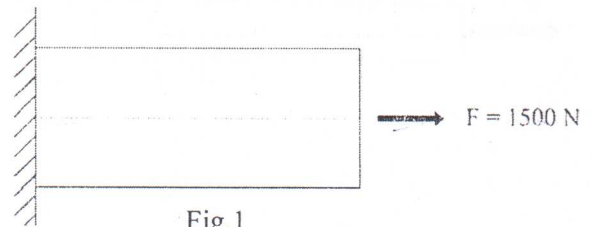# Sheet (1)
Stress Analysis
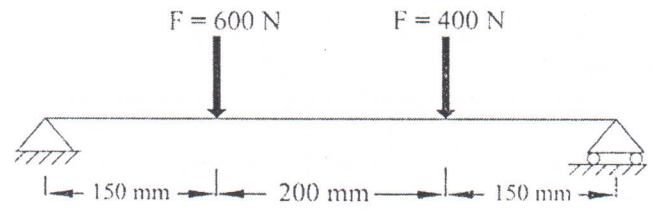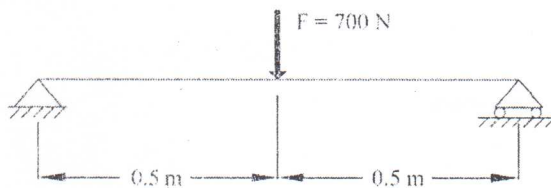
1) For the shown machine member 2 cm diameter
   and 50 cm long and supported at one end as
   cantilever
   Find :
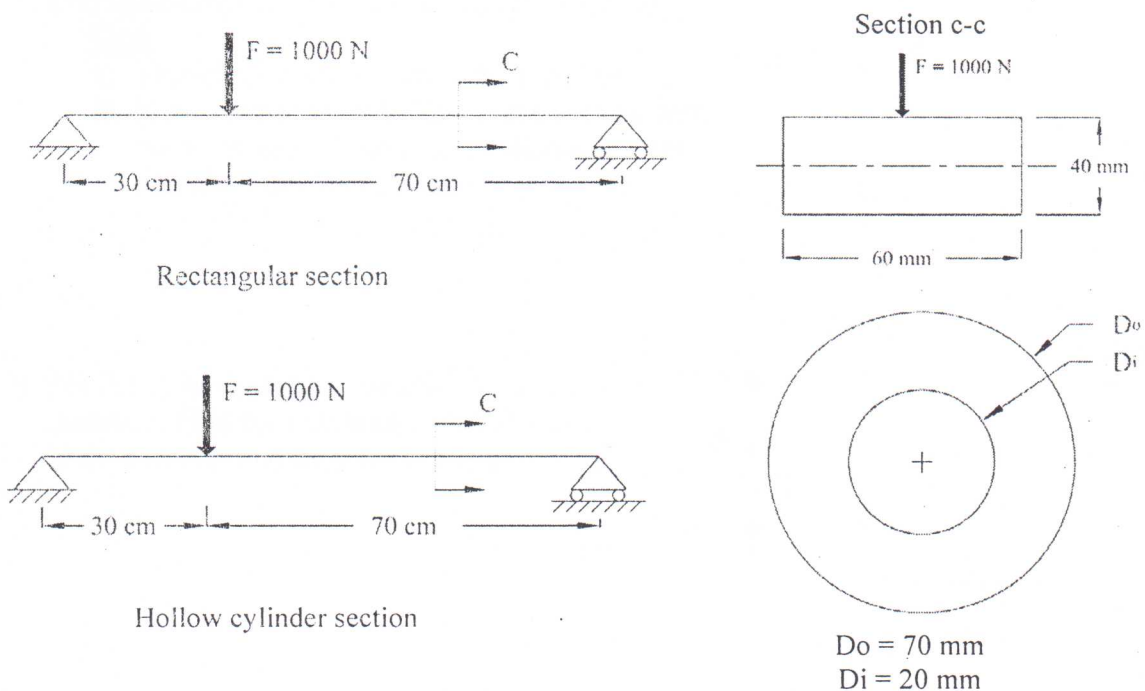   a) the tension stress in the member
   b) If the force (F) was in the opposite
      direction will the stress be changed,
   why?

F = 1500 N

Fig.1

2) For the 10 mm diameter beams shown in fig.(2 , 3) draw the bending moment diagram and
   calculate the maximum bending stress in the members.

