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NEET

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CLASSROOM CONTACT PROGRAMME

(ACADEMIC SESSION 2023-2024)

Class – XI - NEET – 2023

Test Type: Chapter wise Test **Date: 28/09/2023**

SYLLABUS

PHYSICS

Duration of test 60 min and questions Paper contains 50 questions. The maximum marks are 200.

PHYSICS

SECTION – A

1. A stone of mass of 16 kg is attached to a string 144 m long and is whirled in a horizontal circle on a smooth surface. The maximum tension in the string that it can withstand is 16N. The maximum velocity of revolution that can be given to the stone without breaking it, will be.
(a) 20 ms^{-1} (b) 16 ms^{-1} (c) 14 ms^{-1} (d) 12 ms^{-1}

2. The angle between the two vectors $-2\hat{i}+3\hat{j}+\hat{k}$ and $\hat{i}+2\hat{j}-4\hat{k}$ is
(a) 45^o (b) 90^o (c) 30^o (d) 60^o

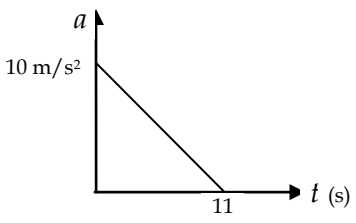
3. Consider a vector $\vec{F}=4\hat{i}-3\hat{j}$. Another vector perpendicular to $\vec{F}$ is
(a) $4\hat{i}+3\hat{j}$ (b) $6\hat{i}$
(c) $7\hat{k}$ (d) $3\hat{i}-4\hat{j}$

4. $\vec{A}$ and $\vec{B}$ are two vectors given by $\vec{A}=2\hat{i}+3\hat{j}$ and $\vec{B}=2\hat{i}+4\hat{j}$. The magnitude of the component of $\vec{A}$ along $\vec{B}$ is
(a) $\frac{5}{\sqrt{2}}$ (b) $\frac{3}{\sqrt{2}}$ (c) $\frac{8}{\sqrt{5}}$ (d) $\frac{5}{\sqrt{13}}$

5. The distance of a particle moving on a circle of radius 12 m measured from a fixed point on the circle is given by $s=2t^3$ (in metre). The ratio of its tangential to centripetal acceleration at t = 2s is
(a) 1 : 1 (b) 1 : 2 (c) 2 : 1 (d) 3 : 1

6. Unit vector perpendicular to vector $\vec{A}=-3\hat{i}-2\hat{j}-3\hat{k}$ and $\vec{B}=2\hat{i}+4\hat{j}+6\hat{k}$ both is
(a) $\frac{3\hat{j}-2\hat{k}}{\sqrt{13}}$ (b) $\frac{3\hat{k}-2\hat{j}}{\sqrt{13}}$
(c) $\frac{-\hat{j}+2\hat{k}}{\sqrt{13}}$ (d) $\frac{\hat{i}+3\hat{j}-\hat{k}}{\sqrt{13}}$

7. A particle starts from rest. Its acceleration (a) versus time (t) graph as shown in the figure. The maximum speed of the particle will be



(a) 110 ms^{-1} (b) 55 ms^{-1}
(c) 550 ms^{-1} (d) 660 ms^{-1}

8. A person walks up a stalled escalator in 90 s. When he is just standing on the same moving escalator, then he is carried for 60 s. The time it would take him to walk up the moving escalator will be
(a) 27 s (b) 50 s (c) 18 s (d) 36 s

9. A body falling from a high Minaret travels 40 m in the last 2 seconds of its fall to ground. Height of Minaret in metre is (Take, g = 10 ms^{-2})
(a) 60 (b) 45 (c) 80 (d) 50

10. A particle moving along X-axis has acceleration f, at time t, given $f = f_0\left(1-\frac{t}{T}\right)$, where f_0 and T are constants. The particle at t = 0 has zero velocity. When $f = 0$, the particle's velocity (v_x) is
(a) $\frac{1}{2}f_0T$ (b) f_0T (c) $\frac{1}{2}f_0T^2$ (d) f_0T^{-2}

11. Find the average velocity when a particle complete the circle of radius 1 m in 10 s.
(a) 2 ms^{-1} (b) 3.14 ms^{-1}
(c) 6.28 ms^{-1} (d) zero

