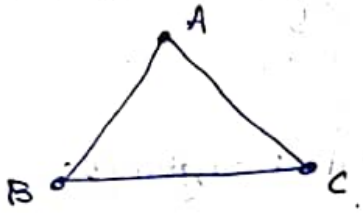
Q.(1) The theorm which deals with three con-current Forces and Follows tringle law is →

(a) Lami's Theorm (b) varginon Theorm (c) Parallegram Law (d) tringle law

Q.(2) The Reference Figure is a _____ Truss

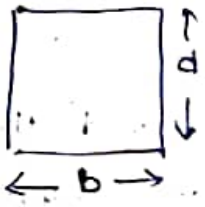


(a) Perfect
(b) Redudant
(c) Deficient
(d) NONE

Q.(3) All moments are not _____ But all couples are _____

(a) couple, moments, (b) moment, couple (c) Forces, moments (d) NONE

Q.(4) The c.G of a Rectungwar section



(a) $x_c = 0$, $Y_c = b/2$ (b) $x_c = b/2$ $Y_c = d/2$

(c) $x_c = d/2$, $Y_c = b/2$ (d) $x_c = b$, $Y_c = d$

Q.(5) Frictional Force generally depend upon →

(a) Area of contact (b) Roughness of surface (c) Both

(d) NONE

(6) A set of Force when Replaced by a single Force which gives same effect as the set of Force is called →

(a) Resultant (b) composition (c) sum of Forces (d) NONE

(7) What is the unit of moment of inertia ?

(a) mm^4 (b) cm^2 (c) m^2 (d) mm^2

(8) Find the velocity of the particle at $t = 1$ min and displacement is given by $t^2 + 2t + 2$

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

(9) For a plastic impact what is the value of co-efficient of Restitution ?

(a) $e = 1$ (b) $e = 2$ (c) $e = 0$ (d) $e = 5$

(10) A ball falls freely from a vertical height (h) what is the value of velocity of the ball ?

(a) 0 (b) $\sqrt{2gh}$ (c) $\sqrt{2ag}$ (d) $\sqrt{2}$

(11) Work done by a conservative force is _____ of the path ?

(a) dependent (b) independent (c) NONE (d) Followed

(12) Find the time of ascent of a particle when it projected at an angle of 90° and velocity = 5 m/sec

(a) $6/g$ (b) $5/g$ (c) g (d) 0

(13) A car intially at Rest But it moves at a velocity of 10 m/s at a time interval of 10 secon Find the acceleration ?

(a) 10 (b) 1 (c) 3 (d) 2

Q.(1) The Force system when they passes through a common point is called ?

(a) Parallel (b) similar (c) con-current (d) co-linear

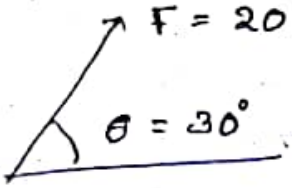
Q.(2) The Force can be transmitted anywhere along it's line of action is the theorm of →

(a) Lami's (b) Varignons (c) Transmisibility (d) NONE

Q.(3) A body is said to be in static equilibrium if it satisfies the following condition's ?

(a) $\Sigma F_x = 0$ (b) $\Sigma F_y = 0$ (c) $\Sigma M = 0$ (d) All

Q.(4)



Find the vertical component of the Force ?

(a) 10 N (b) 30 N (c) 40 N (d) NONE

Q(5) A body is in the table having weight 10 N. Due to the surface of contact there is Friction and co-effcient of Friction is 0.3. When a horizintal Force of 20 N is applied Find the Frictional Force

(a) 3 N (b) 4N (c) 0 (d) 6 N

Q.(6) Dynamic Friction is always _____ than static Friction ?

(a) more (b) less (c) same (d) NONE

Q.(7) The C.G of a square section having each side b, is written as

(a) $x_c = y_c = a$ (b) $x_c = y_c = a/2$ (c) $x_c = 0, y_c = a/2$ (d) NONE

Q.(8) The theorm which can be written as $I_{zz} = I_{xx} + I_{yy}$ is called as →

(a) Parallel axis Theorm (b) Perpendicular axis Theor

(c) Both (d) NONE

Q.(9) A car intially starts from Rest moves a distance of 100 m in 10 second attained a velocity of 5 m/s Find the accelaration of the car ?

