PHYSICS

BOOKS - NEET PREVIOUS YEAR (YEARWISE + CHAPTERWISE)

MOTION IN TWO AND THREE DIMENSION

Others

1. The x and y coordinates of the particle at any time are $x = 5t - 2t^2$ and $y = 10t$ respectively, where x and y are in meters and t in seconds. The acceleration of the particle at t=2s is:

A. 0

B. $5m/s^2$

C. $-4m/s^2$

D. $-8m/s^2$

Answer: c

2. If the magnitude of sum of two vectors is equal to the magnitude of difference of the two vector, the angle between these Vector is
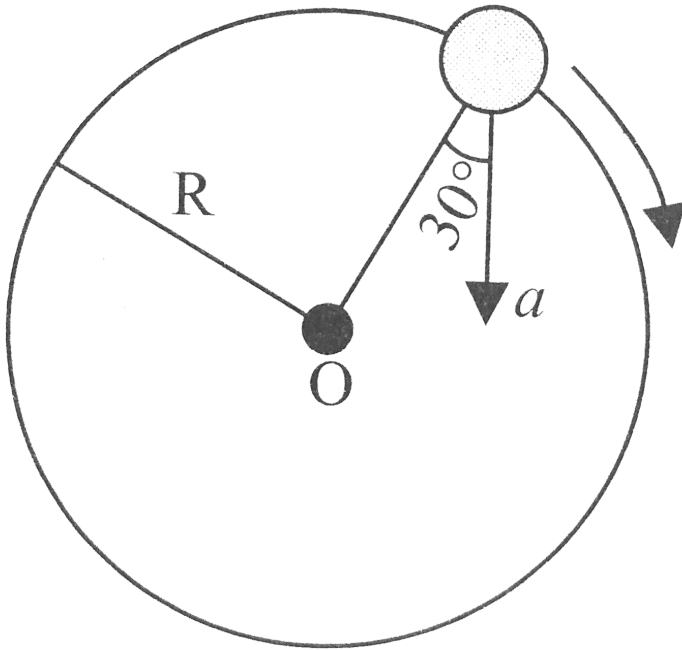
A. $90°$

B. $45°$

C. $108°$

D. $0°$

Answer: a

3. In the given figure, $a = 15m/s^2$ represents the total acceleration of a particle moving in the clockwise direction in a circle of radius $R = 2.5m$ at a given instant of time. The

speed of the particle is.

A. 4.5 m/s

B. 5.0 m/s

C. 5.7 m/s

D. 6.2 m/s

Answer: c

4. A ship A is moving Westwards with a speed of $10 kmh^{-1}$ and a ship B 100km South of A is moving northwards with a speed of $10 kmh^{-1}$. The time after which the distance between them shortest is

   A. 0h

   B. 5h

C. $5\sqrt{2}h$

D. $10\sqrt{2}h$

Answer: b

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5. Two particles, 1 and 2, move with constant velocities v_1 and v_2. At the initial moment their radius vectors are equal to r_1 and r_2. How must these four vectors be interrelated for the particles to collide?

A. $\dfrac{r_1 - r_2}{|r_1 - r_2|} = \dfrac{v_2 - v_1}{|v_2 - v_1|}$

B. $r_2 . v_1 = r_2 . r_2$

C. $r_1 \times v_1 = r_2 \times v_2$

D. $r_1 \times v_1 = v_1 - v_2$

Answer: a

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6. Two stone of masses m and $2m$ are whirled

in horizontal circles, the heavier one in a

radius $r/2$ and the lighter one in radius r. The

tangential speed of lighter stone is n times that of the value of heavier stone when the experience same centripetal forces. the value of n is

A. 2

B. 3

C. 4

D. 1

Answer: a

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7. The position vector of a particle $\overrightarrow{R}$ as a funtion of time is given by:

$$\overrightarrow{R} = 4\sin(2\pi t)\hat{i} + 4\cos(2\pi t)\hat{j}$$

Where R is in meters, t is in seconds and $\hat{i}$ and $\hat{j}$ denote until vectors along x-and y-directions, respectively Which one of the following statements is wrong for the motion of particle ?

