Université d'Ottawa
Faculté de génie

Département de
génie civil

University of Ottawa
Faculty of Engineering

Department of
Civil Engineering

uOttawa

L'Université canadienne
Canada's university

**GNG1105F – Engineering Mechanics**

**Midterm Exam**

**19:00 – 20:20** **Monday, March 2nd, 2015**
**Professor: M. Al-Riffai**

**NB: Closed book examination. Only non-programmable calculators are allowed.**

**Problem 1 (25 marks)**

Cable ***AB*** shown in Fig. 1 is subjected to a tension of 700 N. If the point at A is in equilibrium:

(a) In your answer booklet, draw the Free-Body-Diagram for the system shown (**6 marks**),
(b) write in vector form, the tension in cables *AB*, *AC* and *AD*, and the vertical force *F* (**10 marks**),
(c) determine the magnitude of the tension in cables *AC* and *AD* and the vertical force *F* (**9 marks**).

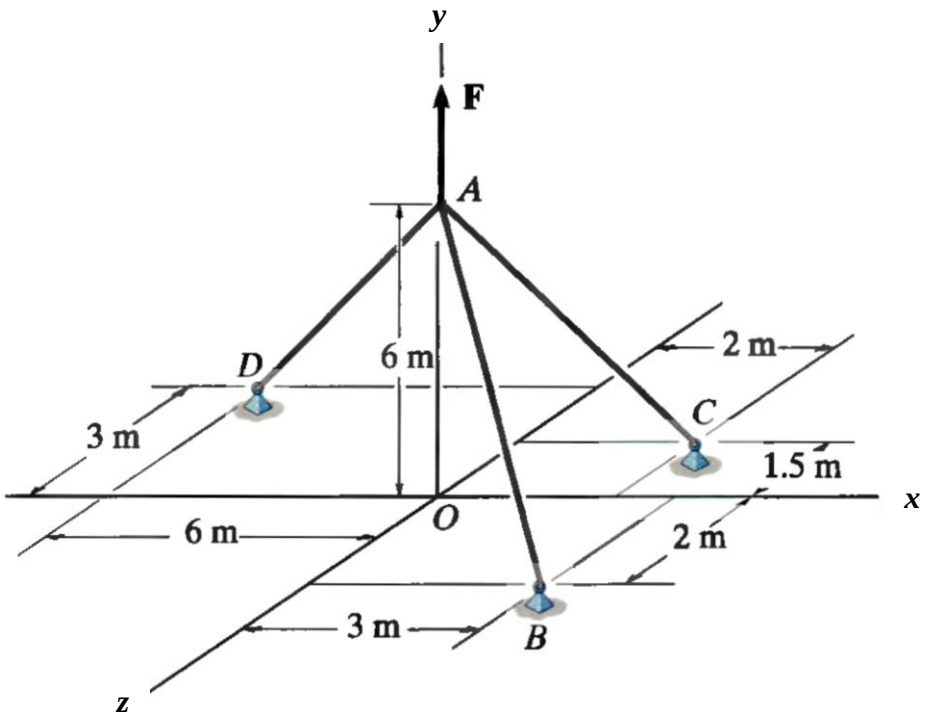


**Fig. 1**

**Problem 2 (15 marks)**

Reduce all of the forces acting on this bracket shown in Fig. 2 below into a force-couple system at O (**12 marks**). Show and sketch the force-couple system on your answer booklet (**3 marks**).

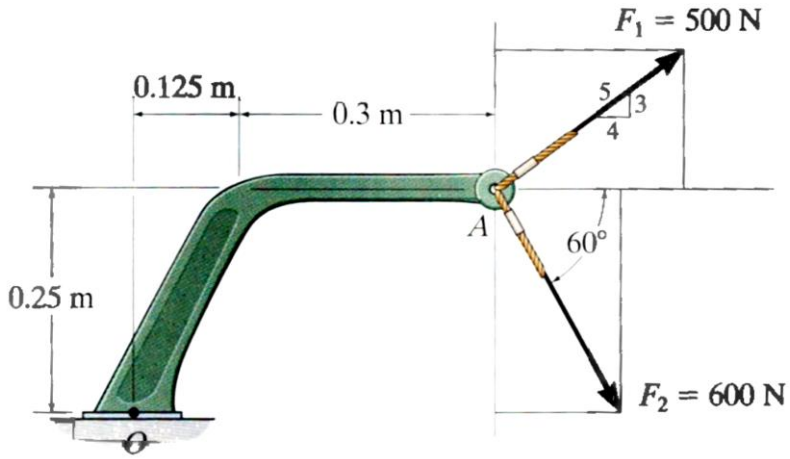


**Fig. 2**

**Problem 3 (20 marks)**

The 25-kg bar has a center of gravity at *G* and is supported by a smooth peg at *C*, a roller at *A*, and cord at *AB*.

(a) Draw the Free-Body-Diagram for the bar shown in Fig. 3 (**5 marks**),
(b) Determine the tension in cord *AB* and the reactions at *A* and *C* (**15 marks**).

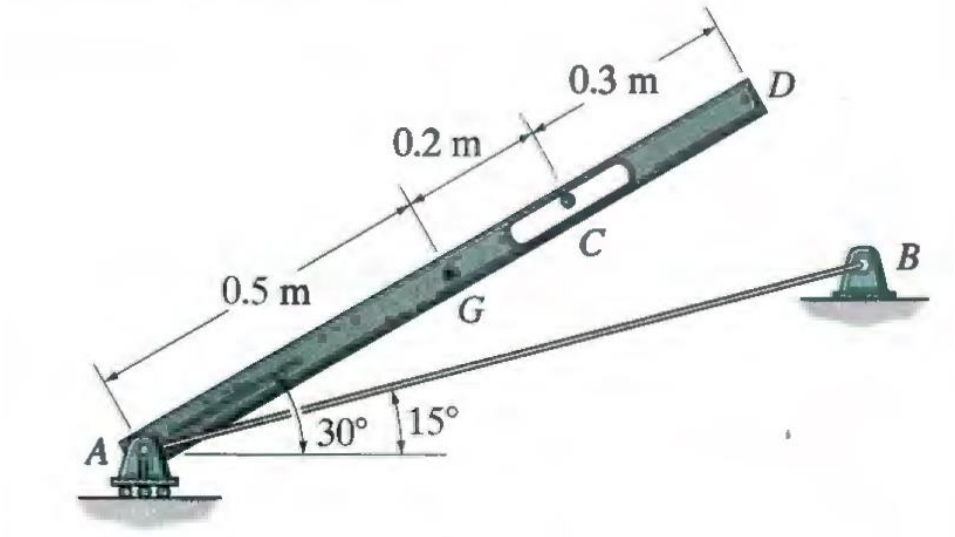


**Fig. 3**