Kulkarni Science Academy

Exam Name :-Cet class 11 th kinematics physics

Date :-31/08/2025

Time :-30 Minutes

Mark :- 50

PHYSICS

1. A body covers half of its distance with speed ' u ' and the other half with a speed ' v ' the average speed of the body is [MHT-CET 2022]

(a) $\frac{u+v}{2}$ **(b)** $\frac{u+v}{2uv}$

(c) $\frac{2uv}{u+v}$ **(d)** $\frac{u-v}{2}$

2. A body is falling freely under gravity. The distance covered by the body in first, second and third second of its motion are in the ratio [MHT-CET 2024]

(a) $1:5:6$ **(b)** $1:2:3$

(c) $1:4:9$ **(d)** $1:3:5$

3. A body is projected at an angle ' θ ' with the horizontal. When it is at the highest point, the ratio of the kinetic energy to potential energy of the body is [MHT-CET 2024]

(a) $\frac{1}{\tan^2\theta}$ **(b)** $\tan\theta$

(c) $\frac{1}{\tan\theta}$ **(d)** $\tan^2\theta$

4. A body is projected at an angle θ with respect to horizontal direction with velocity u. The maximum range of the body is

(a) $R = \frac{u^2 \sin 2\theta}{g}$ **(b)** $R = \frac{u^2 \sin^2\theta}{2g}$

(c) $R = \frac{u^2}{g}$ **(d)** $R = u^2 \sin\theta$

5. A body is projected from the earth at angle $30°$ with the horizontal with some initial velocity. If its range is 20 m, the maximum height reached by its is (in metre)

(a) $5\sqrt{3}$ **(b)** $\frac{5}{\sqrt{3}}$

(c) $\frac{10}{\sqrt{3}}$ **(d)** $10\sqrt{3}$

6. A body is thrown with a velocity of $10\ ms^{-1}$ at an angle of $60°$ with the horizontal. Its velocity at the highest point is

(a) $7\ ms^{-1}$ **(b)** $9\ ms^{-1}$

(c) $18.7\ ms^{-1}$ **(d)** $5\ ms^{-1}$

7. A body moving in a circular path with a constant speed has constant [MHT-CET 2022]

(a) momentum. **(b)** acceleration.

(c) kinetic energy. **(d)** velocity.

8. A body moving with constant speed in a circular path has

(a) Constant angular momentum **(b)** constant acceleration

(c) constant velocity **(d)** constant kinytic energy

9. A bomb is dropped by an aeroplane flying horizontally with a velocity $200\ km/hr$ and at a height of 980 m . At the time of dropping a bomb, the distance of the aeroplane from the target on the ground to hit directly is $(g = 9.8\ m/s^2)$ [MHT-CET 2021]

(a) $\frac{10^4}{9\sqrt{2}}$ **(b)** $\frac{10^4}{9}$ m

(c) $\frac{10^4}{18}$ m **(d)** $\frac{\sqrt{2}\times10^4}{9}$ m

10. A bomb is dropped from an aeroplane flying horizontally with a velocity 720 km/hr at an altitude of 980 m . The bomb will hit the ground after a time :

(a) 1 s **(b)** 7.2 s

(c) 14.15 s **(d)** 0.15 s

11. A man can thrown a stone 100 m away. The maximum height to which he can throw vertically is

(a) 200 m **(b)** 100 m

(c) 50 m **(d)** 25 m

12. A particle is performing U.C.M. along the circumference of a circle of diameter 50 cm with frequency 2 Hz . The acceleration of the particle in m/s^2 is[MHT-CET 2019]

(a) $2\pi^2$ **(b)** $4\pi^2$

(c) $8\pi^2$ **(d)** π^2

13. A particle is performing uniform circular motion in a horizontal plane. The angular acceleration of the particle is directed along [MHT-CET 2023]

(a) the radius towards the centre **(b)** the tangent to the circular path

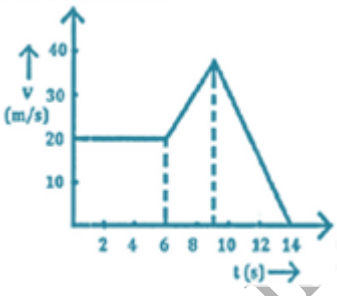
(c) the axis of rotation which is perpendicular to the plane of circle **(d)** the radius away from the centre

14. A shell fired at an angle of $30°$ to the horizontal with velocity 196 m/s . The time of flight is $\left[\sin 30° = \frac{1}{2} = \cos 60°\right]$ [MHT-CET 2022]