(a) $1/8$ m/s^2 (b) 8 m/s^2 (c) 0.8 m/s^2 (d) 8.1 m/s^2

Q.(10) What are the methods to Analyze and Solve the problems of truss ?

(a) method of Force (b) Resolution (c) method of Joint

(d) All

Q.(11) The two mass system having $m_1 = 10$ kg and $m_2 = 5$ kg. They have equal kinetic energy Find the Ratio of linear momentum ?

(a) 2 (b) $\sqrt{2}$ (c) $1/2$ (d) 2.2

(12) In the concept of virtual work The Summation of $\Sigma V.W$ =

(a) 0 (b) 1 (c) 2 (d) NONE

---

(13) The displacement equation is given by $x = t^3 - 60t$ Find the Force applied on a system whose mass is 5 kg at a time of 10 secon

(a) 400 (b) 300 (c) 100 (d) 500

---

(14) Find the energy stored in a spring where the spring stiffness is 10N/m and deflection is 10 meter?

(a) 400 (b) 300 (c) 100 (d) 500

---

(15) For a elastic colision what is the value of co-effcient of Restitution ?

(a) 0 (b) 1 (c) 2 (d) 3

Q.(1) In order to determine the effect of force on a body we must know H's →

(a) magnitude (b) direction (c) point of application (d) All

Q.(2) If the Resultant of two Forces P and Q acting at an angle (α) with P then

(a) $\tan\alpha = \frac{P\sin\theta}{P+Q\cos\epsilon}$ (b) $\tan\alpha = \frac{P\cos\theta}{P+Q\cos\epsilon}$ (c) $\tan\alpha = \frac{Q\sin\theta}{P+Q\cos\epsilon}$

(d) $\tan\alpha = \frac{Q\cos\theta}{P+Q\cos\epsilon}$

Q.(3) Find the value of the Resultant when two Forces of 10N and 20N acting at an angle of 60°

(a) $\sqrt{500}$ (b) 0 (c) $\sqrt{700}$ (d) $\sqrt{425}$

Q.(4) If the arm of a couple is doubled, Then H's moment will

(a) Same (b) Double (c) half (d) NONE

Q.(5) Lami's Theorm is applicable only For →

(a) co-Planner Forces (b) Parallel Forces

(c) concurrent forces (d) Any Forces

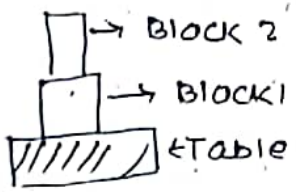
Q.(6) The Moment of inertia of a circular section of diameter (d) is given by

(a) $\frac{\pi d^4}{64}$ (b) $\frac{\pi d^3}{32}$ (c) $\frac{\pi d^4}{32}$ (d) $\frac{\pi d^4}{96}$

Q.(7) Theorm of perpendicular axis is used in in obtaining the moment of inertia of →

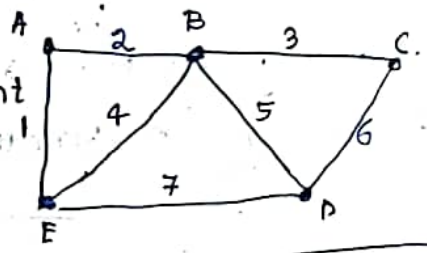
(a) Square (b) Rectangle (c) Triangle (d) Circle

Q.(8) In the Following figure how many Frictional Force are there?



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

Q.(9) Check whether the truss is satisfied the equation and what is it's type?



