

MIC : Roll No 247,250,260

1 section A : Roll No 250

1. A stone of mass 1 kg is thrown with a velocity of 20 ms^{-1} across the frozen surface of lake and it comes to rest after traveling a distance of 50 m. What is the magnitude of the force motion of the stone ?
 - A. 1 N
 - B. 2 N
 - C. 3 N
 - D. 4 N
2. Find the acceleration of 2 kg block.
 - A. 2.5 m/s^2
 - B. 5 m/s^2
 - C. 7.5 m/s^2
 - D. 10 m/s^2
3. The linear momentum p of a body is given by $p = Ay + Bv$ where y be mass and v be velocity then dimensions of AB are —
 - A. $[M^1 L^1 T^{-1}]$
 - B. $[M^1 L^1 T^{-2}]$
 - C. $[M^0 L^1 T^{-1}]$
 - D. $[M^0 L^1 T^{-2}]$
4. A body is moving with uniform acceleration describes 40 m in the first 5 sec and 65 m in next 5 sec. Its initial velocity will be
 - A. 4 m/s
 - B. 2.5 m/s^2
 - C. 5.5 m/s^2
 - D. 11 m/s
5. Two balls A and B made from same material have masses in the ratio 1 : 2 respectively. If they are set in motion on the ground with same initial velocity, the minimum stopping distance
 - A. is smaller for ball A
 - B. is smaller for ball B
 - C. is same for both the balls
 - D. may be any of the above case depending upon the value of μ
6. Three masses of 1 kg, 6 kg and 3 kg are connected to each other with threads and are placed on a table as shown in figure. What is the acceleration with which the system is moving?
(take, $g = 10 \text{ ms}^{-1}$)
 - A. zero
 - B. 2 ms^{-2}
 - C. 4 ms^{-2}
 - D. 3 ms^{-2}

7. A ball is thrown from a cliff with speed v along three different directions; vertically upwards, horizontally and vertically downwards. The speed on reaching ground will be maximum when it is thrown
- vertically upwards
 - vertically downwards
 - horizontally
 - same in all the three cases
8. The numerical ratio of displacement to the distance covered is always
- less than one
 - equal to one
 - equal to or less than one
 - equal to or greater than one
9. A body moves with initial velocity 10 ms^{-1} . If it covers a distance of 20 m in acceleration of the body is
- 20 ms^{-1}
 - $20\sqrt{2} \text{ ms}^{-1}$
 - 40 ms^{-1}
 - $10\sqrt{2} \text{ ms}^{-1}$
10. A ball is projected with an initial velocity of 40 ms at an angle of 60° with the horizontal. Find its speed when its direction of motion makes 45° with the horizontal
- 20 ms^{-1}
 - $20\sqrt{2} \text{ ms}^{-1}$
 - 40 ms^{-1}
 - $10\sqrt{2} \text{ ms}^{-1}$
11. Total work done by all the forces is equal to change in its kinetic energy
- Only if the forces acting on it are conservative in nature
 - Always
 - Only if friction is not acting
 - Only if external force is not doing any work
12. A block of mass 10 kg is suspended by three strings as shown in the figure. The extension t_2 is
- 100 N
 - $\frac{100}{\sqrt{3}} \text{ N}$
 - $\sqrt{3} \times 100 \text{ N}$
 - $50\sqrt{3} \text{ N}$
13. It is given to us that $\vec{A} = 2\vec{i} + 3\vec{j} + 4\vec{k}$ and $\vec{B} = 6\vec{i} + 7\vec{j} + 8\vec{k}$. Find the value of $\vec{A} \cdot \vec{B}$
- 25 units
 - 45 units
 - 65 units
 - 85 units
14. A particle starts from rest, accelerates at 2 m/s^2 for 10s and then goes with constant speed for 30s and then decelerates at 4 ms^{-2} till it stops. What is the distance traveled by it?