(a) 16.5 s **(b)** 6.5 s

(c) 10 s **(d)** 20 s

15. A velocity - time graph of a body is shown below. The distance covered by the body from 6 second to 9 second is

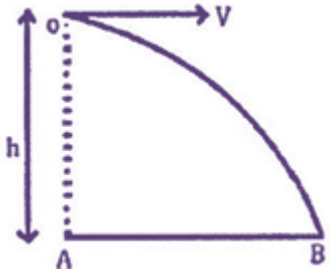


[MHT-CET 2024]

(a) 22.5 m **(b)** 90.0 m

(c) 120.0 m **(d)** 60.0 m

16. An aeroplane is flying in a horizontal direction with a velocity of 540 km/hr at a height of 1960 m . When it is vertically above the point A on the ground, a body is dropped from it. The body strikes the ground at point B . The distance AB is equal to ($g = 9.8$ m/s^2)



[MHT-CET 2022]

(a) 3600 m **(b)** 4000 m

(c) 2000 m **(d)** 3000 m

17. An object is projected at an angle of $45°$ with the horizontal. The horizontal range and maximum height reached will be in the ratio.

(a) 1:2 **(b)** 2:1

(c) 1:4 **(d)** 4:1

18. Angular velocity of hour hand of a watch is[MHT-CET 2005]

(a) $\frac{\pi}{43200}\text{rads}^{-1}$ **(b)** $\frac{\pi}{30}\text{rads}^{-1}$

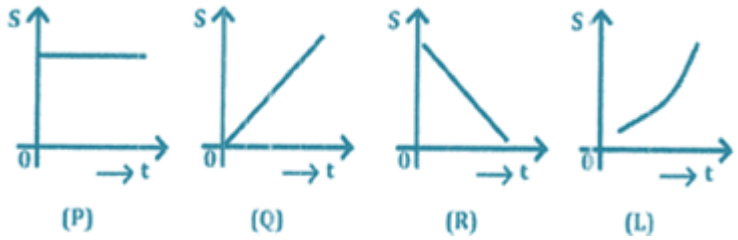
(c) $\frac{\pi}{21600}\text{rads}^{-1}$ **(d)** $\frac{\pi}{1800}\text{rads}^{-1}$

19. At certain place, the ratio of the frequencies of two simple pendulums is $3:2$. Then their lengths are in the ratio [MHT-CET 2023]

(a) $\frac{4}{9}$ **(b)** $\frac{9}{4}$

(c) $\frac{\sqrt{2}}{3}$ **(d)** $\frac{\sqrt{3}}{2}$

20. Figure shows four position-time graphs for the motion of a body. The body is moving with non-uniform velocity is represented correctly by s-t graph



[MHT-CET 2024]

(a) (Q) **(b)** (P)

(c) (L) **(d)** (R)

21. For a particle in uniform circular motion has [MHT-CET 2024]

(a) linear acceleration always along the axis of the circular path **(b)** linear velocity always tangential to the circular path, without change in its magnitude

(c) linear velocity always radial to the circular path, without change in its magnitude **(d)** linear acceleration always tangential to the circular path

22. For a projectile ratio of maximum height reached to the square of time of flight is $(\text{g} = 10\ \text{m/s}^2)$ [MHT-CET 2024]

(a) $10:1$ **(b)** $5:2$

(c) $5:4$ **(d)** $5:1$

23. For a projectile, the maximum height and horizontal range are same. The angle of projection ' θ ' of the projectile is [MHT-CET 2024]

(a) $\tan^{-1}(4)$ **(b)** $\tan^{-1}\left(\frac{1}{2}\right)$

(c) $\tan^{-1}(2)$ **(d)** $\tan^{-1}\left(\frac{1}{4}\right)$

24. For an object thrown at $45°$ to horizontal, the maximum height (H) and horizontal range (R) are related as

(a) $R = 16H$ **(b)** $R = 8H$

(c) $R = 4H$ **(d)** $R = 2H$

25. If $\vec{\text{A}} \cdot \vec{\text{B}} = AB$, then the angle between $\vec{\text{A}}$ and $\vec{\text{B}}$ is

(a) 0 ° **(b)** 45 °

(c) 90 ° **(d)** 180 °

26. If the angle of projection of a projectile is $30°$, then how many times the horizontal range is larger than the maximum height?

(a) 2 **(b)** 3

(c) $3\sqrt{4}$ **(d)** $4\sqrt{3}$

27. The angle of projection of a projectile for which the horizontal range and maximum height are equal is

(a) $\tan^{-1}(2)$ **(b)** $\tan^{-1}(4)$

(c) $\cot^{-1}(2)$ **(d)** $60°$

28. The equation of motion of a projectile is $y = 12x - \frac{3}{4}x^2$. The horizontal component of velocity is 3ms^{-1}. What is the range of the projectile?

