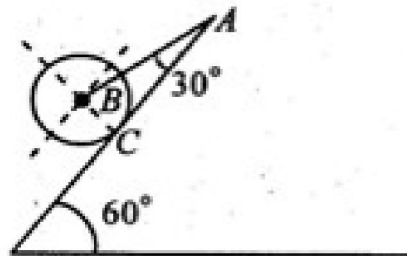


(2)

2. (a) What is transmissibility of forces ? 2
(b) Determine the resultant of two like parallel forces analytically. 5
(c) State and prove the law of parallel axis theorem. 7
3. (a) State various types of support used on a beam. 2
(b) Prove that it is better to pull than to push while moving an object. 5
(c) A roller weighing 3 kN and lying on a smooth inclined plane of inclination 45° to the horizontal is prevented from rolling down the inclined plane by a string as shown in the figure. Find the tension of the string AB and the reaction at C . 7



(3)

4. (a) What is angle of Repose ? 2
(b) A body weighing 20 kN resting on a rough horizontal plane can just be moved by a horizontal force 5 kN. Determine the co-efficient of friction and the total reaction. 5
(c) A uniform ladder of length 10 m and weighing 20 kN is placed against a smooth vertical wall with its lower end 8 m from the wall. In this position, the ladder is just to slip. Determine (i) the coefficient of friction between the ladder and the floor and (ii) the frictional force acting on the ladder at the point of contact between the ladder and the floor. 7
5. (a) What do you mean by moment of moment of area ? 2
(b) Determine the centroid of a T-section having the dimensions: Flange = 150 mm \times 10 mm.
Web = 290 mm \times 10 mm. 5
(c) Prove that for a rectangular beam section

$$I_{xx} = \frac{bd^3}{12}$$

where b and d are breadth and depth of the section. 7