A. Acceleraion is along -R

B. Magnitude of accleration vector is $\dfrac{v^2}{R}$.

where v in the velocity of particle is 8 m/s

C. path of the particle is a circle of radius 4 m

D.

Answer: c

8. a projectile is fired from the surface of the earth with a velocity of $5ms^{-1}$ and angle θ with the horizontal. Another projectile fired from another planet with a velocity of $3ms^{-1}$ at the same angle follows a trajectory which is identical with the trajectory of the projectile fired from the earth.The value of the acceleration due to gravity on the planet is in ms^{-2} is given $\left(g = 9.8ms^{-2}\right)$

   A. 3.5

   B. 5.9

C. 16.3

D. 110.8

Answer: a

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9. A particle is moving such that its position coordinates (x, y) are $(2m, 3m)$ at time $t = 0, (6m, 7m)$ at time $t = 2s$, and $(13m, 14m)$ at time $t = 5s$.

Average velocity vector $\left(\overrightarrow{V}_{av}\right)$ from $t = 0$ to $t = 5s$ is

A. $\dfrac{1}{5}\left(13\hat{i} + 14\hat{j}\right)$
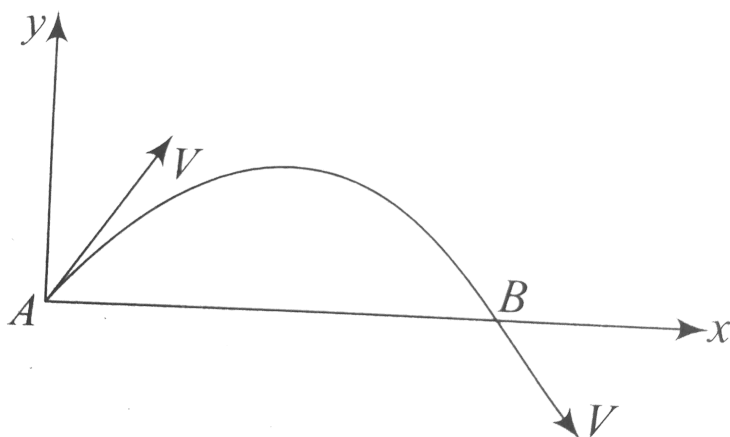
B. $\dfrac{7}{3}(i + j)$

C. $29\hat{i} + \hat{j}0$

D. $\dfrac{11}{56}(i + j)$

Answer: d

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10. The velocity of a projectile at the initial point A is $\left(2\hat{i} + 3\hat{j}\right)m/s$. Its velocity (in m/s) 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. $2\hat{i} + 3\hat{j}$

Answer: c

11. Find the angle of projection of a projectile for which the horizontal range and maximum height are equal.

A. $\theta = \tan^{-1}\left(\dfrac{1}{4}\right)$

B. $\theta = \tan^{-1}(4)$

C. $\theta = \tan^{-1}(2)$

D. $\theta = \tan 45°$

Answer: b

12. A missile is fired for maximum range with an initial velocity of $20m/s$. If $g = 10m/s^2$, the range of the missile is

A. 50 m

B. 60 m

C. 20 m

D. 40 m

Answer: d

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13. A particle has initial velocity $\left(3\hat{i} + 4\hat{j}\right)$ and has acceleration $\left(0.4\hat{i} + 0.3\hat{j}\right)$. Its speed after $10s$ is.
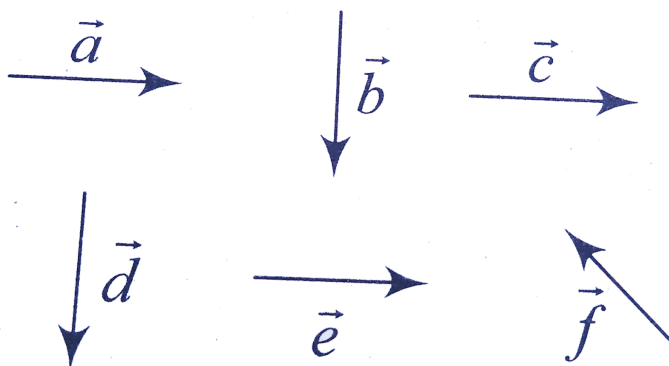
A. 7 unit

