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**
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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 60^0, Determine the magnitude of the resultant force. Also determine the angle β and γ as shown in fig. below [8M]
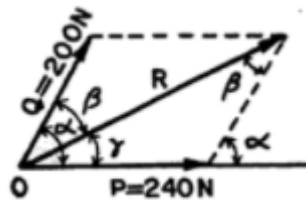

   b) A load of 500 N is lying on an inclined plane, whose inclination with the horizontal is 30°. If the coefficient of friction between the load and the plane is 0.4, find the minimum and maximum horizontal force, which will keep the load in equilibrium. [8M]

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]
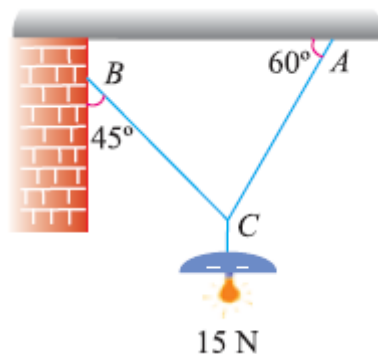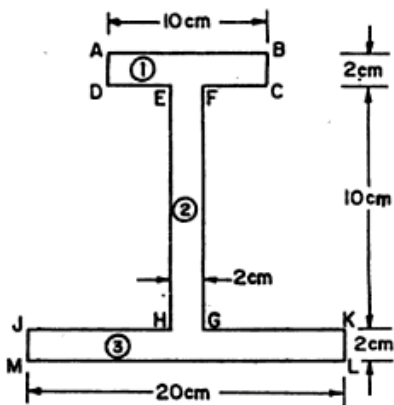
4   Determine the centroid for the following figure: [16M]
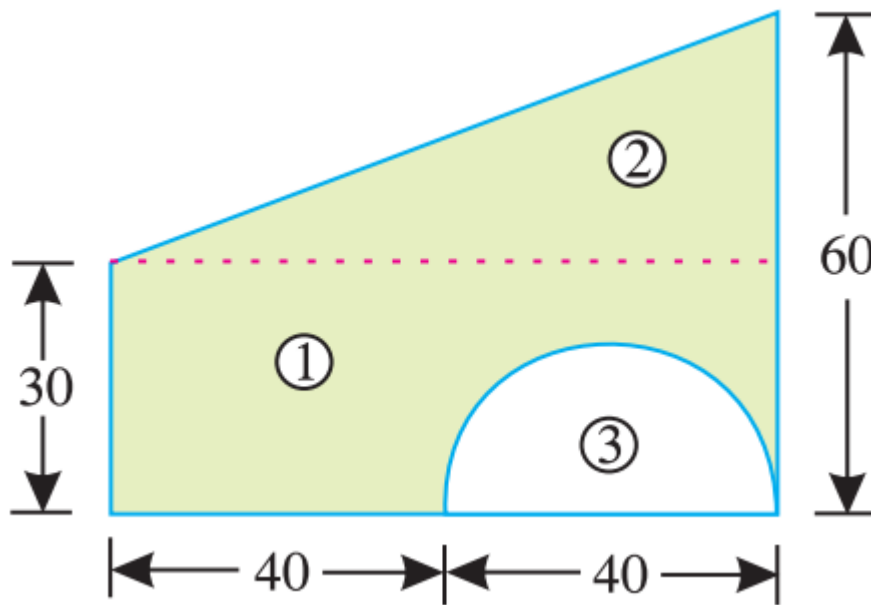
5   Find the moment of inertia of the section as shown in the fig about centroidal axis   [16M]
XX perpendicular to the web.

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6   A projectile fired from the edge of a 150 m high cliff with an initial velocity of 180   [16M]
m/s at an angle of elevation of 30° with the horizontal. Neglecting air resistance
find
(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
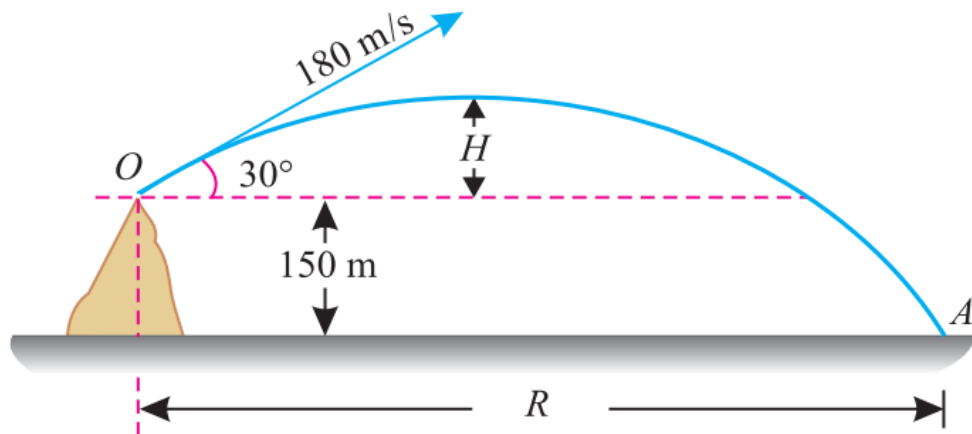
7   A body of weight 1 KN is on the horizontal surface of a table. This weight is   [16M]
connected to another body of weight 2 KN by a string passing over a smooth pulley
fixed at the corner of the table. The coefficient of friction between 1 KN weight and
the table surface is 0.20. If the system is released from rest, find the velocity of 2
KN weight after it has moved 1.2 m using the work-energy method.

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