Single Correct Answer Type

| 1. | 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 |

| | 1 | | | |
|-----|--|--|---|--|
| | a) $\frac{r_2}{r_1}$ | b) $\sqrt{\frac{r_2}{r_1}}$ | c) $\left(\frac{r_1}{r_2}\right)^2$ | d) $\left(\frac{r_2}{r_1}\right)^2$ |
| 2. | A grass hopper finds that | he can jump a maximum h | orizontal distance of 1 m. V | Vith what speed can be |
| | travel along the path if he | e speeds a negligible time o | n the ground | • |
| | a) $9.8 \mathrm{ms}^{-1}$ | b) 4.42 ms^{-1} | c) 2.21 ms^{-1} | d) 3.13 ms ⁻¹ |
| 3. | A particle is kept at rest a | at the top of a sphere of dia | meter 42 <i>m</i> . When disturbe | ed slightly, it slides down. At |
| | what height h' from the l | bottom, the particle will lea | ive the sphere | |
| | a) 14 m | b) 28 m | c) 35 m | d) 7 <i>m</i> |
| 4. | In a bicycle the radius of | rear wheel is twice the rad | ius of front wheel. If r_f and | r_r are the radius, v_f and v_r |
| | are the speed of top most | points of wheel, then | , | |
| | a) $v_r = 2v_f$ | b) $v_f = 2v_r$ | c) $v_f = v_r$ | d) $v_f > v_r$ |
| 5. | A car is moving in a circu | lar horizontal track of radi | us 10 <i>m</i> with a constant spe | eed of 10 <i>m</i> /sec. A plumb |
| | bob is suspended from th | e roof of the car by a light | rigid rod of length 1.00 m. T | The angle made by the rod |
| | with track is | | | |
| | a) Zero | b) 30° | c) 45° | d) 60° |
| 6. | At the height 80 <i>m</i> , an ae | roplane is moving with 150 |) <i>m/s</i> . A bomb is dropped f | rom it so as to hit a target. |
| | At what distance from the | e target should be bomb be | e dropped (Given $g = 10 m$ | /s ²) |
| | a) 605.3 <i>m</i> | b) 600 <i>m</i> | c) 80 m | d) 230 m |
| 7. | When a ceiling fan is swit | tched off its angular velocit | y reduces to 50% while it r | nakes 36 rotations. How |
| | many more rotation will | it make before coming to re | est (Assume uniform angula | ar retardation) |
| | a) 18 | b) 12 | c) 36 | d) 48 |
| 8. | A particle moves with con | nstant angular velocity in c | ircular path of certain radiu | is and is acted upon by a |
| | certain centripetal force | F. If the angular velocity is | doubled keeping radius the | e same, the new force will be |
| | a) 2 <i>F</i> | b) <i>F</i> ² | c) 4 <i>F</i> | d) <i>F</i> /2 |
| 9. | A body moving along a ci | rcular path of radius R with | h velocity <i>v</i> , has centripetal | acceleration <i>a</i> . If its |
| | velocity is made equal to | 2v, then its centripetal acc | eleration is | a |
| | a) 4 <i>a</i> | b) 2a | c) $\frac{a}{4}$ | d) $\frac{a}{2}$ |
| 10 | The minimum velocity (i | n ms ^{-1}) with which a car d | 4 river must traverse a flat ci | urve of radius of 150 m and |
| 10. | coefficient of friction 0.6 | to avoid skidding is | | |
| | a) 60 | b) 30 | c) 15 | d) 25 |
| 11. | A cart is moving horizont | ally along a straight line w | ith constant speed 30 ms ^{-1} | A projectile is to be fired |
| | from the moving cart in such a way that it will return to the cart has moved 80 m. At what speed (relative | | | |
| | to the cart) must the proj | ectile be fired? (Take $g =$ | 10 ms^{-2}) | |