B. $7\sqrt{2}$

C. 8.5 unit

D. 10 unit

Answer: b

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14. Six vector $\overrightarrow{a}$ through $\overrightarrow{f}$ have the magnitudes and direction indicated in the figure. Which of the following statements is

true?

A. b = c =f

B. d = c =f

C. d =e =f

D. b = e =f

Answer: c

15. A particle of mass m is projected with velocity making an angle of $45°$ with the horizontal When the particle lands on the level ground the magnitude of the change in its momentum will be .

A. 2 mv

B. $\dfrac{mv}{\sqrt{2}}$

C. $mv\sqrt{2}$

D. zero

Answer: c

16. $\vec{A}$ and $\vec{B}$ are two Vectors and θ is the angle between them, if $\left| \vec{A} \times \vec{B} \right| = \sqrt{3}\left(\vec{A} \cdot \vec{B} \right)$ the value of θ is

A. $60°$

B. $45°$

C. $30°$

D. $90°$

Answer: a

17. A paricle starting from the origin (0,0) moves in a straight line in (x, y) plane. Its coordinates at a later time are $(\sqrt{3}, 3)$. The path of the particle makes with the x-axis an angle of

A. $30°$

B. $45°$

C. $60°$

D. $0°$

Answer: c

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18. A car runs at a constant speed on a circulat track of radius $100m$. Taking $62.8s$ for every circular lap. The average velocity and average speed for each circular lap respectively are :

A. 0,0

B. 0,10m/s

C. 10 m/s, 10 m/s

D. 10 m/s, 0

Answer: b

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19. For angles of projection of a projectile at

angle $(45° - \theta)$ and $(45° + \theta)$, the

horizontal ranges described by the projectile

are in the ratio of :

A. $1:1$

B. $2:3$

C. $1:2$

D. $2:1$

Answer: a

20. A stone tied to the end of string 1m long is whirled in a horizontal circle with a constant speed. If the stone makes 22 revolution in 44s, What is the magnitude and direction of acceleration of the ston is ?

A. $\dfrac{\pi^2}{4} ms^{-2}$ and direction along the radius towards the centre

B. $\pi^2 ms^{-2}$ and direction along the radius away from centre

C. $\pi^2 ms^{-2}$ and direction aloing the radius

from centre

D. $\pi^2 ms^{-2}$ and direction along the

tangent to the circle

Answer: c

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21. If a vector $2\hat{i} + 3\hat{j} + 8\hat{k}$ is perpendicular to

the vector $4\hat{j} - 4\hat{i} + \alpha\hat{k}$. Then the value of α

is

A. -1

B. $\dfrac{1}{2}$

C. $-\dfrac{1}{2}$

D. 1

Answer: c

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22. the circular motion of a particle with

constant speed is

A. Simple harmonic but not periodic

B. Periodic and simple harmonic

C. neither periodic nor simple harmonic

D. periodic but not simple harmonic

Answer: d

23. If $|A \times B| = \sqrt{3}A.B,$ then the value of

|A+B| is

A. $\left(A^2 + B^2 + AB\right)^{1/2}$

B. $\left(A^2 + B^2 + \dfrac{AB}{\sqrt{3}}\right)$

C. A = B

D. $\left(A^2 + B^2\sqrt{3}AB\right)^{1/2}$

Answer: a

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24. The vector sum of two forces is perpendicular to their vector differences. In

that case, the forces

A. are not equal to each other in magnitude

B. cannot be predicted

C. are equal to each other

D. are equal to each other in magnitude

Answer: d

25. A particle moves along a circle if radius (20 //pi) m with constant tangential acceleration. If the velocity of the particle is $80m/s$ at the end of the second revolution after motion has begun the tangential acceleration is .

