

Code No: PT32051/RA

R13
SET - 1

III B. Tech II Semester Supplementary Examinations, April - 2018
ENGINEERING MECHANICS
 (Civil Engineering)

Time: 3 hours

Max. Marks: 70

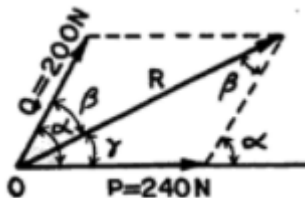
- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
 2. Answering the question in **Part-A** is compulsory
 3. Answer any **THREE** Questions from **Part-B**

PART -A

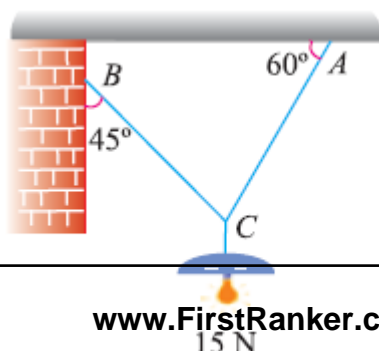
- 1 a) What is limiting friction? [3M]
- b) Write equilibrium equations for coplanar systems. [4M]
- c) Distinguish between centroid and centre of Gravity. [4M]
- d) What is products of Inertia. [4M]
- e) A particle, starting from rest, moves in a straight line, whose equation of motion is given by : $S = t^3 - 2t^2 + 3$. Find the velocity and acceleration of the particle after 5 seconds. [3M]
- f) Write the applications of Work – energy method. [4M]

PART -B

- 2 a) Two forces of magnitude 240 N and 200 N are acting at a point O as shown in fig. below. If the angle between the force is 60° . Determine the magnitude of the resultant force. Also determine the angle β and γ as shown in fig. below [8M]



- b) A load of 500 N is lying on an inclined plane, whose inclination with the horizontal is 30° . If the coefficient of friction between the load and the plane is 0.4, find the minimum and maximum horizontal force, which will keep the load in equilibrium. [8M]
- 3 a) State and Prove Lami's Theorem. [8M]
 - b) An electric light fixture weighting 15 N hangs from a point C, by two strings AC and BC. The string AC is inclined at 60° to the horizontal and BC at 45° to the horizontal as shown in Fig. Using Lami's theorem, or otherwise, determine the forces in the strings AC and BC. [8M]



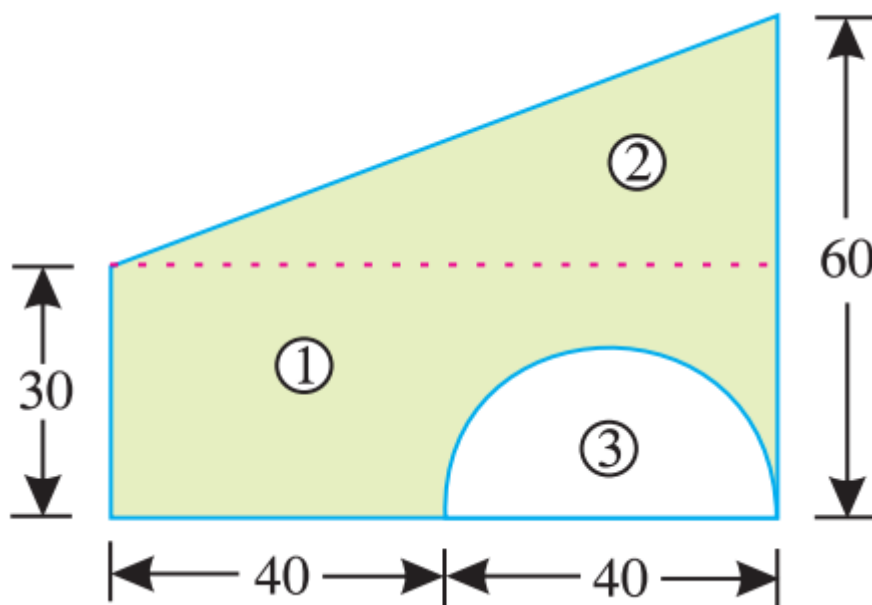
Code No: PT32051/RA

R13

SET - 1

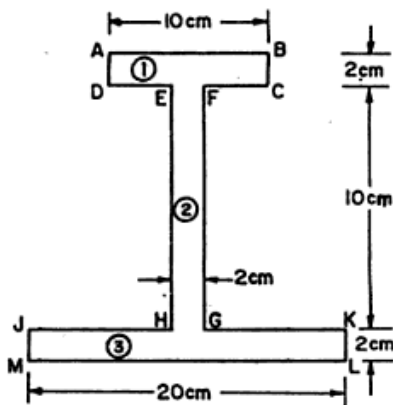
4 Determine the centroid for the following figure:

[16M]



5 Find the moment of inertia of the section as shown in the fig about centroidal axis XX perpendicular to the web.

[16M]

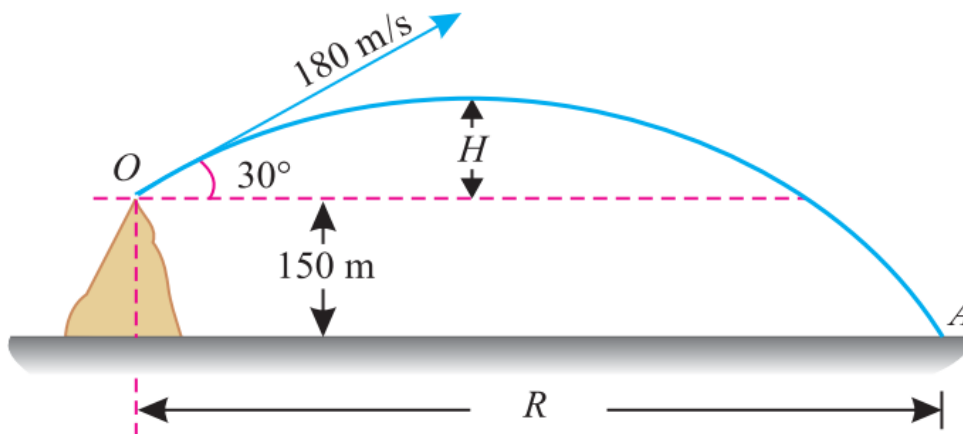


Code No: PT32051/RA

R13

SET - 1

- 6 A projectile fired from the edge of a 150 m high cliff with an initial velocity of 180 m/s at an angle of elevation of 30° with the horizontal. Neglecting air resistance find [16M]
- (i) The greatest elevation above the ground reached by the projectile
- (ii) Horizontal distance from the gun to the point, where the projectile strikes the ground



- 7 A body of weight 1 kN is on the horizontal surface of a table. This weight is connected to another body of weight 2 kN by a string passing over a smooth pulley fixed at the corner of the table. The coefficient of friction between 1 kN weight and the table surface is 0.20. If the system is released from rest, find the velocity of 2 kN weight after it has moved 1.2 m using the work-energy method. [16M]

3 of 3