GNG 1105

ENGINEERING MECHANICS

Midterm Exam

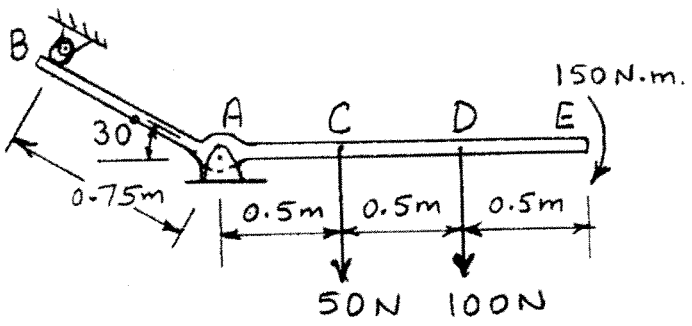
Time: 80 minutes

Professor: André Skaff

Closed book Examination. Non-programmable calculators only are allowed. Don't separate the pages. Answers must be on the same page and its back if necessary.

1. (15 marks)

The link shown is connected by a pin joint at A and rests against a roller support at B. It supports 2 forces at points C and D and a couple at point E as indicated on the diagram.

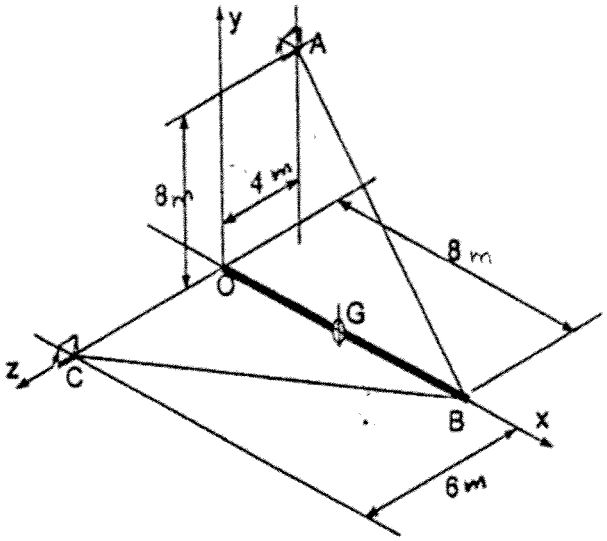


a) Reduce these 2 forces and the couple to an equivalent force-couple system at A.

b) Find the reactions at points A and B if the system is in equilibrium.

2. (15 marks)

A steel beam OB of length 8m and weighing 1.5 KN is being pulled into position using two cables, BA and BC. The beam is in a horizontal position along the x-axis. At O the beam is supported by a frictionless ball and socket joint. The centre of gravity of the beam is at G, halfway between O and B.



a) Draw the free-body- diagram of beam OB

b) Write, in vector form, the tensions in cables BA and BC.

c) Find the tensions in cables BA and BC