MECHANICS

1. The resultant of two forces P and Q acting at a pt is R. If Q be doubled, R is doubled and if Q is reversed , R is again doubled. Show $P:Q:R::\sqrt{2}:\sqrt{3}:\sqrt{2}$.

2. A body of mass 26kg is suspended by two strings 5 cm and 12 cm long, their other ends being fastened to the extremities of a rod 13 cm long. If the rod be so held that the body hangs immediately below the middle point , find the tensions of the strings.

3. A ring of weight W which can slide freely on the smooth vertical circle is supported by a string attached to the highest pt. If the thread subtends an angle θ at the center, find the tension, reaction of the circle on the ring.

4. A block of weight W =200kg is placed on the weighing machine. A force F = 50 kg is applied at $\theta = 30^{\circ}$. What will the weighing machine read?

5. Find the NASC of the equilibrium of a number of coplanar concurrent forces.

6. A string ABCD is suspended from two fixed pts A and D. It carries weight of 30 kg and W kg recp at two pts B and C on it. The inclination to the vertical of AB is 30° and that of CD is 60° , the angle BCD being . Find W and the tension in the different parts of the string.

7. A light string of length l is fastened to two pts A and B at the same level at distance 'a' apart. A ring of weight W can slide on the string and horizontal force P

Is applied to it s.t. it is in equilibrium vertically below B. Show that

P = $\dfrac{aW}{l}$ and tension of the string is $\dfrac{W\left(l^{2}+a^{2}\right)}{2l^{2}}$.