| | -) 10=1 | h $d = \sqrt{2}$ | 401 | d) None of the above |
| | a) 10 ms ⁻¹ | b) $10\sqrt{8}$ ms ⁻¹ | $\frac{c}{3}$ ms ⁻¹ | 2 |
| 12. | A ball thrown by a boy is | caught by another after 2 s | sec some distance away in t | the same level. If the angle |
| | of projection is 30°, the v | elocity of projection is | | |
| | a) 19.6 <i>m/s</i> | b) 9.8 <i>m/s</i> | c) 14.7 <i>m/s</i> | d) None of these |
| 13. | The maximum velocity (i | n ms^{-1}) with which a car c | lriver must traverse a flat c | urve of radius 150 <i>m</i> and |
| | coefficient of friction 0.6 | to avoid skidding is | | |
| | a) 60 | b) 30 | c) 15 | d) 25 |
| 14. | A car is moving in a circu | lar horizontal track of radi | us 10m with a constant spe | ed of 10 ms^{-1} . The angle |

| | made by the rod with trac | k is | | | |
|-----|--|-------------------------------------|---|--|--|
| | a) Zero | b) 30° | c) 45° | d) 60° | |
| 15. | An object of mass 2 <i>m</i> is p | rojected with a speed of 10 | 00 ms^{-1} at angle $\theta = \sin^{-1}$ | $\left(\frac{3}{5}\right)$ to the horizontal. At the | |
| | highest point, the object b | reaks into pieces of same r | nass <i>m</i> and the first one co | mes to rest. The distance | |
| | between the point of projection and the point of landing of the bigger piece (in metre) is (given, $g =$ | | | | |
| | 10 IIIS^{-} | አ) 1200 | a) 1440 | 4) 060 | |
| 16 | On the centre of a friction | less table a small hole is m | c) 1440 ade through which a weigh | u) 700 otless string of length 21 is | |
| 10. | inserted. On the two ends | of the string two halls of th | ne same mass <i>m</i> are attach | ed. Arrangement is made in | |
| | such a way that half of the | string is on the table top a | ind half is hanging below. T | 'he ball on the table top is | |
| | made to move in a circular path with a constant speed v . What is the centripetal acceleration of the | | | | |
| | moving ball | | - | | |
| | a) <i>mvl</i> | b) <i>g</i> | c) Zero | d) 2 <i>mvl</i> | |
| 17. | A 2 kg stone at the end of | a string 1 <i>m</i> long is whirle | d in a vertical circle at a co | nstant speed. The speed of | |
| | the stone is $4 m/sec$. The | tension in the string will be | e 52 <i>N</i> , when the stone is | | |
| | a) At the top of the circle | | b) At the bottom of the cir | rcle | |
| 10 | c) Halfway down | | d) None of the above | | |
| 18. | A body of mass $\sqrt{3}$ kg is su | ispended by a string from a | a rigid support. The body is | s pulled horizontally by a | |
| | 10 rce F until the string match 10GeV | h 0 0 N 0 0 N | c) 9.8 N 19.6 N | d) 196 N 98 N | |
| 19. | One end of a string of len | gth l is connected to a par | ticle of mass <i>m</i> and other | to a small neg on a smooth | |
| 171 | horizontal table. If the pa | article moves in a circle v | with speed v , the net force | e on the particle (directed | |
| | towards the centre) is | | 1 / | 1 (| |
| | a) T | b) $T = \frac{mv^2}{mv^2}$ | c) $T \pm \frac{mv^2}{mv^2}$ | d) zero | |
| 0.0 | | | | | |
| 20. | A projectile is thrown in the value 147 ms^{-1} Then | he upward direction making | lg an angle of 60° with the | norizontal direction with | |