- A. 750 m
 - B. 800 m
 - C. 700 m
 - D. 850 m
15. Find the net force on 1kg block in lift moving upwards with 10 m/s
- A. 5 N
 - B. 10N
 - C. 20
 - D. Zero
16. A ball is thrown vertically downward with a velocity of 20 m/s from the top of a tower. It hits the ground after some time with a velocity of 80 m/s The height of the tower is:
(Take, $g = 10 \text{ m/s}^2$)
- A. 340 m
 - B. 320 m
 - C. 300 m
 - D. 360 m

2 section B: Roll No 247

17. A man leaves his house for a cycle ride. He comes back to his house after half-an-hour covering a distance of one kilometer. What is his average velocity for the ride?
- A. $\frac{1}{2} \text{ kmh}^{-1}$
 - B. 10 kmh^{-1}
 - C. zero
 - D. 2 kmh^{-1}
18. If a car covers $2/5^{th}$ of the total distance With v_1 speed and $3/5^{th}$ distance with v_2 then average speed is.
- A. $\frac{1}{2} \sqrt{v_1 v_2}$
 - B. $\frac{v_1 + v_2}{2}$
 - C. $\frac{2v_1 v_2}{v_1 + v_2}$
 - D. $\frac{5v_1 v_2}{3v_1 + 2v_2}$
19. A ball is thrown with 100 m/s . Find ratio of distance travelled in 5^{th} and 6^{th} seconds of motion.
- A. 9 : 11
 - B. 11 : 9
 - C. 2 : 3
 - D. 3 : 2
20. 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. $\frac{g}{5}$
21. Which of these statements are correct?
 (I) Work done by conservative forces in a round trip is zero.
 (II) Kinematical equations are Valid if acceleration is constant.
 (III) Vector addition is commutative.
 (IV) Total mechanical energy of a system is always conserved.
 A. I, II and III only
 B. I, II and IV only
 C. II and IV only
 D. I, II, III and IV only
22. A string of mass $2kg$ is attached to a block Of mass $10kg$. Find the tension in string of half of its length.
 A. $11N$
 B. $22N$
 C. $33N$
 D. $44N$
23. $5 \mu A =$
 A. $0.005mA$
 B. $5000nA$
 C. *both(A)and(B)*
 D. $5000A$
24. A body is moving on a circular path with constant angular velocity. If it takes 1.57 seconds to complete one revolution then the angular velocity will be
 A. $1rad/sec$
 B. $2rad/sec$
 C. $3rad/sec$
 D. $4rad/sec$
25. A car travelling at $108kmh^{-1}$ has its speed reduced to $36kmh^{-1}$ after travelling a distance of $200m$. The time taken for this progress is
 A. $10sec$
 B. $5sec$
 C. $15sec$
 D. $20sec$
26. Find F such that the block of mass $1kg$ is in equilibrium.
 A. $4N$
 B. $6N$
 C. $8N$
 D. $10N$
27. A ball is projected vertically upwards With an initial velocity of $10ms^{-1}$ from the top of a tower Of height $40m$. Find of the average speed for its entire motion.

- A. $10ms^{-1}$
 B. $12.5ms^{-1}$
 C. $25ms^{-1}$
 D. $5ms^{-1}$
28. If all the surfaces are smooth, then find the contact force between $2kg$ and $3kg$.
 A. $10N$
 B. $15N$
 C. *Zero*
 D. $25N$
29. Find tension (T) in the string as shown in figure
 A. $5N$
 B. $10N$
 C. $15N$
 D. $20N$
30. A ball is dropped from a tower. It is observed that the distance covered by it in 1^{st} three seconds is equal to the distance covered by it in the last second. Find the height of the tower.
 A. $80m$
 B. $125m$
 C. $180m$
 D. $245m$
31. $\vec{p} = 2\vec{i} + 4\vec{j} + 9\vec{k}$
 $\vec{Q} = 3\vec{i} + a\vec{j} - 6\vec{k}$
 If \vec{P} is perpendicular to Q then find the value of ' a '.
 A. 3
 B. 6
 C. 9
 D. 12
32. A body of mass $60kg$ suspended by means of three strings. P , Q and R as shown in the figure is in equilibrium. The tension in the string P is
 A. $1039N$
 B. $2039N$
 C. $3039N$
 D. $4039N$