(a) 18 m **(b)** 16 m

(c) 12 m **(d)** 21.6 m

29. The equation of the trajectory of a ball projected at an angle ' θ ' with the horizontal, is given as $y = \sqrt{3}x - \frac{gx^2}{2}$. The initial velocity of the ball is .

g = acceleration due to gravity

$\left[\begin{matrix}\sin 30° = 0.5 = \cos 60° \\ \cos 30° = \sqrt{3}/2 = \sin 60°\end{matrix}\right]$ [MHT-CET 2022]

(a) 3 m/s **(b)** 5 m/s

(c) 1 m/s **(d)** 2 m/s

30. The horizontal range of a projectile is $4\sqrt{3}$ times its maximum height. Its angle of projection will be

(a) $45°$ **(b)** $60°$

(c) $90°$ **(d)** $30°$

31. The position ' x ' of a particle varies with a time as $x = at^2 - bt^3$ where ' a ' and ' b ' are constants. The acceleration of the particle will be zero at time ' t ' is equal to [MHT-CET 2023]

(a) $\frac{2a}{3b}$ **(b)** zero

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

32. The ratio of the angular speed of the hour hand of a clock to that of its minute hand is[MHT-CET 2019]

(a) 3600: 1 **(b)** 1: 24

(c) 1: 12 **(d)** 12: 1

33. Three particles *A, B* and *C* are projected from the same point with the same initial speeds making angles $30°$, $45°$ and $60°$ respectively with the horizontally. Which of the following statements is correct?

(a) *A,B* and *C* have unequal ranges **(b)** Range of *A* and *C* are less than that of *B*

(c) Range of *A* and *C* are equal and greater than that of *B* **(d)** *A* ,*B* and *C* have equal ranges

34. Two balls A and B are projected at an angle of $45°$ and $60°$ respectively so that the maximum heights reached are same for both. The ratio of initial velocity of projection of the ball A to that for ball B is

$\left(\sin 45° = \cos 45° = \frac{1}{\sqrt{2}}, \sin 60° = \cos 30° = \frac{\sqrt{3}}{2}\right)$ [MHT-CET 2022]

(a) $\sqrt{2}:\sqrt{3}$ **(b)** $\sqrt{3}:\sqrt{2}$

(c) $\sqrt{3}:2$ **(d)** $2:\sqrt{3}$

35. Two bodies A and B are projected with same velocity. If bodies A and B are projected at an angle of $30°$ and $60°$ with the horizontal respectively, the ratio of maximum height reached by the body A to that of body B is

$\left(\sin 30° = \cos 60° = \frac{1}{2} \sin 60° = \cos 30° = \frac{\sqrt{3}}{2}\right)$ [MHT-CET 2021]

(a) 2: 1 **(b)** 3: 1

(c) 1: 2 **(d)** 1: 3

36. Two bodies are thrown up at angles of $45°$ and $60°$ with the horizontal respectively. If same vertical height is attained by both the bodies, then the ratio of velocities with which they are thrown is

$\left(\sin 45^\circ = \cos 45^\circ = \frac{1}{\sqrt{2}},\right)$
$\left(\sin 60^\circ = \cos 30^\circ = \frac{\sqrt{3}}{2}, \sin 30^\circ = \cos 60^\circ = \frac{1}{2}\right)$ [MHT-CET 2022]

(a) $\sqrt{\frac{3}{2}}$ **(b)** $\sqrt{\frac{2}{3}}$

(c) $\frac{2}{\sqrt{3}}$ **(d)** $\frac{\sqrt{3}}{2}$

37. Two projectiles A and B are projected with velocities $\sqrt{2}\,v$ and V respectively. They have the same range. If A is thrown at angle of 15° with the horizontal, the angle of projection of B with horizontal will be
$\left(\sin 30^\circ = \cos 60^\circ = \frac{1}{2}, \sin 90^\circ = \cos 0^\circ = 1\right)$ [MHT-CET 2022]

(a) 45° **(b)** 90°

(c) 60° **(d)** 30°

38. Two trains, each 30 m long are travelling in opposite directions with velocities $5\ \text{m/s}$ and $10\ \text{m/s}$. They will cross after [MHT-CET 2023]

(a) 3 s **(b)** 4 s

(c) 2 s **(d)** 1 s

39. Two vectors $\vec{A}$ and $\vec{B}$ are inclined to each other at an angle θ. Which of the following is the unit vector perpendicular to both $\vec{A}$ and $\vec{B}$?

