INSPIRING MINDS | PHYSICS +1

where success reflects...

Time:1:30 hrs	Objective Test	MM:120

Name:-.....

Contact no:-.....

UNIT 1 to 5
[PHYSICS]

Marking Scheme

Correct Answers: +4

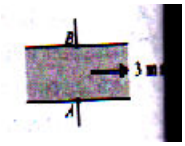
Wrong Answers: -1

INSPIRING MINDS

#SCO 36-37 DLF Road,Tripuri PATIALA
Ph No. 7508272168

OBJECTIVE TEST [UNIT 1 to 5]

Q1. A river is flowing from west to east with a speed 5m s^{-1}. A swimmer can swim in still water at a speed of 10ms^{-1}
If he wants to start form point A on south bank and reach opposite point B on north bank, in what direction should he swim?



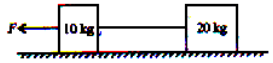
(a) 30° C east of north
(b) 60° C east of north
(c) 30° C west of north
(d) 60° C west of north

Q2. A cyclist is ridding with a speed of 27 km h^{-1} . As he approaches a circular turn on the road fo radius 80 m, he applies brakes and reduces his speed at the constant rate of 0.50 m s^{-1} every second. The net acceleration of the cyclist on the circular turn is
(a) 0.68 ms^{-2} (b) 0.86 ms^{-2}
(c) 0.56 ms^{-2} (d) 0.76 ms^{-2}

Q3. A fighter plane is flying horizontally at an altitude of 1.5 km with speed 720 km h^{-1}. At what angle of sight (w.r.t. horizontal) when the target is seen, should the pilot drop the bomb in order to attack the target?
(a) 23° (b) 32°
(c) 12° (d) 42°

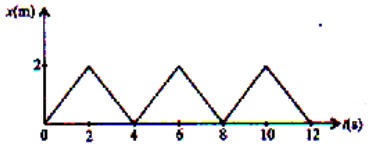
Q4. A man can swim with a speed of 4 km h^{-1} in still water. He crosses a river 1 km wide that flows steadily at 3 km h^{-1} . If the makes his strokes normal to the river current, how far down the river does he go when he reaches the other bank?
(a) 500 m (b) 600 m
(c) 750 m (d) 850 m

Q5.Two blocks of masses 10 kg and 20kg are connected by a massless string and are placed on a smooth horizontal surface as shown in the figure. If a force F= 600 N is applied to 10 kg block, then the tension in the string is



(a) 100 N (b) 200 N
(c) 300 N (d) 400 N

Q6. Figure shows the position-time (x-t)graph of one dimensional motion of a body of mass 500g. What is the time interval between two consecutive impulses received by the body?

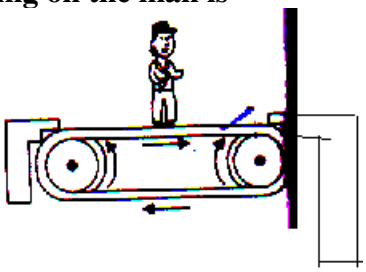


(a) 2 s (b) 4 s
(c) 6 s (d) 8 s

Q7. Two billiard balls A and B, each of mass 50 g and moving in opposite directions with speed of 5 m s^{-1} each, collide and rebound with the same speed. The impulse imparted to each ball is
(a) 0.25 Kg ms^{-1}
(b) 0.5 Kg ms^{-1}
(c) 0.1 Kg ms^{-1}
(d) 0.125 Kg ms^{-1}

Q8. The rear side of a truck is open and a box of mass 40 kg is placed 5 m away from the open end. The coefficient of friction between the box and the surface below it is 0.15. The truck starts for rest with an acceleration of 2 m s^{-2} on a straight road . At what distance from the starting point does the box fall off the truck?
(a) 20 m (b) 30 m
(c) 40 m (d) 50 m

Q9. Figure shows a man of mass 55 kg standing stationary with respect to a horizontal conveyor belt that is acceleration with 1 m s^{-2}. The net force acting on the man is