(a) Perfect (b) Redudant (c) Deficient

(d) NONE

Q.(10) The Relationship $s = ut + \frac{1}{2}at^2$ is applicable to bodies which have →

(a) uniFoom accelration (b) uniFoom velocity (c) a & b

(d) uniFoom displacement

Q.(11) The maximum height of a projectile on a horizintal range is given by

(a) $\frac{u^2 \sin 2\alpha}{2g}$ (b) $\frac{u^2 \sin\alpha}{2g}$ (c) $\frac{u^2 \sin^2\alpha}{2g}$ (d) $\frac{u^2 \sin^2 2\alpha}{2g}$

Q.(12) TWO bodies having masses 10 kg and 20 kg moves with velocity 5 m/sec and 10 m/sec after colision Both masses combines and moves with velocity V, Find the value of V ?

(a) $\frac{3}{25}$ (b) 25 (c) $\frac{25}{3}$ (d) $\frac{25}{4}$

Q(13) The Rate of change of momentum of a body is equal to

(a) applied Force (b) moment (c) velocity (d) NON

Q.(14). During a plastic impact what is/ are conserved ?

(a) Kinetic energy (b) Momentum (c) Both (d) NON

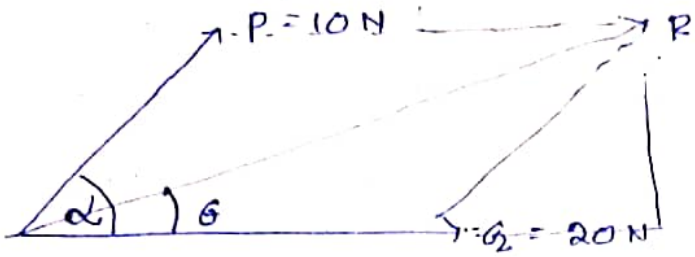
Q.(15) Work done by a Force acting on a Particle is equal to the →

(a) change in power (b) change in energy

(c) change in kinetic energy (d) 0

(Q) Two Forces of 10 and 20 N acts on a body at an angle of 90° Find the Resultant of the Two Force System?

Ans →



we know using Parallegram Law

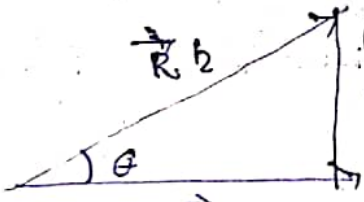
$$R = \sqrt{P^2 + Q^2 + 2PQ\cos\alpha}$$

here $P = 10\ N$, $Q = 20\ N$, $\alpha = 90°$

$$= \sqrt{10^2 + 20^2 + 2\times10\times20\times\cos 90°}$$

$$= \sqrt{100 + 400 + 0} = \sqrt{500}\ \text{Newton}$$

(Q) Find the angle (θ) in the above diagram



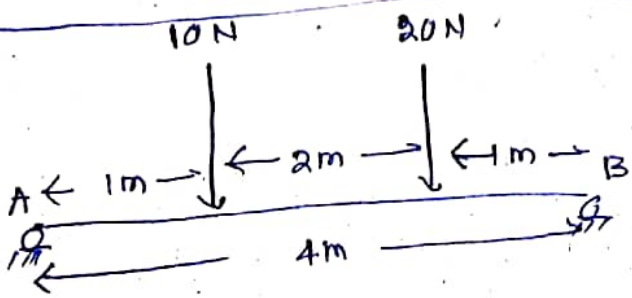
$$\tan\theta = \frac{P}{b}$$

$$\tan\theta = \frac{P\sin\alpha}{Q + P\cos\alpha}$$

$$\Rightarrow \tan\theta = \frac{10\times\sin 90°}{20 + 10\cos 90°} = \frac{10\times1}{20+0} = \frac{10}{20}$$

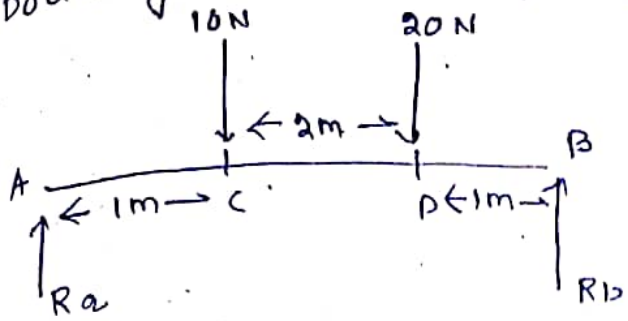
$$\Rightarrow \tan\theta = 1/2 \Rightarrow \theta = \tan^{-1}(0.5) =$$