(a) $\frac{\vec{A}\times\vec{B}}{\vec{A}\cdot\vec{B}}$ **(b)** $\frac{\hat{A}\cdot\hat{B}}{\sin\theta}$

(c) $\frac{\vec{A}\times\vec{B}}{AB\sin\theta}$ **(d)** $\frac{\hat{A}\times\hat{B}}{AB\cos\theta}$

40. What is the angular velocity of earth?

(a) $\frac{2\pi}{86400}\,\text{rad s}^{-1}$ **(b)** $\frac{2\pi}{3600}\,\text{rad s}^{-1}$

(c) $\frac{2\pi}{24}\,\text{rad s}^{-1}$l **(d)** $\frac{2\pi}{6400}\,\text{rad s}^{-1}$

41. What is the unit vector along $\hat{i}+\hat{j}$?

(a) $\frac{\hat{i}+\hat{j}}{\sqrt{2}}$ **(b)** $\sqrt{2}(\hat{i}+\hat{j})$

(c) $\hat{i}+\hat{j}$ **(d)** $\hat{k}$

42. Which one of the following statements is wrong? [MHT-CET 2023]

(a) A body can have zero velocity and still be accelerated.

(b) A body can have a constant velocity and still have a varying speed.

(c) The direction of the velocity of a body can change when its acceleration is constant.

(d) A body can have a constant speed and still have a varying velocity.

43. A stone is thrown at an angle θ to the horizontal reaches a maximum heights H. then the time of flight of stone will be

(a) $\sqrt{\frac{2H}{g}}$ **(b)** $2\sqrt{\frac{2H}{g}}$

(c) $\frac{2\sqrt{2H\sin\theta}}{g}$ **(d)** $\frac{\sqrt{2H\sin\theta}}{g}$

44. A stone thrown at an angle θ to the horizontal a projectile makes an angle $\pi/4$ with the horizontal, then its initial velocity and angle of projection are, respectively

(a) $\frac{\sqrt{2h\sin\theta}}{g}$ **(b)** $\frac{2\sqrt{2h\sin\theta}}{g}$

(c) $2\sqrt{\frac{2h}{g}}$ **(d)** $\sqrt{\frac{2h}{g}}$

45. An aeroplane flying horizontally with a speed of $360\ \text{kmh}^{-1}$ releases a bomb at a height of 490 m from the ground. When will the bomb strike the ground?

(a) 8 s **(b)** 6 s

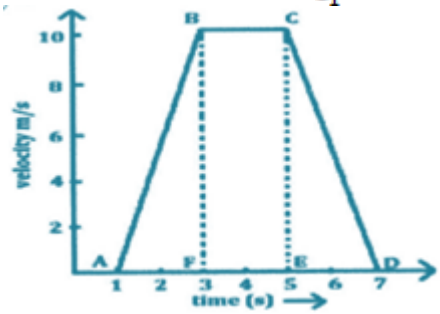
(c) 7 s **(d)** 10 s

46. At any instant, for a body performing uniform circular motion, velocity vector and acceleration vector are [MHT-CET 2022]

(a) make an angle of $45°$ with each other **(b)** in opposite direction

(c) normal to each other **(d)** along the same direction

47. For the velocity - time graph shown in the figure below, the distance covered by the body in last two second of its motion is ' S_1 '. What is the ratio of ' S_1 ' to the total distance covered by it



[MHT-CET 2024]

(a) $\frac{1}{2}$ **(b)** $\frac{1}{4}$

(c) $\frac{2}{3}$ **(d)** $\frac{1}{3}$

48. Given $\vec{A} = 4\hat{i} + 6\hat{j}$ and $\vec{B} = 2\hat{i} + 3\hat{j}$. Which of the following is correct?

(a) $\vec{A} \times \vec{B} = \vec{0}$ **(b)** $\vec{A} \cdot \vec{B} = 24$

(c) $\frac{|\vec{A}|}{|\vec{B}|} = \frac{1}{2}$ **(d)** $\vec{A}$ and $\vec{B}$ are anti-parallel

49. A pilot of mass 1 g is moving with an angular velocity of 1 rads^{-1} along a circle of radius 1 m the centrifugal force is

(a) 0.1 dyne **(b)** 12 dyne

(c) 10 dyne **(d)** 100 dyne

50. A particle is performing a uniform circular motion along a circle of radius ' R '. In half the period of revolution, its displacement and distance covered are respectively [MHT-CET 2022]

(a) $R, \pi R$ **(b)** 2R, 2πR

(c) $\sqrt{2R}, 2\pi R$ **(d)** $2R, \pi R$