| | a) 25 s | b) 10.98 s | c) 5.49 s | d) 2745 s | |
| 21. | A particle describes a hori | zontal circle in a conical fu | nnel whose inner surface i | s smooth with speed of | |
| | 0.5 m/s. What is the height | nt of the plane of circle from | n vertex of the funnel | | |
| | a) 0.25 <i>cm</i> | b) 2 <i>cm</i> | c) 4 <i>cm</i> | d) 2.5 <i>cm</i> | |
| 22. | A projectile is projected w | ith a speed u making an a | ngle 2 $	heta$ with the horizontal | . What is the speed when | |
| | its direction of motion ma | kes an angle θ with the ho | rizontal | | |
| | a) $(u\cos 2\theta)/2$ | b) $u \cos \theta$ | c) $u(2\cos\theta - \sec\theta)$ | d) $u(\cos\theta - \sec\theta)$ | |
| 23. | For motion in a plane with | n constant acceleration a, in | nitial velocity \overline{v}_0 and final v | relocity \vec{v} after time t , we | |
| | have $\vec{x} = \vec{x} + \vec{x}$ | 24) | $(h) \stackrel{\rightarrow}{\rightarrow} \stackrel{\rightarrow}{\rightarrow} - t^2$ | | |
| | a) $\vec{v} \cdot (\vec{v} - at) = \vec{v}_0 \cdot (\vec{v}_0 + at)$ | (,) | b) $V. V_0 = at^2$ | | |
| 24 | The average acceleration $v_0 t$ | vector for a particle having | $u_{0}v_{0}v_{0} - a v_{0}v_{0}$ | is | |
| | a) A constant vector of magnitude v^2/r | | | | |
| | b) A vector of magnitude v^2/r directed normal to the plane of the given uniform circular motion | | | | |
| | c) Equal to the instantane | ous acceleration vector at | the start of the motion | | |
| | d) A null vector | | | | |
| 25. | An aeroplane is flying with a uniform speed of $100 m/s$ along a circular path of radius $100 m$. the angular | | | | |
| | speed of the aeroplane wi | ll be | | | |
| 0.1 | a) 1 rad/sec | b) 2 rad/sec | c) 3 rad/sec | d) 4 rad/sec | |
| 26. | An arrow is shot into air. I | ts range is 200 <i>m</i> and its ti | me of flight is $5s$. If $g = 10$ | m/s^2 , then the horizontal | |
| | component of velocity of t a) $125 m/s$ | ne arrow is b) $25 m/s$ | c) $31.25 m/c$ | d) $40 m/s$ | |
| 0.7 | aj 12.5 <i>IIL/S</i> | | C_{J} 51.25 m/s | | |

| | where <i>PR</i> equals | | | | |
|-----|---|---|---|---|--|
| | $P \qquad R \qquad Q$ | | | | |
| | | | | | |
| | ↓ ↓ | | | | |
| | 6 N 4 N | | | | |
| | a) (2/5) <i>R Q</i> | b) (3/5) <i>R Q</i> | c) (2/3)R Q | d) (1/2) <i>R Q</i> | |
| 28. | Two particles A and B are | projected with same speed | d so that ratio of their maxin | mum heights reached is | |
| | 3:1. If the speed of A is do | oubled without altering oth | er parameters, the ratio of I | horizontal ranges attained | |
| | by <i>A</i> and <i>B</i> is | | | | |
| | a) 1:1 | b) 2:1 | c) 4:1 | d) 3:2 | |
| 29. | A monkey can jump a max | kimum horizontal distance | of 20 m. Then the velocity of | of the monkey is | |
| | a) 10 ms^{-1} | b) 14 ms ⁻¹ | c) 20 ms^{-1} | d) 24 ms ⁻¹ | |
| 30. | A body can throw a stone | up to a maximum height of | f 10 <i>m</i> . The maximum horizo | ontal distance that the boy | |
| | can throw the same stone | up to will be | | 5 | |
| | a) $20\sqrt{2}m$ | b) 10m | c) $10\sqrt{2}m$ | d) 20 <i>m</i> | |
