



College of Engineering & Technology

Department : Basic and Applied Sciences  
 Course Coordinator : Prof. Dr. Mohamed Abbasi  
 Course : Engineering Mechanics (1)  
 Course Code : BA141  
 Final Exam  
 Date: 18 – 1 – 2012

Marks : 40  
 Time: 2 Hrs

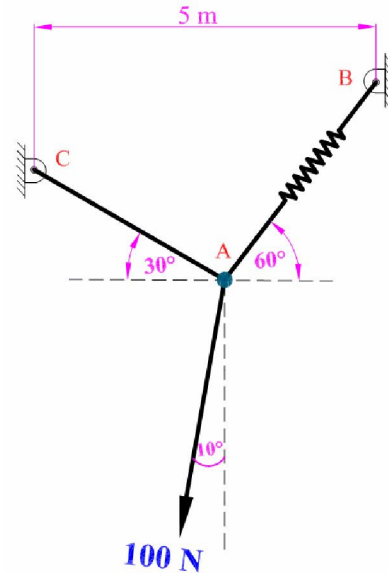
Answer the following questions:

Question 1 (10 marks)

The unstretched length of spring AB is 0.2 m. The spring has a stiffness  $k = 500 \text{ N/m}$ , a Force  $F = 100 \text{ N}$  is applied at A.

Determine:

- The force in spring AB and cord AC
- The required length of chord AC for equilibrium

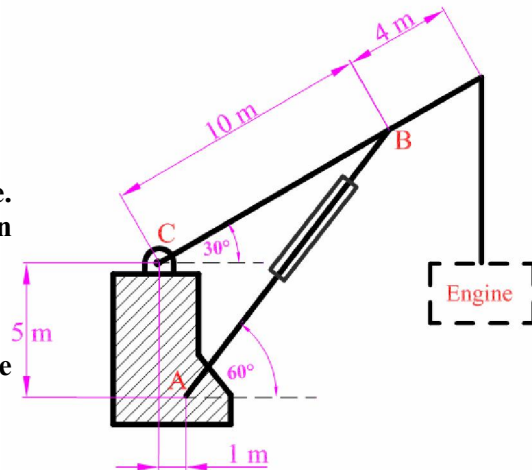


Question 2 (6 marks)

The crane shown is lifting 100 kg engine. The engine is tilted into the shown position by a hydraulic cylinder AB (rigid link).

Determine:

- The force in the piston rod AB of the hydraulic cylinder
- The force supported by the pin at C

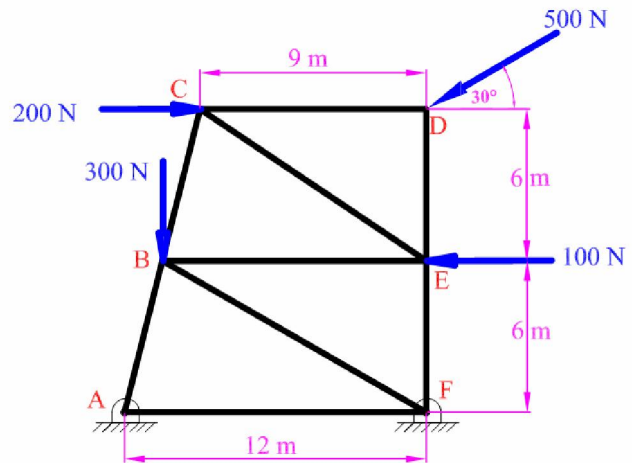


**Question 3 (6 marks)**

The truss ABCDEF is subjected to the loading shown.

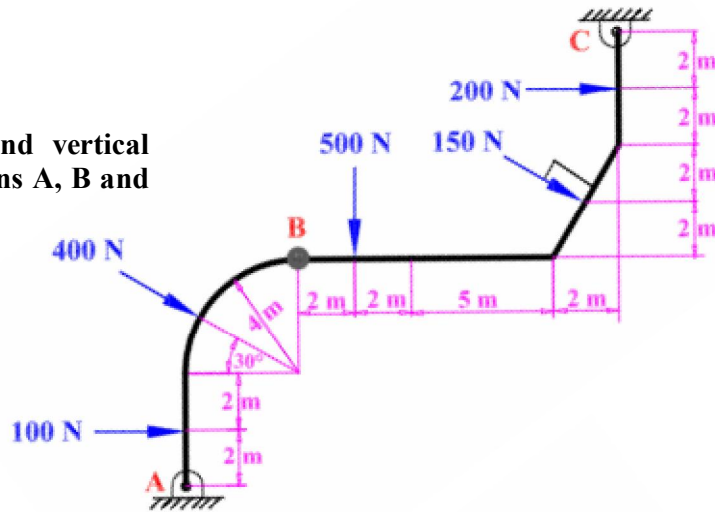
Determine:

- a) The force in members BC, CE, DE and EF
- b) State if the members BC, CE, DE and EF are in tension or compression



**Question 4 (8 marks)**

Determine the horizontal and vertical components of reaction at pins A, B and C of the two member frame.

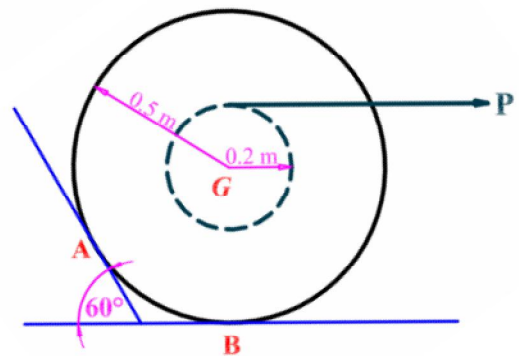


**Question 5 (10 marks)**

The spool has a mass of 500 kg and rests against the wall at A and on the beam at B. If the coefficient of static friction at A is  $\mu_A = 0.3$  and at B is  $\mu_B = 0.5$  respectively.

Determine:

- a) The force P that must be applied to the cable that will cause the spool to move
- b) The reaction at A
- c) The reaction at B



**Good Luck**