University of Technology
Machanical Engineering Department
Semester Examination 2015/2016

Subject: Mechanics II
Division: Energy Plants Engineering
Examiner: Asst. Prof. Dr. Sadeq H. Bakhy

Year: First Year
Exam Time: 3 Hrs.
Date: 13/6/2016

1. Answer Four Questions Only.

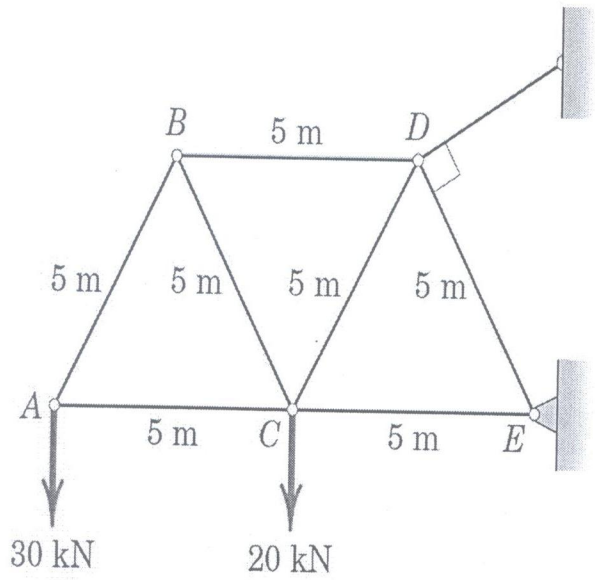
2. All Questions Carry Equal Marks.

Q_1

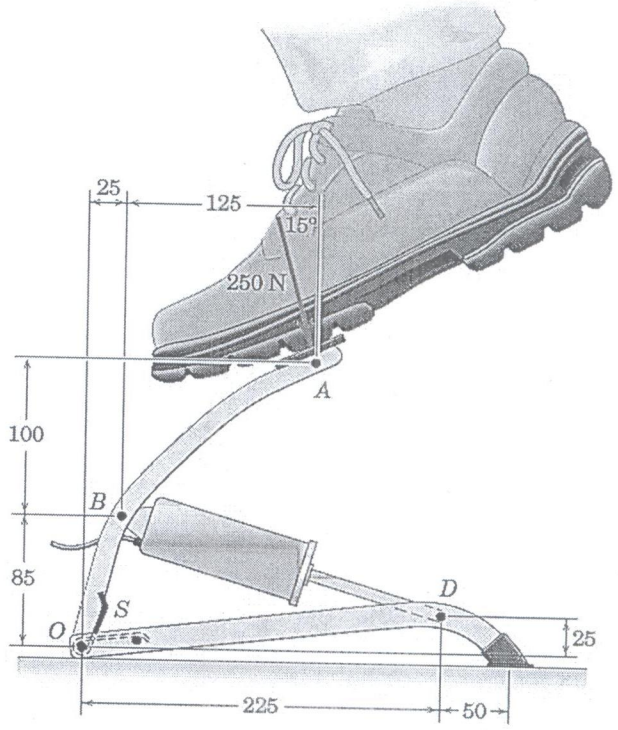
Compute the force in each member of the loaded cantilever truss by the method of joints.

Q_2

A 250-N force is applied to the foot-operated air pump. The return spring ***S*** exerts a 3N.m moment on member ***OBA*** for this position. Determine the corresponding compression force ***C*** in the cylinder ***BD***. If the diameter of the piston in the cylinder is 45 mm, estimate the air pressure generated for these conditions. State any assumptions.