F = 700 N

0.5 m   0.5 m

Fig.2

F = 600 N   F = 400 N

150 mm ─── 200 mm ─── 150 mm

Fig.3

3) For the beams shown in figure 4 calculate the maximum bending stress

F = 1000 N

C

30 cm ─── 70 cm

Rectangular section

Section c-c

F = 1000 N

40 mm

60 mm

F = 1000 N

C

30 cm ─── 70 cm

Hollow cylinder section

Do

Di

Do = 70 mm
Di = 20 mm

Fig.4

4) For the riveted joint shown in the figure the applied force F = 1500 N and the rivet diameter is 2 cm. Find the shear stress on the rivet.
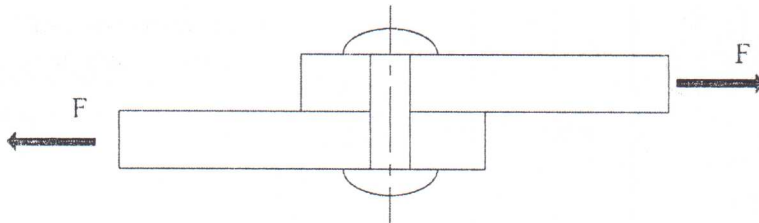
5) If we replace the previous bracket with the following with the same force (F) and rivet diameter find the shear stress on the rivet.
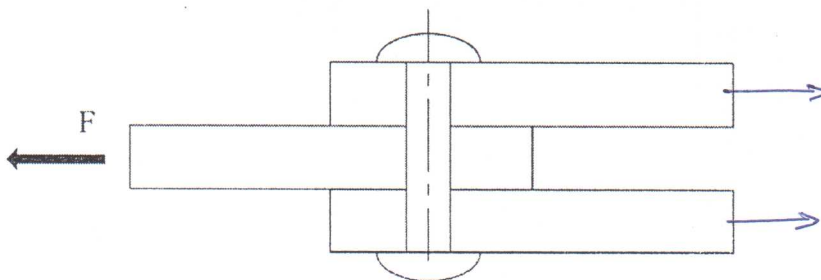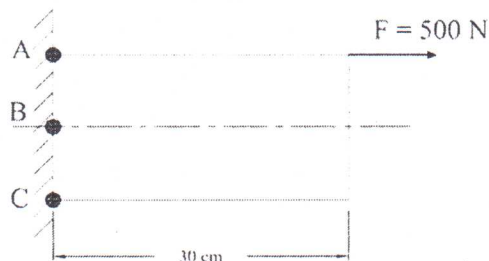
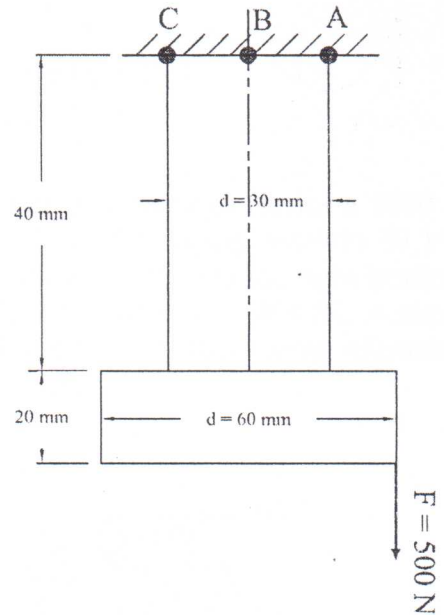6) For the shown machine member 4 cm diameter a rotating torque T = 4 N.m acts on the member
   <u>Find</u>
   a) Maximum shear stress on the member.
   b) If the member was hollow cross-section with outer diameter 4 cm & inner diameter 1 cm calculate maximum shear stress.
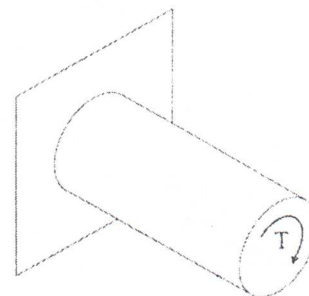
7) For the shown machine member 5 cm diameter. Find the maximum normal stress in the member and its point of action.

F = 500 N

A

B

C

30 cm

Alexandria Higher Institute of Engineering & Technology
Communications & Computer Departments
2nd Year

Mechanical Engineering (ME 252)
Machine Design
Asst. Prof. Khaled Tawfik

8) For the shown machine member find the maximum stress in the member.

C   B   A

40 mm

d = 30 mm

20 mm   d = 60 mm

F = 500 N

9) For the shaft shown in the figure Diameter 5 cm. Find stress at point A .

A

40 cm

F=600 N