| 31. | Given $\vec{P} \cdot \vec{O} = 0$ then $ \vec{P} $ | $\times \vec{0}$ is | , | , | |
| - | | h Zoro | റി 1 | | |
| ~~ | | | | a) \sqrt{PQ} | |
| 32. | An object is being weighe | d on a spring balance movi | ng around a curve of radius | $100 \text{ m at a speed } 7 \text{ ms}^{-1}$. | |
| | The object has a weight of | f 60 kg-wt. The reading reg | istered on the spring balan | ce would be | |
| ~~ | a) 60.075 kg-wt | b) 60.125 kg-wt | c) 60.175 kg-wt | d) 60.225 kg-wt | |
| 33. | Two projectiles A and B a | re thrown with velocities <i>v</i> | $\frac{1}{2}$ and $\frac{1}{2}$ respectively. They have | ave the same range. If <i>B</i> is | |
| | thrown at an angle of 15° to the horizontal, a must have been thrown at an angle | | | | |
| | a) $\sin^{-1}\left(\frac{1}{2}\right)$ | h) $\sin^{-1} \begin{pmatrix} 1 \\ - \end{pmatrix}$ | () $2 \sin^{-1} \left(\frac{1}{-} \right)$ | d) $\frac{1}{-\sin^{-1}(\frac{1}{-1})}$ | |
| | (16) | (4) | (4) | 2^{311} (8) | |
| 34. | An electric fan has blades | of length 30 cm as measur | ed from the axis of rotation | . If the fan is rotating at | |
| | 1200 r. p. m.The accelerat | tion of a point on the tip of | the blade is about | 2 | |
| | a) 1600 <i>m</i> / sec ² | b) 4740 <i>m</i> / sec ² | c) 2370 m/\sec^2 | d) 5055 m/\sec^2 | |
| 35. | If the angle of projection of | of a projectile is 30°, then h | ow many times the horizon | tal range is larger than the | |
| | maximum height? | | . – | . – | |
| | a) 2 | b) 3 | c) 3√4 | d) 4√3 | |
| 36. | A scooter is going round a | a circular road of radius 10 | 0 m at a speed of $10 m/s$. T | he angular speed of the | |
| | scooter will be | | | | |
| | a) 0.01 <i>rad/s</i> | b) 0.1 <i>rad/s</i> | c) 1 rad/s | d) 10 <i>rad/s</i> | |
| 37. | An aeroplane is flying hor | izontally with a velocity of | 600 km/h and at a height o | if 1960 m. When it is | |
| | vertically above a point A | on the ground a bomb is re | eleased from it. The bomb s | trikes the ground at point | |
| | <i>B</i> . The distance <i>AB</i> is | | | | |
| 00 | a) 1200 m | b) 0.33 km | c) 333.3 km \rightarrow \rightarrow | d) 3.33 km \rightarrow | |
| 38 | The vector which can give | e unit vector along <i>x</i> -axis w | $A = 2\hat{i} - 4\hat{j} + 7k, B = 7\hat{i}$ | i + 2j - 5k and $C = -4i + 3k$ | |
| | $7\hat{j} + 3\hat{k}$ is | | _ | | |
| | a) 4î + 5ĵ + 5k | b) –5î – 5ĵ + 5k | c) $-4\hat{i} - 5\hat{j} - 5\hat{k}$ | d) 4î – 5ĵ + 5k | |
| 39. | Given that A and B are gro | eater than 1. The magnitud | e of $(\vec{A} \times \vec{B})$ can not be | | |
| | a) equal to AB | b) less than <i>AB</i> | c) more than <i>AB</i> | d) equal to A/B | |
| 40. | Given $\vec{R} = \vec{A} + \vec{B}$ and $R =$ | A = B. The angle between | \vec{A} and \vec{B} is | | |
| | a) 60° | b) 90° | c) 120° | d) 180° | |
| 41. | body of mass 1 kg tied to one end of string is revolved in a horizontal circle of radius 0.1 m with a speed | | | | |
| | of 3 <i>revolution/sec</i> , assuming the effect of gravity is negligible, then linear velocity, acceleration and | | | | |
| | tension in the string will b | De | | | |
| | a) 1.88 <i>m/s</i> , 35.5 <i>m/s</i> ² , 35 | 5.5 N | b) 2.88 <i>m/s</i> , 45.5 <i>m/s</i> ² , 45 | .5 N | |