(Q)



Find the value of Reaction at A and B and also the Resultant of the sys

Drawing the F.B.D of the Bar



we know

Σ upward Force = Σ Downward Force

$$R_a + R_b = 10 + 20 = 30 \quad \ldots (1)$$

considering Moment at point A we get

$$\Sigma M_A = 0$$

$$R_b \times 4 = 10 \times 1 + 20 \times 3$$

$$R_b \times 4 = 20 + 60 \Rightarrow R_b = \frac{80}{4} = 20\ N$$

$$R_a + R_b = 30\ N$$

$$\Rightarrow R_a = 30 - R_b = 30 - 20 = 10\ N$$

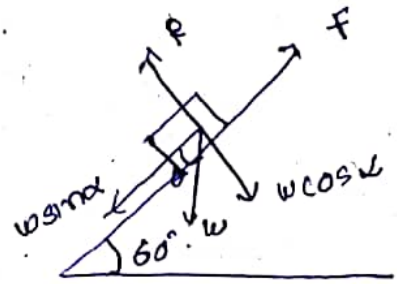
Resultant is the sum of all the forces

$$= 10 + 20 - (R_a + R_b) = 30 - (20 + 10)$$

$$= 30 - 30 = 0$$

---

(2) If a body of weight 200 N is moving in a inclined plane without any external Force the angle of inclination is 60°. Find the co-effcient of Friction ?



$\Sigma Y = 0 \quad R = w\cos\alpha$

$= 200 \cos 60°$

$\Sigma x = 0$

$F = w\sin\alpha$

$\downarrow$

$\mu \times R = w\sin\alpha \Rightarrow \mu = \frac{w\sin\alpha}{w\cos\alpha} = \tan\alpha = \tan 60°$

... a car initially at Rest, But moves at a velocity of 20 m/s at a time interval of 20 second. Find the acceleration of the car.

Ans → $u = 0$ $t = 20$ second

$v = 20$ m/s

we know $v = u + at$

$20 = 0 + a \times 20$

$\Rightarrow a = \frac{20}{20} = 1$ m/s2

(Q) If the displacement of a particle is given by the equation $x = 2t^2 + 4t + 2$

Find the value of velocity and acceleration after 2 minutes ?

Ans → here displacement is given so we have

$$x = 2t^2 + 4t + 2$$

The velocity $v = \frac{dx}{dt} = \frac{d}{dt}(2t^2 + 4t + 2)$

$$= 2\frac{d}{dt}t^2 + 4 \times \frac{dt}{dt} + \frac{d}{dt}(2)$$

$$= 2 \times 2t + 4 \times 1 + 0 = 4t + 4 \Big]_{t=2}$$

$$= 4 \times 2 + 4 = 12 \text{ m/s}$$

acceleration $a = \frac{dv}{dt}$

$$= \frac{d}{dt}(4t + 4) = 4 \times \frac{dt}{dt} + \frac{d}{dt}(4)$$

$$= 4 \times 1 + 0$$

$$= 4 \text{ m/s}^2$$

(4) consider two blocks having equal masses of 10 kg. initially block 1 is at rest but block 2 is moving at a speed of 4 m/s. after at a point both block collide and moves with a single (equal) velocity Find that velocity ?

Ans → $m_1 = 10\ kg, \quad m_2 = 10\ kg$

$u_1 = 0 \qquad u_2 = 4\ m/s$

using conservation of momentum we can write

$$m_1 u_1 + m_2 u_2 = (m_1 + m_2) \times v$$

$$10 \times 0 + 10 \times 4 = (10+10) \times v$$

$$40 = 20 \times v \implies v = \frac{40}{20} = 2\ m/sec$$