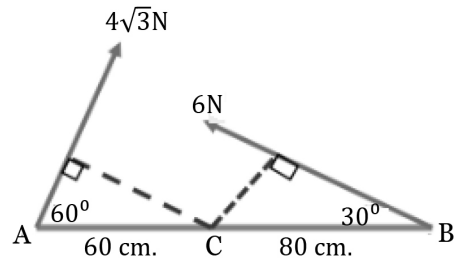


Applied math – Model 1

1. The $\vec{F} = 3\vec{i} - 5\vec{j}$ acts at the point $A(-1,1)$, then the moment of \vec{F} about the origin = ...
 a) $-8\vec{k}$ b) $-2\vec{k}$ c) $8\vec{k}$ d) $2\vec{k}$

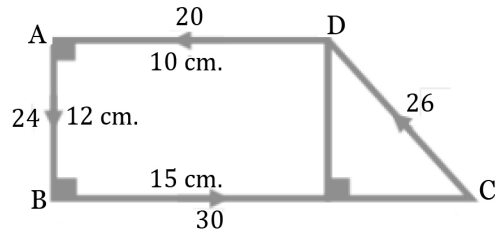
2. A Train with mass 40 ton moves with velocity 72 km/h, then the momentum of the train = ... Ton .m /sec
 a) 8 b) 80 c) 800 d) 2880

3. In the opposite figure
 The Sum of moments of the given forces about the point C is ... newton. cm
 a) -120 b) 120
 c) 240 d) -240



4. A body of mass 2 kg. is acted upon by the two forces $\vec{F}_1 = 4\vec{i} + 2\vec{j}$, $\vec{F}_2 = -\vec{i} + \vec{j}$, measured in newton, then magnitude of its acceleration = ... m/sec²
 a) 3 b) $\frac{3}{\sqrt{2}}$ c) $3\sqrt{2}$ d) $5\sqrt{2}$

5. In the opposite figure
 $ABCD$ is a trapezium,
 The set of forces acting a shown are equivalent
 a couple the magnitude of moment = ... kg . wt. cm
 a) 24 b) 48
 c) 300 d) 600



6. A body moves in a straight line whose position vector $\vec{x} = \left(\frac{3t-2}{t+1}\right)\vec{c}$, then its displacement vector $\vec{s} = \dots$
 a) $\frac{3t-2}{t+1}$
 b) $\frac{3t}{t+1}$
 c) $\frac{5t}{t+1}$
 d) $\frac{3t+2}{t+1}$

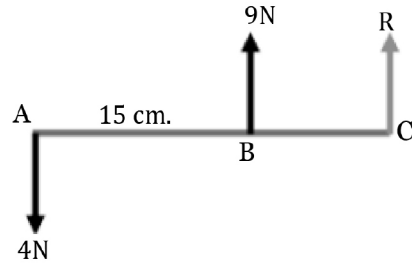
7. A body moving in a straight line and the algebraic measure to its displacement vector at any moment is determined by the relation $S = 24.5 t - 4.9 t^2$, then the motion acceleration at $t \in \dots$

- a) $]2.5, \infty[$ b) $[2.5, \infty[$ c) $[0, 2.5[$ d) $]0, 2.5[$

8. In the opposite Figure

Two opposite forces with magnitudes 4 and 9 newton acts at A and B respectively where $AB = 15 \text{ cm}$, if their resultant acts at C , then $AC = \dots$

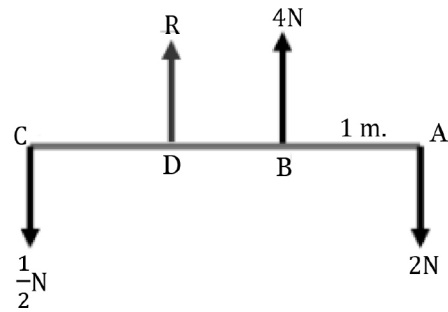
- a) 17 b) 27
c) 40 d) 40.8



9. In the opposite Figure

$AB = 1 \text{ m}$, $AC = 3 \text{ m}$, if their resultant acts at D , then $AD = \dots \text{ m}$