(a) 35 N (b) 45 N
(c) 55 N (d) 65 N

Q10. A car of mass 100 kg moving with a speed 18 km h^{-1} on a smooth road and colliding with a horizontally mounted spring of spring constant 6.25 $\times 10^3$ N m^{-1}. The maximum compression of the spring is

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

Q11. In a shotput event an athlete throws the shotput of mass 10 kg with an initial speed of 1 ms^{-1} at 45° from a height 1.5 m above ground. Asssuming air resistance to be negligible and acceleration due to gravity to be 10 ms^{-2}, the kinetic energy of the shotput when it just reaches the ground will be

(a) 2.5 J (b) 5 J
(c) 52.5 J (d) 155 J

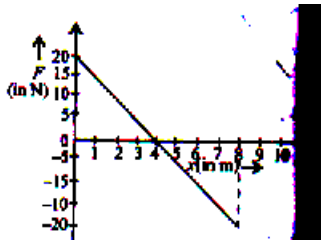
Q12. A particle acted upon by constant forces $4\hat{i}+\hat{j}-3\hat{k}\ and\ 3\hat{i}+\hat{j}-\hat{k}$ **is displaced from the point** $\hat{i}+2\hat{j}+3\hat{k}\ to\ po\,\text{int}\ 5\hat{i}+4\hat{j}+\hat{k}$. **The total work done by the forces in SI unit is**

(a) 20 (b) 40
(c) 50 (d) 30

Q13. A trolley of mass 200 kg moves with a uniform speed of 36 km h^{-1} on a frictionless track. A child of mass 20 kg runs on the trolley from one end to the other (10 m away) with a speed 4 m s

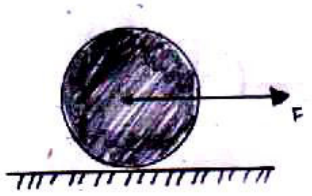
(a) 8.4 ms^{-1} (b) 10.4 ms^{-1}
(c) 12.2 ms^{-1} (d) 14.6 ms^{-1}

Q14. A force F acting on an object varies with distance x as shown in the figure. The work done by the force in moving the object from x=0 to x=8 m is



(a) Zero J (b) 80 J
(c) -40 J (d) 40 J

Q15. A uniform disc of mass M and radius R, is resting on a table on its rim. The coefficient of friction between disc and table is μ. Now the disc is pulled with a force F as shown in figure. What is the maximum value of F for which the disc rolls without slipping?



(a) μMg (b) 2 μMg
(c) 3 μMg (d) 4 μMg

Q16. Two discs of moments of inertia I_1 and I_2 about their respective axes, rotating with angular frequencies $\omega_1\ and\ \omega_2$ **respectively , are brought into contact face to face with their axes of rotation coincident. The angular frequency of the composite disc will be**

$a)\ \frac{I_1\omega_1+I_2\omega_2}{I_1+I_2}$ $b)\ \frac{I_2\omega_1+I_1\omega_2}{I_1+I_2}$

$c)\ \frac{I_1\omega_1+I_2\omega_2}{I_1-I_2}$ $d)\ \frac{I_2\omega_1+I_1\omega_2}{I_1-I_2}$

Q17. A child is standing with folded hands at the centre of a platform rotating about its central axis. The kinetic energy of the system is k. Now, the child stretches his arms so that moment of inertia of the system doubled. Now, the kinetic energy of the system is

(a) k/4 (b) k/2
(c) 2k (d) 4k

Q18. A man stands on a rotating platform with his arms stretched holding a 5 kg weight in each hand. The angular speed of the platform is 1.2 rev s^{-1}. The moment of inertia of the man together with the platform may be taken to be constant and equal to 6 kg m^2. If the man brings his arms close to his chest with the distance of each weight from the axis changing for 100 cm to 20 cm. The new angular speed of the platform is