A. $160\pi m/s^2$

B. $40\pi m/s^2$

C. $40\pi m/s^2$

D. $640\pi m/s^2$

Answer: b

26. A wheel of radius $1m$ rolls forward half a revolution on a horizontal ground. The magnitude of the displacement of the point of the wheel initially on contact with the ground is.

A. 2 m

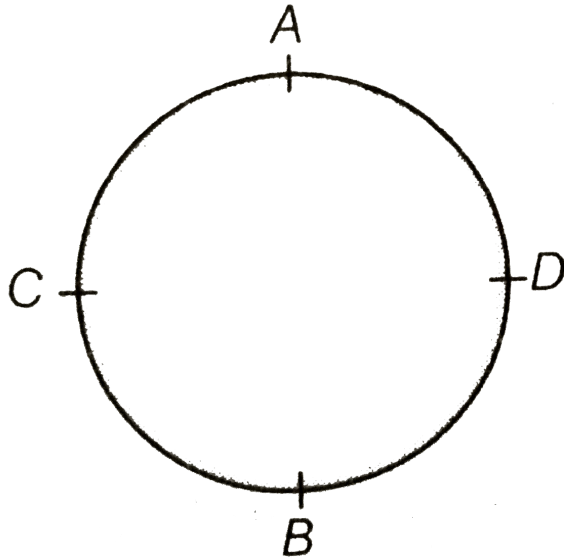B. $\sqrt{\pi^2 + 4}m$

C. πm

D. $\sqrt{\pi^2 + 2m}$)

Answer: b

27. A stone is attached to one end of a straing

and roteted in verticle cricle .If string breaks at

the position of maximum tension, will break at

A. A

B. B

C. C

D. D

Answer: b

28. Two particle are projected with same initial velocities at an angle $30°$ and $60°$ with the horizontal .Then

    A. their heights will be equal

    B. their height will be different

    C. their range of flight will be equal

    D. their ranges will be different

Answer: b

29. What is the value of linear velocity, if $\vec{\omega} = 3\hat{i} - 4\hat{j} + \hat{k}$ and $\vec{r} = 5\hat{i} - 6\hat{j} + 6\hat{k}$?

A. $6\hat{i} + 2\hat{j} - 3\hat{k}$

B. $-18\hat{i} - 13\hat{j} + 2\hat{k}$

C. $18\hat{i} - 13\hat{j} + 2\hat{k}$

D. $6\hat{i} - 2\hat{j} + 8\hat{k}$

Answer: \b

30. Person aiming to reach the exactly opposite point on the bank of a stream is swimming with a speed of $0.5ms^{-1}$ at an angle of $120°$ with the direction of flow of water.The speed of water in the stream is

A. 1.0m/s

B. 0.5m/s

C. 0.25m/s

D. 0.43m/s

Answer: c

31. If a unit vector is represented by

$0.5\hat{i} + 0.8\hat{j} + c\hat{k}$ the value of c is

A. 1

B. $\sqrt{0.11}$

C. $\sqrt{0.01}$

D. 0.39

Answer: b

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32. 9.8m/s

A. 10 m/s

B. 5.8m/s

C. 17.3m/s

D.

Answer: d

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33. A boat which has a speed of $5km$ per hour in still water crosses a river of width 1 km along the shortest possible path in fifteen minutes. The velocity of the river water in km per hour is :-

A. 5

B. 1

C. 3

D. 4

Answer: c

34. Find the torque of a force $\overrightarrow{F} = -3\hat{i} + \hat{j} + 5\hat{k}$ acting at the point $\overrightarrow{r} = 7\hat{i} + 3\hat{j} + \hat{k}$