| | c) 3.88 m/s, 55.5m/s ² , 55.5 N | | d) None of these | | |

| 42. | A body of mass <i>m</i> is moving in a circle of radius <i>r</i> with a constant speed <i>v</i> . The force on the body is $\frac{mv^2}{r}$ and | | | | |
|-----|---|--------------------------------------|---|--|--|
| | is directed towards the centre. What is the work done by this force in moving the body over half the | | | | |
| | circumference of the circl | le | | | |
| | a) $\frac{mv^2}{mv} \times \pi r$ | b) Zero | c) $\frac{mv^2}{mv^2}$ | d) $\frac{\pi r^2}{\pi r^2}$ | |
| | r | | r^2 | mv^2 | |
| 43. | A particle describes a horizontal circle in a conical funnel whose inner surface is smooth with speed of | | | | |
| | 0.5 ms^{-1} . What is the height of the plane of circle from vertex of the funnel? | | | | |
| | a) 0.25 cm | b) 2 cm | c) 4 cm | d) 2.5 cm | |
| 44. | 4. A stone of mass <i>m</i> is tied to a string and is moved in a vertical circle of radius <i>r</i> making <i>n</i> revolutions | | | | |
| | <i>minute</i> . The total tension | i in the string when the stor | ne is at its lowest point is | | |
| | a) <i>mg</i> | | b) $m(g + \pi n r^2)$ | | |
| | c) $m(g + \pi nr)$ | | d) $m\{g + (\pi^2 n^2 r)/900\}$ | | |
| 45. | The resultant of two vectors of magnitudes 2A and $\sqrt{2}A$ acting at an angle θ is $\sqrt{10}A$. The correct value of | | | $\sqrt{10}A$. The correct value of θ | |
| | is | | | | |
| | a) 30° | b) 45° | c) 60° | d) 90° | |
| 46. | A projectile fired with init | tial velocity <i>u</i> at some angle | e θ has a range <i>R</i> . If the init | ial velocity be doubled at | |
| | the same angle off projection, then the range will be | | | | |
| | a) 2 <i>R</i> | b) <i>R</i> /2 | c) <i>R</i> | d) 4 <i>R</i> | |
| 47 | A helicopter is flying hori | zontally at an altitude of 2 | km with a speed of 100 ms | ⁻¹ . A packet is dropped | |
| | from it. The horizontal distance between the point where the packet is dropped and the point where it hit | | | | |
| | the ground is $(g = 10 \text{ ms})$ | ⁻²) | | | |
| | a) 2 km | b) 0.2 km | c) 20 km | d) 4 km | |
| 48 | A bullet is fired with a velocity u making an angle of 60° with the horizontal plane. The horizontal | | | ne. The horizontal | |
| | component of the velocity of the bullet when it reaches the maximum height is | | | | |
| | a) <i>u</i> | b) 0 | c) $\frac{\sqrt{3u}}{2}$ | d) <i>u</i> /2 | |
| 49. | A body of mass 0.4 kg is whirled in a vertical circle making $2 rev/sec$. If the radius of the circle is $2 m$. | | | dius of the circle is 2 <i>m</i> , | |
| | then tension in the string when the body is at the top of the circle, is | | | | |
| | a) 41.56 <i>N</i> | b) 89.86 <i>N</i> | c) 109.86 <i>N</i> | d) 115.86 <i>N</i> | |
| 50. | A stone is tied to one end | of a string 50 <i>cm</i> long is wi | hirled in a horizontal circle | with a constant speed. If | |
| | the stone makes 10 revolutions in 20 s, what is the magnitude of acceleration of the stone | | | | |
| | a) 493 <i>cm/s</i> ² | b) 720 <i>cm/s</i> ² | c) 860 <i>cm/s</i> ² | d) 990 <i>cm/s</i> ² | |
| | | | | | |