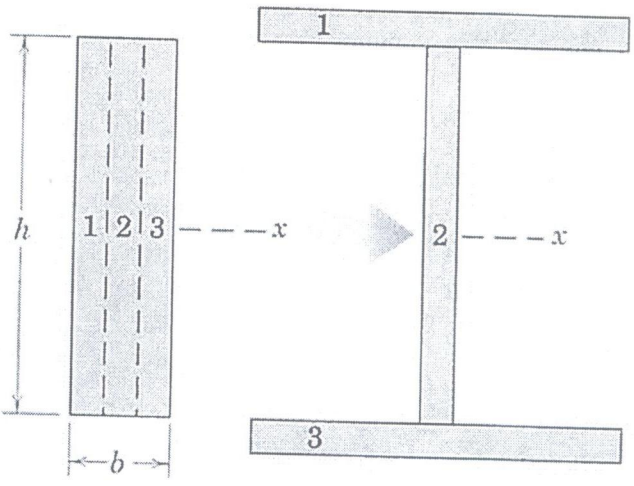
Q_1



Q_2

Q_3

The rectangular area shown in part-**a**- of the figure is split into three equal areas which are then arranged as shown in part-**b**-. **Determine** an expression for the moment of inertia of area in part **b** about the centroidal x-axis. What percent increase **n** over the moment of inertia of area **a.**
(assume h = 200mm and b = 60 mm)



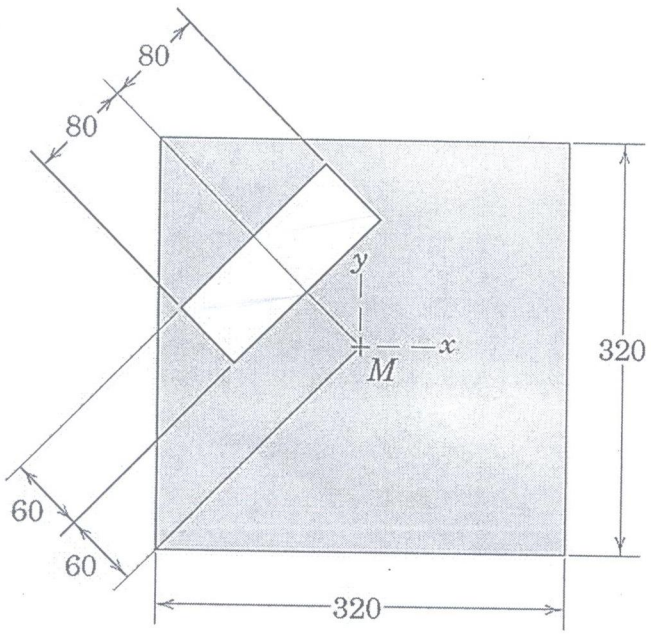
Q_3 (a) (b)

Q4

Determine the coordinates of the centroid of the shaded area. The plate center is M.

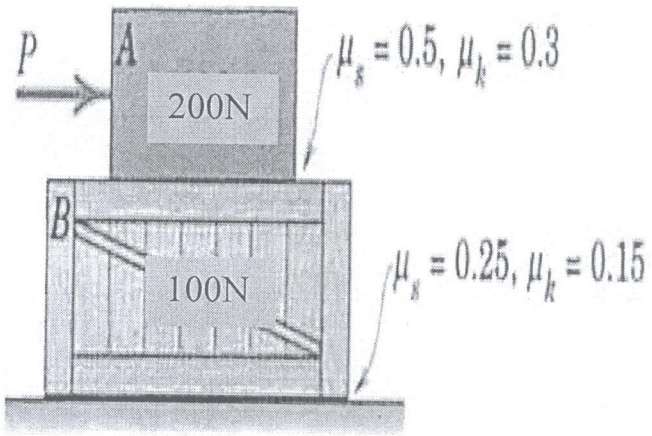
Q5

The force ***P*** is applied to the 200N weight of block ***A*** which rests atop the 100N crate ***B***. The system is at rest when ***P*** is first applied. Determine what happens to each body if (a) ***P*** =60 N, (b) ***P*** = 80 N, and (c) ***P*** = 120N.



Dimensions in millimeters

Q4



Q5

Best wishes