

Code: R7100105

R07

B. Tech I Year (R07) Supplementary Examinations, May 2012

APPLIED MECHANICS

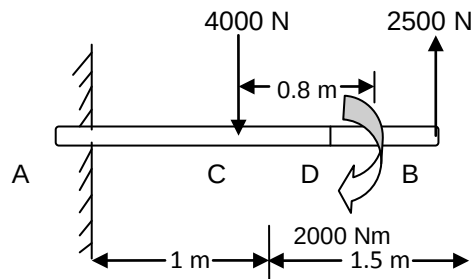
(Civil Engineering)

Time: 3 hours

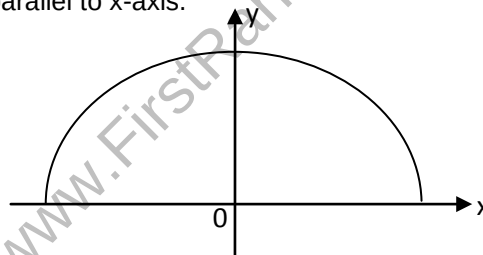
Max Marks: 80

Answer any FIVE questions
All questions carry equal marks

- 1 The following figure shows two vertical forces and a couple of moment 2,000 Nm acting on a horizontal rod which is fixed at end A. Find the resultant of the system and find an equivalent system through A.



- 2 (a) What are the various types of friction? Also mention the laws.
(b) A body of weight 200 N is placed on a rough horizontal plane. If the coefficient of friction between the body and the horizontal plane is 0.3, find the horizontal force required to just slide the body on the plane.
- 3 A belt is running over a pulley of diameter 120 cm at 200 r.p.m. The angle of contact is 165° and coefficient of friction between the belt and pulley is 0.3. If the maximum tension in the belt is 3000 N, find the power transmitted by the belt.
- 4 Determine the centre of gravity of a semi-circle of radius R as shown in the following figure. Consider the strip parallel to x-axis.



- 5 Find the moment of inertia of a triangular section about the base of the section.
- 6 A particle moves along a straight line with an acceleration described by the equation: $a = -8s^{-2}$, where a is in m/s^2 and s is in m. When $t = 1$ s, $s = 4$ m and $v = 2$ m/s. Find the acceleration when $t = 2$ s.
- 7 Write short notes on the following:
(i) Work- energy method. (ii) Equations of plane motion. (iii) Fixed axis rotation.
- 8 A body performing simple harmonic motion has a velocity = 12 m/s when the displacement is 50 mm and 3 m/s when the displacement is 100 mm, the displacement being measured from the mid-point. Calculate the frequency and amplitude of the motion. When the displacement is 75 mm?