3 section C : Roll No 260

33. Dimension of pressure x linear momentum are
 A. $[M^1L^2T^{-2}]$
 B. $[M^2L^1T^{-2}]$
 C. $[M^2L^0T^{-3}]$

- D. $[M^{-1}L^{-1}T^{-2}]$
34. What determines the nature of the path followed by the particle
- Speed*
 - Velocity*
 - Acceleration*
 - Both(B)and(c)*
35. A bullet moving with velocity 100 ms⁻¹ hits a wooden block. It is observed that it penetrates the block by 90 cm till its velocity gets halved. Find the distance further perpetrated assuming that the block offers uniform resistance through its length.
- 60cm
 - 45cm
 - 30cm
 - 20cm
36. A ball is thrown downwards at 10 m/s from a cleft or height 175 m. Find time required to reach ground. ($Take g = 10m/s^2$)
- 4s
 - 5s
 - 6s
 - 7s
37. A stone is dropped from a height h. It hits the ground with a certain momentum P. If the same stone is dropped from a height 100% more than the previous height, the momentum when it hits the ground will change by:
- 68%
 - 41%
 - 200%
 - 100%
38. Find the acceleration of the system?
- $\frac{g}{6}$
 - $\frac{g}{3}$
 - $\frac{2g}{3}$
 - $\frac{g}{4}$
39. Identify the correct statement related to the graph?
- The body is speeding up as the velocity and acceleration are in same direction
 - The body is slowing down as the velocity and acceleration are in opposite direction
 - The body is speeding up as the velocity and acceleration are in opposite direction
 - The body is slowing down as the velocity and acceleration are in same direction
40. Find the ratio of tensions in both the strings.
- 5 : 8
 - 2 : 3
 - 3 : 4

- D. 1 : 1
41. Find the speed of block of mass 1 kg when it reaches ground from top of a smooth wedge as shown x in figure.
- $5m/s$
 - $10m/s$
 - $15m/s$
 - $20m/s$
42. A 150 m long train is moving with a uniform velocity of 45 km/hr. The time taken by the train to cross a bridge of length 850 m is
- 56sec
 - 68sec
 - 80sec
 - 92sec
43. Which of the following equation is physically incorrect but dimensionally correct?
- $v^2 = u^2 + as$
 - $v^2 = u^2 + 2as$
 - $v = u + at$
 - $s = ut + \frac{1}{2}at^2$
44. Find the time after which the heavier block hits the ground.
- 6seconds
 - 12seconds
 - 18seconds
 - 24seconds
45. If a body is moving on a curve —
- I. There is no force acting on the body if it is moving with constant speed.*
- II. Whenever speed is constant there is no acceleration. Hence there is no force.*
- Statement I and II both are correct
 - Statement I is correct and II is wrong
 - Statement I is wrong and II is correct
 - Statement I and II both are incorrect
46. A ball is projected from ground level at an angle 37° with respect to the horizontal with a speed of 50 ms⁻¹. Find the horizontal distance covered by it when it hits the ground.
- 120m
 - 240m
 - 360m
 - 480m
47. If the frequency of a motor
- 60 pi rad/sec
 - 120 pi rad/sec

- C. $180 \pi \text{ rad/sec}$
D. $240 \pi \text{ rad/sec}$
48. If the equation of trajectory of a particle is given by $y = x\sqrt{3} - \left(\frac{x^2}{20}\right)$ Calculate the range of the
- A. $20m$
B. $20\sqrt{3}m$
C. $10\sqrt{3}m$
D. $10m$
49. Find the acceleration of 5 kg mass.
- A. $\frac{g}{2}$
B. $\frac{g}{4}$
C. $\frac{g}{8}$
D. The system will not move
50. A ball is dropped from a tower of height 80 m and another one is projected vertically from the base of the tower with 40 ms^{-1} . Find the time at which they will meet.
- A. 1 sec
B. 2 sec
C. 4 sec
D. 3 sec