12. If the velocity of a particle is $v = At + Bt^2$, where A and B are constants, then the distance travelled by it between 1s and 2s is
(a) 3A + 7B (b) $\frac{3}{2}A+\frac{7}{3}B$
(c) $\frac{A}{2}+\frac{B}{3}$ (d) $\frac{3}{2}A+4B$

13. A ball thrown vertically upwards after reaching a maximum height h returns to the starting point after a time of 10 s. Its displacement after 5 s is
(a) h (b) 2 h (c) 10 h (d) 20h

14. A particle starts moving from rest wiith uniform accelereation. It travels a distance x in first 2 s and distance y in the next 2 s. Then,
(a) y = 3x (b) y = 4x (c) y = x (d) y = 2x

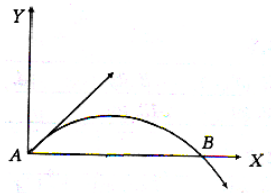
15. A particle moves along with X-axis. The position x of particle with respect to time t from origin given by $x = b_0 + b_1t + b_2t^2$. The acceleration of particle is
(a) b_0 (b) b_1 (c) b_2 (d) $2b_2$

16. A car covers the first half of the distance between the two places at 40 kmh^{-1} and another half at 60 kmh^{-1}. The average speed of the car is
(a) 40 kmh^{-1} (b) 48 kmh^{-1}
(c) 50 kmh^{-1} (d) 60 kmh^{-1}

17. The range of projectile is R when the angle of projection is 40^o. For the same velocity of projection and range, the other possible angle of projection is
(a) 45^o (b) 50^o (c) 60^o (d) 40^o

18. A particle is projected with a velocity v, so that its horizontal range twice the greatest height attained. The horizontal range is
(a) $\frac{4v^2}{5g}$ (b) $\frac{v^2}{g}$ (c) $\frac{v^2}{2g}$ (d) $\frac{2v^2}{3g}$

19. The velocity of a projectile at the initial point A is $\left(2\hat{i}+3\hat{j}\right)$ ms^{-1}. Its velocity (in ms^{-1}) at point B is



(a) $-2\hat{i}-3\hat{j}$ (b) $-2\hat{i}+3\hat{j}$ (c) $2\hat{i}-3\hat{j}$ (d) $2\hat{i}+3\hat{j}$

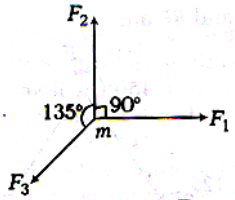
20. The velocity vector of the motion described by the position vector of a particle $\vec{r} = 2t\hat{i}+t^2\hat{j}$ is given by
(a) $\vec{v} = 2\hat{i}+2t\,\hat{j}$ (b) $\vec{v} = 2t\,\hat{i}+2t\,\hat{j}$
(c) $\vec{v} = t\,\hat{i}+t^2\,\hat{j}$ (d) $\vec{v} = 2\hat{i}+t^2\,\hat{j}$

21. A body is projected with an angle θ. The maximum height reached is h. If the time of flight is 4 s and g = 10 ms^{-2}, then value of h is
(a) 40 m (b) 20 m (c) 5 m (d) 10 m

22. The equation of motion of a projectile is
$$y = 12x-\frac{3}{4}x^2$$
What is the range of projectile?
(a) 12 m (b) 16 m (c) 20 m (d) 24 m

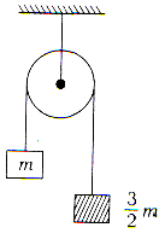
23. A large number of bullets are fired in all directions with same speed v. What is the maximum area on the ground on which these bullets will spread ?
(a) $\pi\frac{v^2}{g}$ (b) $\pi\frac{v^4}{g^2}$ (c) $\pi^2\frac{v^4}{g^2}$ (d) $\pi^2\frac{v^2}{g^2}$

24. When a force F acts on a body of mass m, the acceleration produced in the body is a. If three equal forces $F_1 = F_2 = F_3 = F$ act on the same body as shown in figure. The acceleration produced is



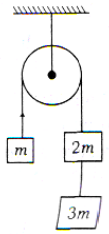
(a) $\left(\sqrt{2}-1\right)a$ (b) $\left(\sqrt{2}+1\right)a$
(c) $\sqrt{2}\,a$ (d) a

25. In the arrangement shown, the mass m will ascend with an acceleration (pulley and rope are massless)



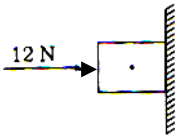
(a) zero (b) $\frac{g}{5}$ (c) g (d) 2g

26. In the figure given below, with what acceleration does the block of mass *m* will move ? (Pulley and strings are massless and frictionless)



