b**	29	**c**
10	**c**	30	**b**
11	**b**	31	**d**
12	**b**	32	**d**
13	**d**	33	**b**
14	**a**	34	**d**
15	**c**	35	**b**
16	**d**	36	**b**
17	**b**	37	**a**
18	**d**	38	**d**
19	**c**	39	**c**
20	**a**	40	**b**