

First: Choose two correct answers in each of the following

1 During the free fall of a body towards the ground, its

- (a) momentum increases
- (b) mass increases
- (c) acceleration remains constant
- (d) velocity decreases
- (e) weight increases

2 The mathematical formula of Newton's second law is

- (a) $F = \frac{m \Delta p}{\Delta t}$
- (b) $F = \frac{v \Delta m^2}{\Delta t}$
- (c) $F = \frac{m \Delta v^2}{\Delta t}$
- (d) $F = \frac{\Delta(mv)}{\Delta t}$
- (e) $F = ma$

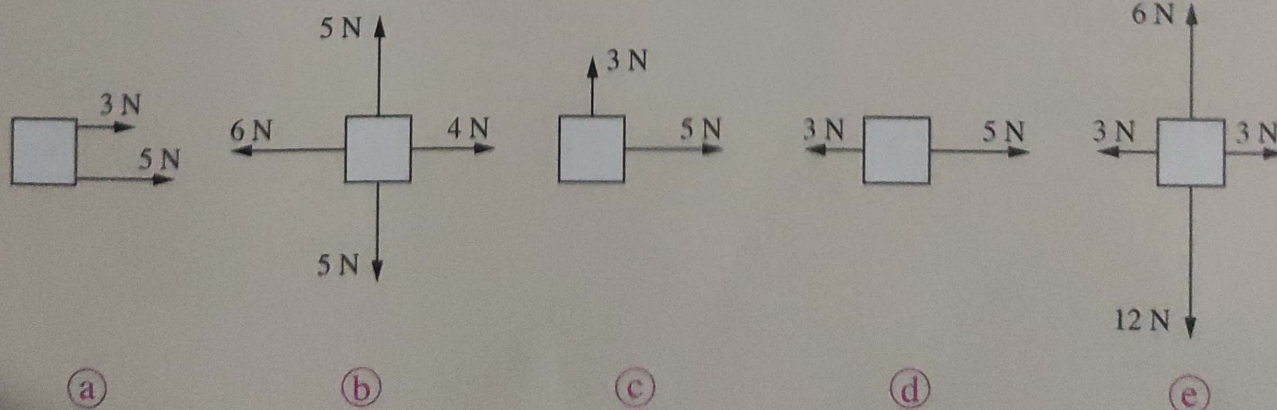
3 The unit that is equivalent to kg.m.s^{-1} is

- (a) J.s
- (b) J.s/m
- (c) N
- (d) N.s
- (e) N/s

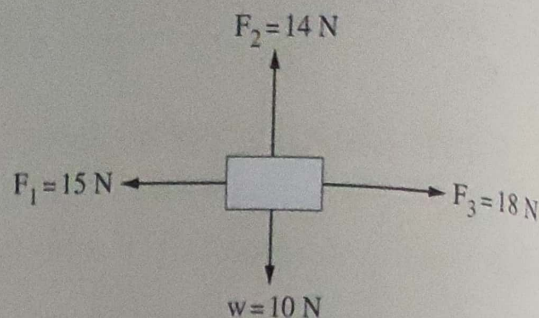
4 A mass of 10 kg is accelerated to move in a straight line such that its velocity changes uniformly from 54 km/h to 108 km/h through 10 s, hence the net force which is acting on this mass is

- (a) equal to 1.5 N
- (b) equal to 15 N
- (c) equal to the change in its momentum through 1 s
- (d) greater than the rate of change in its momentum
- (e) smaller than the rate of change in its momentum

5 The following diagrams represent five cases of a body that is affected by a number of forces, in which of these cases the body has the least magnitude of acceleration?

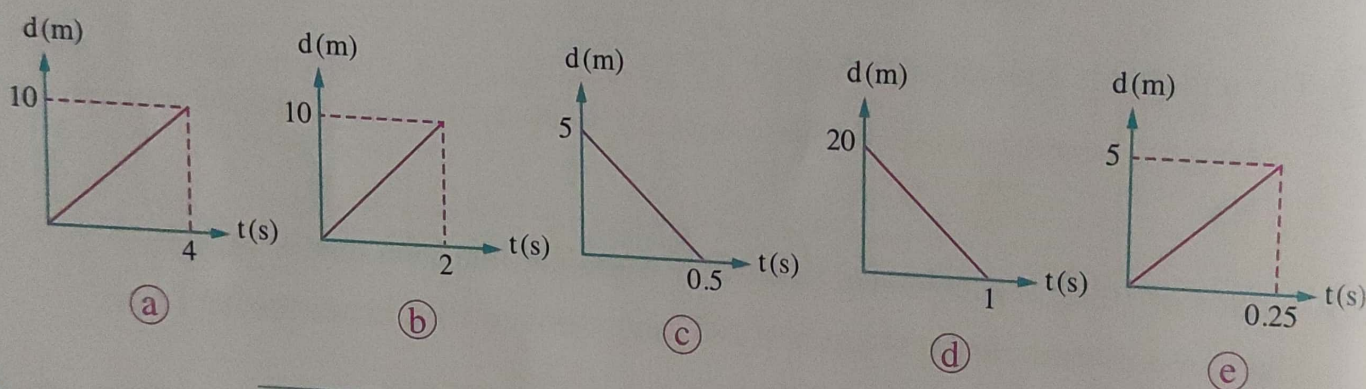


- 6 Multiple forces affect a body as shown in the opposite figure, so which of the following statements is correct about that body? (Take: $g = 10 \text{ m/s}^2$)



- (a) The mass of the body is 1 kg.
- (b) The mass of the body is 100 kg.
- (c) The acceleration of the body's motion is 0.5 m/s^2 .
- (d) The acceleration of the body's motion is 1 m/s^2 .
- (e) The acceleration of the body's motion is 5 m/s^2 .

- 7 The following graphs represent (displacement-time) relations for five bodies that have equal masses, so the two graphs that represent the states of the two bodies of the largest magnitude of momentum are



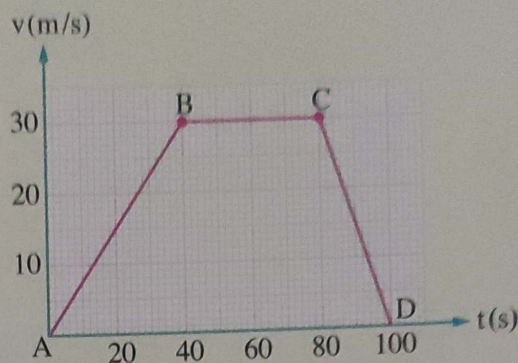
- 8 A body of mass m and weight F begins a free fall from a height h to reach the surface of the ground after an elapsed time interval t , if the momentum of the body at the moment of striking the ground is p , which of the following mathematical relations is correct for that body?

(Given that: g is the acceleration due to gravity and the resistance of air is negligible)

- (a) $F = \frac{m\sqrt{2gh}}{t}$
- (b) $F = m\sqrt{2ght}$
- (c) $p = 2mgh$
- (d) $p = \sqrt{2mgh}$
- (e) $p = m\sqrt{2gh}$

Second: Choose from the list what suits the spaces

- 1 The following graph represents the variation of the velocity of a body of mass 80 kg through 100 s, hence the net force that affects the body in stage BC is (a) and in stage CD is (b)



120 N
60 N
0
- 60 N
- 120 N

- 2 The net force, that if acts on a static body of mass 30 kg it makes the body:
- (a) acquire an acceleration of 3 m.s^{-2} , equals
- (b) acquire a velocity of 8 m.s^{-1} through a time interval of 6 s, equals

40 N
60 N
90 N
120 N
150 N