(a) $\frac{g}{3}$ (b) $\frac{2g}{5}$ (c) $\frac{2g}{3}$ (d) $\frac{g}{2}$

27. A block of weight 5 N is pushed against a vertical wall by a force 12 N. The coefficient of friction between the wall and block is 0.6. The magnitude of the force exerted by the wall on the block is



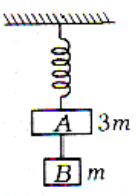
(a) 12 N (b) 5*N* (c) 7.2 N (d) 13 N

28. A rope of length L and mass M is hanging from a rigid support. The tension in the rope at a distance x from the rigid support is

(a) Mg (b) $\left(\frac{L-x}{L}\right)Mg$

(c) $\left(\frac{L}{L-x}\right)Mg$ (d) $\frac{x}{L}Mg$

29. Two blocks A and B of masses 3m and m respectively are connected by a massless and inextensible string. The whole system is suspended by a masselss spring as shown in figure. The magnitudes of accelereation of A and B immediately after the string is cut, are respectively



(a) $g\,\frac{g}{3}$ (b) $\frac{g}{3}, g$ (c) g, g (d) $\frac{g}{3}, \frac{g}{3}$

30. A body of mass m is placed on a rough surface with coefficient of friction μ inclined at θ. If the mass is in equilibrium, then

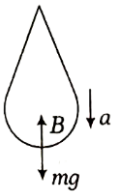
(a) $\theta = tan^{-1}\mu$ (b) $\theta = tan^{-1}\left(\frac{1}{\mu}\right)$

(c) $\theta = tan^{-1}\frac{m}{\mu}$ (d) $\theta = tan^{-1}\frac{\mu}{m}$

31. A marble block of mass 2 kg lying on ice when given a velocity of 6 ms^{-1} is stopped by friction in 10 s. Then, the coefficient of friction is

(a) 0.01 (b) 0.02 (c) 0.03 (d) 0.06

32. A balloon with mass *m* is desending down with an acceleration a (where, a < g). How much mass should be removed from it, so that it starts moving up with an acceleration a?



(a) $\frac{2ma}{g+a}$ (b) $\frac{2ma}{g-a}$ (c) $\frac{ma}{g+a}$ (d) $\frac{ma}{g-a}$

33. Two particles of equal masses are revolving in circular paths of radii r_1 and r_2 respectively with the same speed. The ratio of their centripetal forces is

(a) $\frac{r_2}{r_1}$ (b) $\sqrt{\frac{r_2}{r_1}}$ (c) $\left(\frac{r_1}{r_2}\right)^2$ (d) $\left(\frac{r_2}{r_1}\right)^2$

34. A fan makes 2400 rpm. If after it is switched off, it comes to rest in 10 s, then find the number of times it will rotate before it comes to rest after it is switched off.

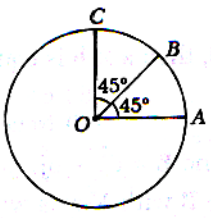
(a) 400 (b) 100 (c) 200 (d) 50

35. The momentum *p* (in kg –ms^{-1}) of a particle is varying with time *t* (in second) as $p = 2 + 3t^2$. The force acting on the particle at t = 3s will be.

(a) 18 N (b) 54 N (c) 9 N (d) 15 N

SECTION -B

36. Find the resultant of three vectors OA, OB and OC shown in the following figure. (Radius of the circle is R)



(a) 2R (b) $R(1+\sqrt{2})$

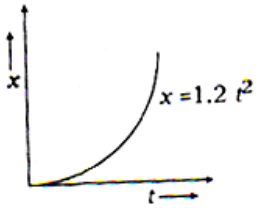
(c) $R\sqrt{2}$ (d) $R(\sqrt{2}-1)$

37. A vector perpendicular to both the vectors $2\hat{i}-\hat{j}+5\hat{k}$ and *X*-axis is
(a) $\hat{j}+5\hat{j}$ (b) $\hat{j}-5\hat{k}$ (c) $5\hat{j}+\hat{k}$ (d) $\hat{i}+\hat{j}+\hat{k}$

