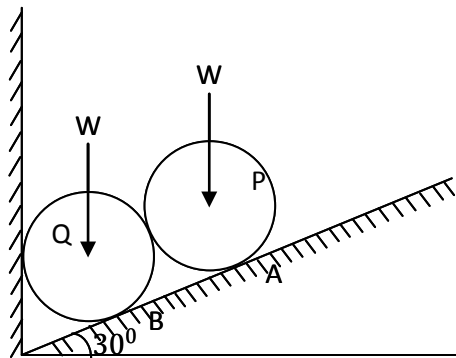
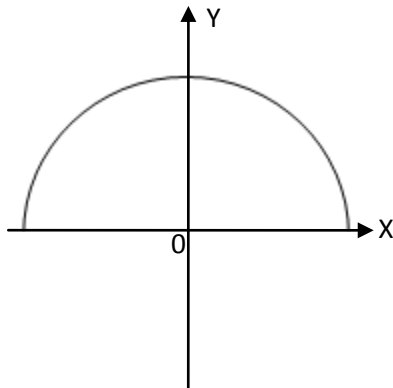


Answer any FIVE questions
All questions carry equal marks

- 1 Two identical rollers P and Q each of weight w are supported by an inclined plane and a vertical wall as shown in the figure. Assume all surfaces to be smooth and draw the free body diagrams of roller P and roller Q respectively.

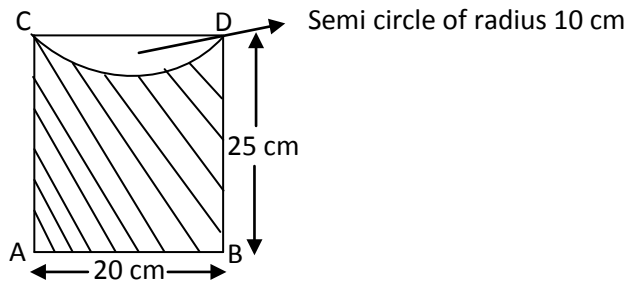


- 2 A body of weight 70 N is placed on a rough horizontal plane to just move the body on the horizontal plane a push of 20 N inclined at 20° to the horizontal plane is required. Find the coefficient of friction.
- 3 Two parallel shafts 6 m apart are to be connected by a belt running over pulleys of diameters 60 cm and 40 cm respectively. Determine the length of the belt required if the belt is open and if the belt is crossed.
- 4 Determine the centre of gravity of a semi-circle of radius R as shown in the following figure. Consider the strip parallel to Y-axis.



Contd. in Page 2

- 5 Find the moment of inertia of the area shown shaded in the following figure about edge AB.



- 6 A wheel rotating about a fixed axis at 20 rpm, is uniformly accelerated for 70 seconds, during which time it makes 50 revolutions. Find angular velocity at the end of this interval and time required for the speed to reach 100 revolutions per minute.
- 7 Write short notes on the following:
(i) work-energy method
(ii) equations of plane motion
(iii) fixed axis rotation
- 8 A body is moving with simple harmonic motion and has velocities of 8 m/s and 3 m/s at a distance of 1.5 m and 2.5 m respectively from the centre. Find the amplitude and time period of the body.