A. $-21\hat{i} + 3\hat{j} + 5\hat{k}$

B. $-14\hat{i} + 3\hat{j} - 16\hat{k}$

C. $4\hat{i} + 4\hat{i} + 6\hat{k}$

D. $14\hat{i} - 38\hat{j} + 16\hat{k}$

Answer: d

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35. A body is whirled in a horizontal circle of radius $20cm$. It has an angular velocity of

$10 rad/s$. What is its linear velocity at any point on the circular path

A. $\sqrt{2}m/s$

B. 2 m/s

C. 10 m/s, 10 m/s

D. 20 m/s

Answer: b

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36. A bullet is fired from a gun eith a speed of 1000m/s on order to hit target 100 m away At what height above target should the gun be aimed ? (The resistance of air is negligible and g = 10 m/s^2)

   A. 5cm

   B. 10cm

   C. 15cm

   D. 20cm

Answer: a

37. The position vectors os a particle is $r = (a \cos \omega t)\hat{i} + (a\omega t)\hat{j}$. The velocity of particle is

A. directiont towards the origin

B. directionaway from the origin

C. parallelto the position vector

D. perpendicular to the position vector

Answer: d

38. Which one of the following is not the vector quantity?

A. Speed

B. Velocity

C. torque

D. Displaecment

Answer: a

39. The angles between the two vectors $\overrightarrow{A} = 3\hat{i} + 4\hat{j} + 5\hat{k}$ and $\overrightarrow{B} = 3\hat{i} + 4\hat{j} - 5\hat{k}$ will be

A. 0°

B. 45°

C. 90°

D. 180°

Answer: c

40. A boat crosses a river with a velocity of $8\dfrac{km}{h}$. If the resulting velocity of boat is $10\dfrac{km}{h}$ then the velocity of river water is

A. $12.8 kmh^{-1}$

B. $6 kmh^{-1}$

C. $8 kmh^{-1}$

D. $10 kmh^{-1}$

Answer: b

41. the resultant of A x 0 will be equal to

A. zero

B. A

C. Zero vector

D. unit vector

Answer: c

42. When milk is churned, cream gets separated due to

A. Centripetal force

B. Centrifugal force

C. friction force

D. Gravititional force

Answer: b

43. An electric fan has blades of length 30 cm neasured from the axis of rotation. If the fanrotating at 120 rev/min. the acceleration of a point on the tip if the blade is

A. $1600 ms^{-2}$

B. $47.4 ms^{-2}$

C. $23.7 ms^{-2}$

D. $50.55 ms^{-2}$

Answer: b

44. Two bodies of same mass are projected with the same velocity at an angle $30°$ and $60°$ respectively.The ration of their horizontal ranges will be

A. $1:1$

B. $1:2$

C. $1:3$

D. $2:\sqrt{2}$

Answer: a

45. The maximum range of a gun from horizontal terrain is $16km$. If $g = 10m/s^2$ what must be the muzzle velocity of the shell?

A. $160ms^{-1}$

B. $200\sqrt{2}ms^{-1}$

C. $400ms^{-1}$

D. $800ms^{-1}$

Answer: c

46. The angle between the vector $\vec{A}$ and $\vec{B}$ is θ. Find the value of triple product $\vec{A} \cdot \left(\vec{B} \times \vec{A} \right)$.

A. $A^2 B$

B. zero

C. $A^2 \sin \theta$

D. $A^2 B \cos \theta$

Answer: b

47. A bus is moving on a straight road towards north with a uniform speed of 50 $km/hour$ turns through $90°$. If the speed remains unchanged after turning, the increase in the velocity of bus in the turning process is

    A. 7007 km/h along South -West driection

    B. zero 50 km/h along West

C. 70.7 km/h along North -West direction

D.

Answer: a

48. The magnitude of vectors A, B and C are 3

4 and uints respectively. If A+ B =C , the angle

between A and B is

A. $\dfrac{\pi}{2}$

B. $\cos^{-1}(0.6)$

C. $\tan^{-1}\left(\dfrac{7}{5}\right)$

D. $\dfrac{\pi}{4}$

Answer: a

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