38. The scalar product of two vectors $\vec{A}=2\hat{i}+2\hat{j}-\hat{k}$ and $\vec{B}=-\hat{j}+\hat{k}$, is given by
(a) $\vec{A}\cdot\vec{B}=3$ (b) $\vec{A}\cdot\vec{B}=4$
(c) $\vec{A}\cdot\vec{B}=-4$ (d) $\vec{A}\cdot\vec{B}=-3$

39. The distance travelled by a particle starting from rest and moving with an acceleration $\frac{4}{3}\ ms^{-2}$, in the third second is
(a) $\frac{10}{3}\ m$ (b) $\frac{19}{3}\ m$ (c) 6 m (d) 4 m

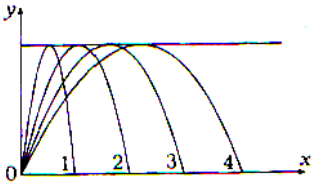
40. Figure given shows the distance-time graph of the motion of a car. It follows from the graph that the car is



(a) at rest
(b) in uniform motion
(c) in non-uniform accelerated motion
(d) uniformly accelerated motion

41. A car moving with a velocity of 10 ms^{-1} can be stopped by the application of a constant force F in a distance of 20 m. If the velocity of the car is 30 ms^{-1}. It can be stopped by this force in
(a) $\frac{20}{3}m$ (b) 20 m (c) 60 m (d) 180 m.

42. Figure shows four paths for a kicked football. Ignorning the effects of air on the flight, rank the paths according to initial horizontal velocity component highest first.

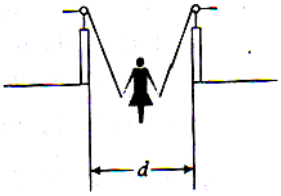


(a) 1, 2, 3, 4 (b) 2, 3, 4, 1
(c) 3, 4, 1, 2 (d) 4, 3, 2, 1

43. A body projected with velocity u at projection angle θ has horizontal range R. For the same velocity and projection angle, its range on the moon surface will be $(g_{moon} = g_{earth}/6)$
(a) 36R (b) $\frac{R}{36}$ (c) $\frac{R}{16}$ (d) 6R

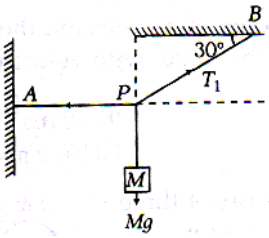
44. A body is projected at an angle of 30^o with the horizontal with momentum p. At its highest point, the magnitude of the momentum is
(a) $\frac{\sqrt{3}}{2}p$ (b) $\frac{2}{\sqrt{3}}p$ (c) p (d) $\frac{p}{2}$

45. A man of mass m has fallen into a ditch of width d. Two of his friends are slowly pulling him out using a light rope and two fixed pulleys as shown in figure. Both the friends exert force of equal magnitudes F. When the man is at a depth h, the value of F is



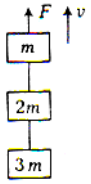
(a) $\frac{mg}{4h}\sqrt{d^2+4h^2}$ (b) hmg
(c) dmg (d) $\frac{mg}{2h}\sqrt{h^2+d^2}$

46. A mass M is hung with a light inextensible string as shown in the figure. Find the tension of the horizontal string.



(a) $\sqrt{2}\ Mg$ (b) $\sqrt{3}\ Mg$ (c) 2 Mg (d) 3 Mg

47. Three blocks with masses m, 2m and 3m are connected by strings as shown in the figure. After an upward force F is applied on block m, the masses move upward at contant speed v. What is the net force on the block of mass 2m? (g is the acceleration due to gravity)



(a) Zero (b) 2 mg (c) 3 mg (d) 6 mg

48. A car is moving in a circular horizontal track of radius 10.0 m with a constant speed of 10.0 ms^{-1}. A plumb bob is suspended from the roof of the car by a light rigid rod of length 10.0 m. The angle made by the rod with the track is (Take, g = 10 ms^{-2})
(a) zero (b) 30^o (c) 45^o (d) 60^o

49. The ratio of angular speed of second hand to the hour-hand of a watch is
(a) 3600 : 1 (b) 720 : 1 (c) 72 : 1 (d) 60 : 1

50. A car of mass 1000 kg negotiates banked curve of radius 90 m on a frictionless road. If the banking angle is 45°, the speed of the car is
(a) 20 ms^{-1} (b) 30 ms^{-1} (c) 5 ms^{-1} (d) 10 ms^{-1}