Alexandria Higher Institute of Engineering & Technology (AIET)			
Department of: Preparatory	2013/2014		0th Year
ME001	Mechanics I		Final, Jan., 15, 2014
Examiners:	Dr. Raafat Ayad and Dr. Rola Afify	Marks:60	Time: 3 hours

Answer the following questions:

Question One (10 marks)

Determine the force in each member of the truss and state if the members are in tension or in compression.

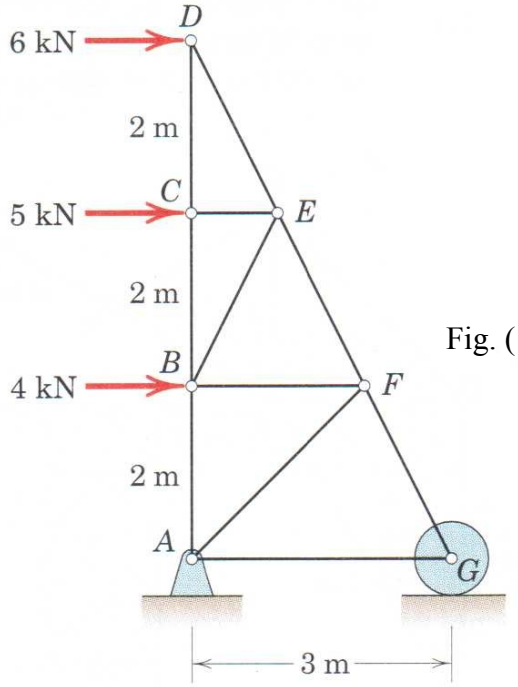

Fig. (1)

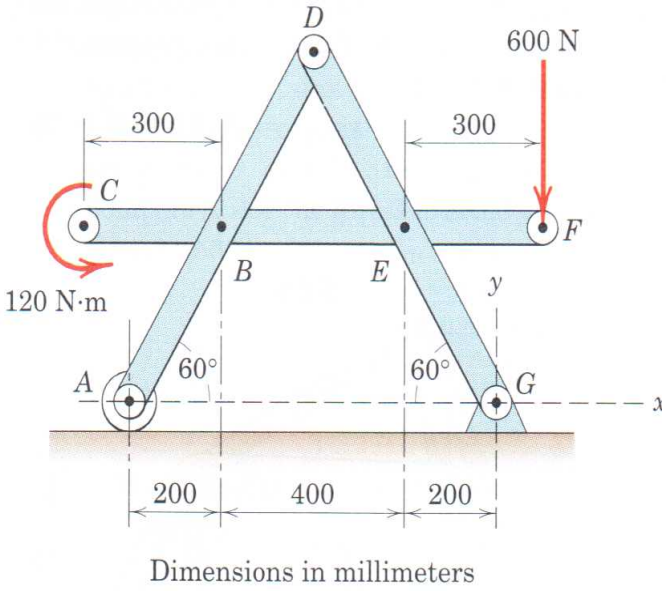

Fig. (2)

Question Two (10 marks)

Determine the horizontal and vertical components of force at pins B, D, E and G.

Question Three (10 marks)

Determine the magnitude of force P so that the 50-kg crate will start moving up the inclined plane.

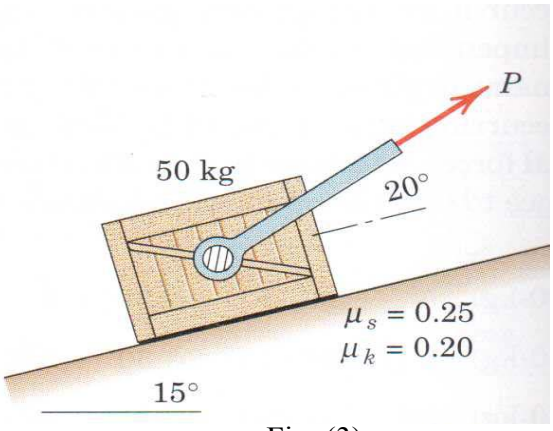

Fig. (3)

Question Four (10 marks)

The ring, shown in Fig. (4), is subjected to two forces F_1 and F_2. If the magnitude of the resultant force is 1kN and is directed vertically downwards. Determine:

A) The magnitudes of F_1 and F_2 provided $\theta = 30^o$.

B) The magnitudes of F_1 and F_2, if F_2 is to have a minimum magnitude.

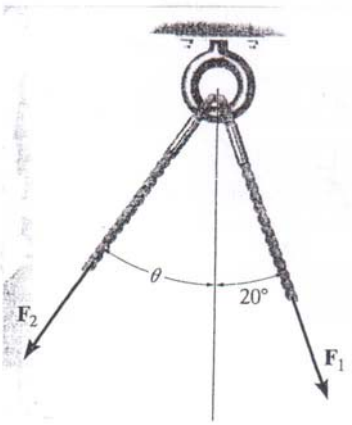

Fig. (4)

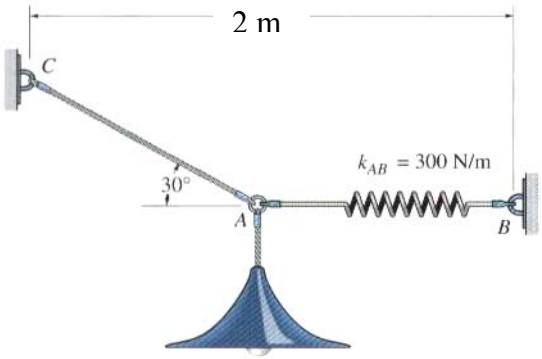

Fig. (5)

Question Five (10 marks)

Determine the required length of cord AC in Fig. (5) so that the 8kg lamp is suspended in the position shown. The undeformed length of spring AB is $l'_{AB} = 0.4$ m, and the springs has a stiffness of $K_{AB} = 300$ N/m.

Question Six (10 marks)

Determine the moment of the couple acting on the member shown in Fig. (6).

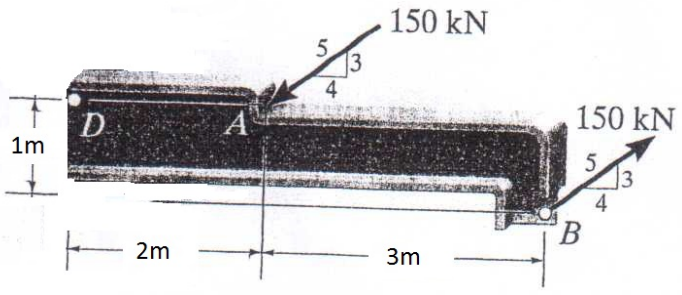

Fig. (6)

Good Luck 2/2

Dr. Raafat Ayad

&

Dr. Rola Afify