Mu'tah University
Medical Physics Exam

Note: $g = 10\ \text{m/s}^2$.

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1. If r is the radius of a circle, what is $[r]$?

(a) T (b) L (c) L^2 (d) M

2. If $\vec{A} = 3\hat{i} - 4\hat{j}$, $\vec{B} = 2\hat{i} + 3\hat{j}$, and $\vec{C} = \hat{i} + 2\hat{j}$, what is the angle that the vector $-\vec{A} - \vec{B} + \vec{C}$ makes with the positive x-axis?

(a) 143° (b) 323° (c) 36.9° (d) 233°

3. A particle undergoes two consecutive (متتالية) displacements: 10 m south and 5 m northeast (شمال الشرق). What is the magnitude of its resultant displacement in m?

(a) 11.2 (b) 14.0 (c) 21.4 (d) 7.37

4. An object moves along the x axis according to the equation $x(t) = (-t^2 + 3t + 2)$ m. What is the instantaneous speed (in m/s) at $t = 2$ s?

(a) 2 (b) 1 (c) −1 (d) −2

5. A particle travels in the positive x direction with a constant velocity of 4 m/s. It then accelerates uniformly at 2 m/s^2 in a time interval of 5 s. What is its average velocity (in m/s) during that time interval?

(a) 9 (b) 14 (c) 2 (d) 4

6. A particle is traveling at a speed of 4 m/s and comes to rest after undergoing a constant negative acceleration for 40 m. How long (in s) does it take the particle to come to rest?

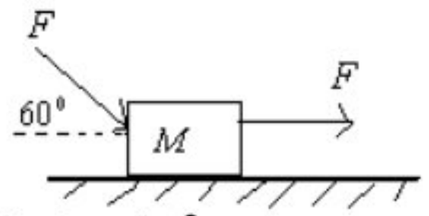
(a) 10 (b) 8 (c) 5 (d) 20

7. A ball is thrown vertically upward from the ground with an initial speed of 3 m/s. How long (in s) does it take the ball to reach its maximum height?

(a) 0.7 (b) 0.5 (c) 0.3 (d) 0.9

8. The horizontal surface on which the block slides (ينزلق) is frictionless.

If the F= 10N and M =5kg, what is the magnitude of the resulting acceleration of the block?



(a) 6 m/ s^2 (b) 6.2 m/ s^2 (c) 5.3 m/ s^2 (d) 3 m/ s^2

9. Two forces $\vec{F}_1 = 3\hat{x} - 5\hat{y}$ and $\vec{F}_2 = 2\hat{x} + \hat{y}$ act on a 1.5 kg body , the magnitude and direction of the acceleration are

(a) 6.4 m/s^2,42^0 (b) -4.2 m/s^2,38.7^0 (c) 4.28 m/s^2,-38.7^0 (d) 6.4 m/s^2,-42^0

10. A 2.0-kg particle has an initial velocity of $(5\hat{x} - 4\hat{y})$ m/s. Some time later, its velocity is $7\hat{x} + 3\hat{y}$ m/s. How much work was done by the resultant force during this time interval, assuming no energy is lost in the process?

(a) 17 J (b) 49 J (c) 19 J (d) 53 J

11. A 4-kg object is lifted vertically through a distance of 10 m by a rope with a tension of 60 N. If the object starts from rest, its final speed (in m/s) is

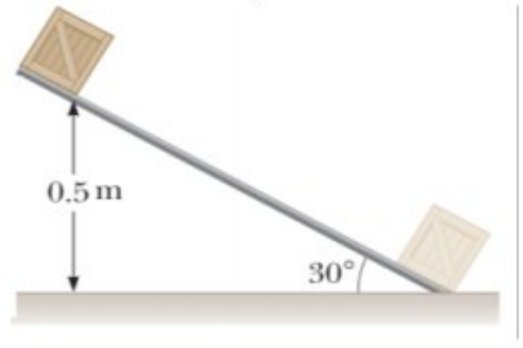
(a) 17.3 (b) 14.1 (c) 10 (d) 22.

12. A 6.0-kg block is released from rest 80m above the ground. When it has fallen 60m its kinetic energy is

(a) 4000 J (b) 3600 J (c) 1200 J (d) 120 J

13. A 3-kg box slides down an inclined plane from rest. The box experiences a constant friction force of magnitude 5 N. The speed of the box at the bottom of the ramp (in m/s) equals.

a) 0.8 b) 2.6 c) 1.8 d) 3.1



14. A constant force of 12 N in the positive x direction acts on a 4.0-kg object as it moves from the origin to the point $(6\hat{\mathbf{i}} - 8\hat{\mathbf{j}})$ m. How much work is done by the given force during this displacement?

(a) 72 J (b) 84 J (c) 60 J (d) 76 J

15. In the figure below, find the force F (in N) such that the system remains in equilibrium.

(a) 50 (b) 30 (c) 90 (d) 70