(a) 2 rev s^{-1} (b) 3 rev s^{-1}
(c) 5 rev s^{-1} (d) 6 rev s^{-1}

Q19. Two uniform solid spheres of equal radii R, but mass M and 4M have a centre to centre separation 6R, as shown in figure. A projectile of the projectile so that it reaches the surface to the second sphere is

a) $\sqrt{\frac{4}{5}\frac{GM}{R}}$ b) $\sqrt{\frac{5}{4}\frac{GM}{R}}$

c) $\sqrt{\frac{3}{5}\frac{GM}{R}}$ d) $\sqrt{\frac{5}{3}\frac{GM}{R}}$

Q20. The escape speed of a body on the earth's surface is 11.2 km s^{-1} . A body is projected with thrice of this speed. The speed of the body when it escapes the gravitational pull of earth is

(a) 11.2 km s^{-1}
(b) $22.4\sqrt{2}$ km s^{-1}
(c) $22.4/\sqrt{2}$ km s^{-1}
(d) $22.4\sqrt{3}$ km s^{-1}

Q21. Two stars of masses m_1 and m_2 are parts of a binary system. The radii of their orbits are r_1 and r_2 respectively, measured from the centre of mass of the system. The magnitude of gravitational force m_1 exerts on m_2 is

a) $\frac{m_1 m_2 G}{(r_1+r_2)^2}$ b) $\frac{m_1 G}{(r_1+r_2)^2}$

c) $\frac{m_2 G}{(r_1+r_2)^2}$ d) $\frac{G(m_1+m_2)}{(r_1+r_2)^2}$

Q22. A research satellite of mass 200kg circles the earth in an orbit radius $\frac{3R_E}{2}$, where R_E is the radius of the earth. Assuming the gravitational pull of mass of 1 kg on the earth's surface to be 10 N, the pull on the satellite will be

(a) 890 N (b) 889 N
(c) 885 N (d) 892 N

Q23. A particle of mass M is situated at the centre of a spherical shell of same mass and radius R. The gravitational potential at a point situated at $\frac{R}{2}$ distance from the centre will be

(a) -3GM / R (b) -2GM/ R
(c) –GM/R (d)-4GM/R

Q24. Which of the following system of units is not based on unit of mass, length and time?

(a) CGS (b) FPS
(c) MKS (d) SI

Q25. The displacement of particle is given by $x=(t-2)^2$ where x is in metres and t in seconds. The distance covered by the particle in first 4 seconds is

(a) 4 m (b) 8 m
(b) 12 m (d) 16 m

Q26. A player throws a ball vertically upwards with velocity υ. At highest point,

(a) both the velocity and acceleration of the ball are zero

(b) the velocity of the ball is υ but its acceleration is zero

(c) the velocity of the ball is zero but its acceleration is g

(d) the velocity of the ball is υ but its acceleration is g

Q27. Which of the following statements are incorrect?

(i) Average velocity is path length divided by time interval.

(ii) In general, speed is greater than the magnitude to the velocity.

(iii) A particle moving is a given direction with a non-zero velocity can have zero speed.

(iv) The magnitude of average velocity is the average speed.

(a) (ii) and (iii)

(b) (ii) and (iv)

(c) (i), (iii) and (iv)

(d) All four

Q28. A vehicle travels half the distance L with speed v_1 and the other half with speed v_2, then its average speed is

(a) $v_1 + v_2 / 2$

(b) $2v_1 + v_2 / v_1 + v_2$

(c) $2 v_1 v_2 / v_1 + v_2$

(d) $(v_1 v_2) / v_1 + v_2$

Q29. Two parallel rail tracks run north-south. On one track train A moves north with a speed of 54 km h^{-1} and on the other track train B moves south with a speed of 90 km h^{-1} . Teh velocity of train A with respect to train B is

(a) 10 ms^{-1} (b) 15 ms^{-1}

(c) 25 ms^{-1} (d) 40 ms^{-1}

Q30. A ball is thrown vertically upwards with the velocity of 20 $m s^{-1}$ from the top of a multistorey building of 25 m high. How high will the ball rise? (Take g =10 $m s^{-1}$)

(a) 10 m (b) 15 m
(c) 20 m (d) 25 m

Answer Key

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