Q.1 The position of a particle is given by equation $X(t)=2t^2$ where t in second and X in metere . The average velocity during time interval from $t=1s$ to $t=5s$ is :

a) 3m/s b) 1m/s c) 0.1m/s d) 9 m/s e) 15 m/s

Q.2 A car accelerates from rest to 45 m/s in 15 s . Its average acceleration is :

a) $3m/s^2$ b) $1m/s^2$ c) $0.1m/s^2$ d) $9 m/s^2$ e) $15 m/s^2$

Q.3 A person walks on a straight road for 100 m and then return back for 20 m.

The ratio of the magnitude of the distance to the displacement of the person is :

a) Zero b) 1.5 c) 5.0 d) 1.25 e) none of the above

Q.4 Which of the following sentences is correct?

a)The average speed of an object is the elapsed time divided by the distance traveled.

b)The average velocity of an object is the ratio of the distance traveled by the elapsed time.

c)The instantaneous velocity is the limit of the average velocity, as the elapsed time tends to zero.

d)The vector position is the derivative of the instantaneous velocity.

e) All of the above are not correct.

Q.5 A car moving along a straight line changes its velocity from 40m/s to 80m/s in a distance of 200m. The acceleration during its motion is :

a) $8.0 m/s^2$ b) $9.6 m/s^2$ c) $12 m/s^2$ d) $6.9 m/s^2$ e) $0.20 m/s^2$

Q.6 If $\mathbf{A} = 2\hat{x} + 3\hat{y}$ and $\mathbf{B} = -\hat{x} + \hat{y}$, then the angle between the resultant $\mathbf{A} + \mathbf{B}$ and the positive direction of x-axis is:

a) 36° b) 42° c) 76° d) 58° e) 13°

Q.7 If $\mathbf{A} = 12\hat{x} - 16\hat{y}$ and $\mathbf{B} = -24\hat{x} + 10\hat{y}$, what is the magnitude of the vector $\mathbf{C} = 2\mathbf{A} - \mathbf{B}$?

a) 42 b) 22 c) 64 d) 90 e) 13

Q.8 A box of a mass 1500 Kg slides from rest on inclined plane, as shown in figure. Neglecting the frictional force, the magnitue of its acceleration is:

a) $8.5m/s^s$ b) $4.9 m/s^2$ c) $1.96m/s^2$ d) $5.3 m/s^2$ e) 1.33 m/s

Q.9 A car moving with a constant velocity. This means that the net force acting on it is

a) maximum b) Minimum c) Zero d) Opposite e) Forward

Q.10 A box is pulled horizontally by a 60 N force at an average velocity 1.0m/s. The power is

a) 0 W b) 3 W c) 30 W d) 50 W e) 60 W

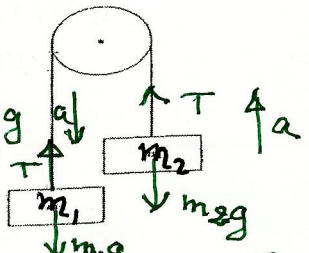
Q.11 A woman pushes horizontally a chair with a force of 400 N. The work she does on the chair to move 2 m is:

a) 400 J b) 800 J c) 200J d) 0 e) 600J

Q.12 In the figure shown, the string and pulley are massless. If m_1=15 Kg and m_2 =10 kg, the tension in the string is:

a) 117.6 N
b) 735 N
c) 980N
d) 49 N
e) Zero

$m_1 g - T = m_1 a$
$T - m_2 g = m_2 a$
$\Rightarrow a = \frac{m_1 - m_2}{m_1 + m_2} g$

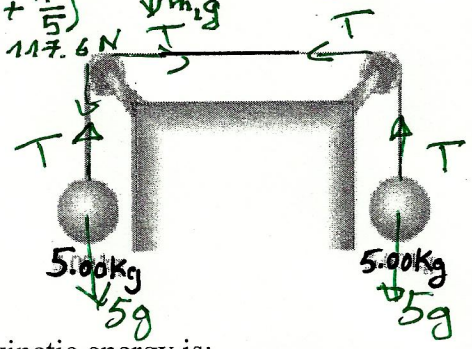


$a = \frac{g}{5} \Rightarrow T = m_2(g+a) = 10g\left(1+\frac{1}{5}\right)$
$= 12g = 117.6\,N$

Q.13 The tension of the string of a system as shown in the figure is

a) Zero
b) 5N
c) 49N
d) 10N
e) 98N

$T = 5g = 49\,N$



Q.14 A ball of mass 0.2 kg is thrown at 10 m/s. Its kinetic energy is:

$KE = \frac{1}{2} m v^2 = 10J$

a) 20 J b) 10 J c) 0.2 J d) 2J e) 10 J

Q.15 A man pushes the box of mass 5Kg in a horizontal direction by 10N force on the surface through a distance of 5m. If the coefficient of kinetic friction is 0.2 . The total work done on the box is:

$W_{net} = (F - F_f)\Delta x = (10 - 0.2 \times 5g) \times 5 = 1J$

a) Zero b) 1.0 J c) 2.5 J d) 7.5 J e) 10.0J

Q.16 If a ball thrown straight up, how does the distance (h) it rises vary with its initial speed?

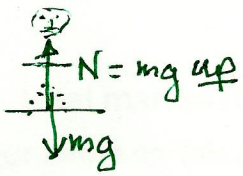
$\frac{1}{2} m v_o^2 = mgh$
$h = \frac{v_o^2}{2g}$

a) $h = v_o^2/g$ b) $h = v_o/g$ c) $h = v_o^2/g$ d) $h = v_o^2/2g$ e) $h = 2v_o^2/g$

Q.17 The sum of two vectors A and B is maximum when both vectors are :

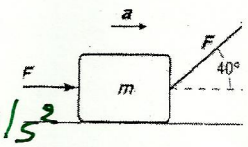
a) parallel
b) opposite in direction
c) perpendicular to each other
d) A inclined 45° with B
e) none of the above

Q.18 A man of 60 kg standing on a floor at rest. The normal force exerted by the floor on the man is:



a) 588 N upward
b) 120 N downward
c) 60 N downward
d) 588N downward
e) 60 N upward

Q.19 In the figure shown, F=40 N and m=2.0 kg. The magnitude of acceleration of the block is:



$F + F\cos 40^\circ = ma \Rightarrow a = \frac{F}{m}(1+\cos 40^\circ) = 35.3\,m/s^2 \simeq 35\,m/s^2$

a) 5.3 m/s^2 b) 4.4 m/s^2 c) 35.0 m/s^2 d) 6.2 m/s^2 e) 8.4m/s^2

Q.20 How much work is done by a person lifting a 2 Kg object from a bottom of a well at constant speed of 2 m/s for 5 sec.

a) 0.22KJ b) 0.2 KJ c) 0.24 KJ d) 0.27 KJ e) 0.51 KJ

$W = mgh = mgvt = 196J \simeq 200J = 0.2\,kJ$