- a) $\frac{5}{2}$
b) $\frac{5}{4}$
c) $\frac{5}{3}$
d) $\frac{5}{6}$



10. A body of mass $m \text{ Kg}$ under the effect of forces $\vec{F}_1 = 3m\vec{i}$, $\vec{f}_2 = -m\vec{i} + 2m\vec{j}$, then magnitude of its acceleration = \dots unit

- a) $\sqrt{2}$
b) $2\sqrt{2}$
c) $3\sqrt{2}$
d) $7\sqrt{2}$

11. A force \vec{F} acts at the point $A(-3, 2)$, if the moment of \vec{F} about the two points $B(3, 1)$, $C(-1, 4)$ equals $-14\vec{k}$, then $\vec{F} = \dots$

- a) $(0, 3)$
b) $(-1, 7)$
c) $(-4, 3)$
d) $(7, 6)$

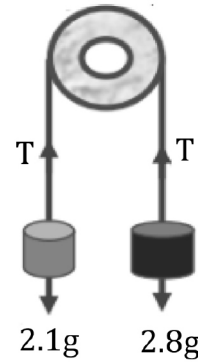
12. A force \vec{F} acts on a body of mass 1 kg moves from rest in a straight line starting from the origin O, if $f = 5x + 6$ where X is its distance from 0 measured in meter, f in newton, then its velocity when $r = 4$ m is ... m/sec

- a) $8\sqrt{2}$ b) $-8\sqrt{2}$ c) $\pm 2\sqrt{8}$ d) $\pm 8\sqrt{2}$

13. If $\vec{F}_1 = 3\vec{i} - b\vec{j}$, $\vec{F}_2 = a\vec{i} - 5\vec{j}$ form a couple, then $a - b = \dots$

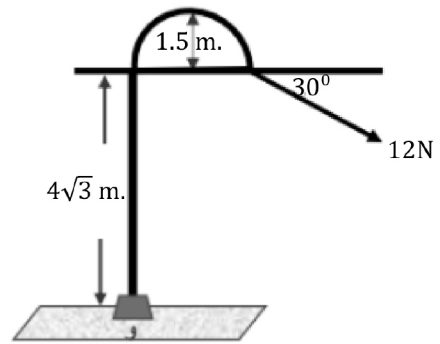
- a) 1 b) 2 c) 3 d) 4

14. In the opposite Figure two masses 2.8 kg. and 2.1 kg. are attached to the ends of a rope Passing over a smooth pulley such that the two masses are on the same horizontal positions as shown, if the masses are left to move then the vertical distance between them after 2 seconds equal ... m



- a) 6.5 b) 5
c) 5.6 d) 6

15. In the opposite figure The magnitude of the moment of the force shown about the point O equal ... newton. m.



- a) 30
b) 90
c) 120
d) 190

16. A force of magnitude 160 kg. wt. acts on a rest body of mass 500 grams for 0.1 sec., if the body were at rest, then its velocity at the end of the interval = ... m/sec

- a) 300 b) 313.6 c) 340 d) 345

17. A uniform ladder of weight $40 \text{ kg} \cdot \text{wt}$, rests with one end on a smooth vertical wall and its other end on a rough horizontal ground, so that it makes an angle of measure 45° with the horizontal. A boy of weight $40 \text{ kg} \cdot \text{wt}$. ascends the ladder so that the ladder is about to slide when he covered $\frac{3}{4}$ of the ladder's length, then the coefficient of static friction between the ladder and the horizontal ground, = ...

- a) $\frac{5}{8}$ b) $\frac{5}{16}$ c) $\frac{1}{3}$ d) $\frac{1}{2}$

18. A car of mass 2 Tons moving on a horizontal road with uniform velocity of magnitude 108 km/h . against a resistance equivalent to $150 \text{ kg} \cdot \text{wt}$. per each ton of its mass, then the power of the engine = ... horses.

- a) 100 b) 110 c) 120 d) 130

Essay Questions

19. A car moves with velocity 72 km/h , if the brake of magnitude 10 newton is For every kg of the car's mass is applied to stop the car, find the distance Covered till it Comes to rest.

20. In the given Figure

Two couples acted on a uniform rod \overline{AB} of length 90 cm . Find magnitude of f which make the rod in equilibrium.