1. The maximum allowable value of each of the reactions is 180 N as shown in *Figure* 1, supports *A* and *B*. Neglecting the weight of the beam, determine the range of the distance "*d* " for which the beam is safe. (25%)

50 N　　　　　100 N　　　　　　150 N

$\leftarrow d \rightarrow$

$\leftarrow$ 450 mm $\rightarrow$ $\leftarrow$ 450 mm $\rightarrow$　　*Figure* 1
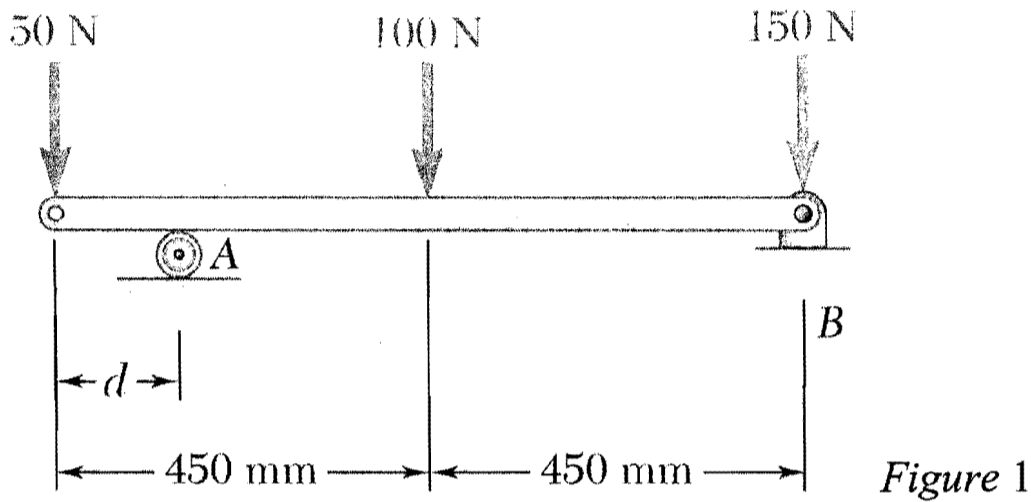
2. Using the method of joints, determine the force in each member of the truss shown in *Figure* 2. State whether each member is in tension or compression. (25%)
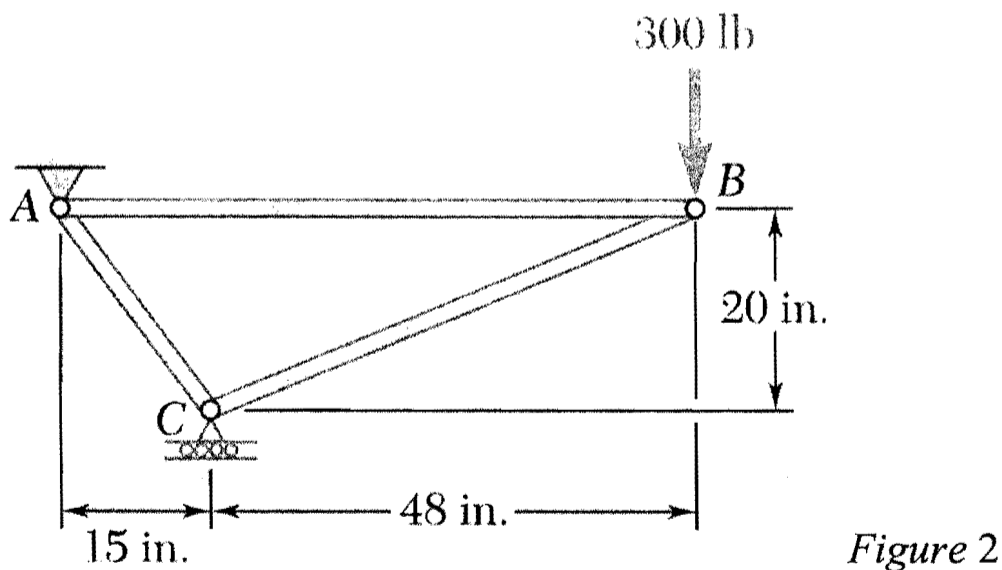
300 lb

A

B

20 in.

C

15 in.　　　$\leftarrow$ 48 in. $\rightarrow$　　　*Figure* 2

3. A 5 *kg* ball *A* strikes a 1 *kg* ball *B* that is initially at rest as shown in Figure 3. Is it possible that after the impact *A* is not moving and *B* has a speed of 5*v* ? Explain your answer. (25%)
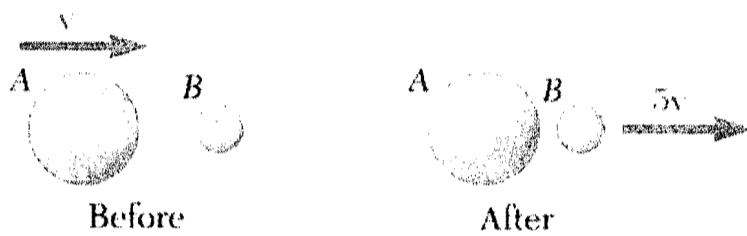

Before　　　　　　After　　　　　　*Figure* 3.

4. At the instant shown, rod *AB* has zero angular acceleration and an angular velocity of 8 rad/s clockwise as shown in *Figure* 4. Knowing that *l* = 0.3 m, determine the angular velocity of rod *DE*.　(25%)
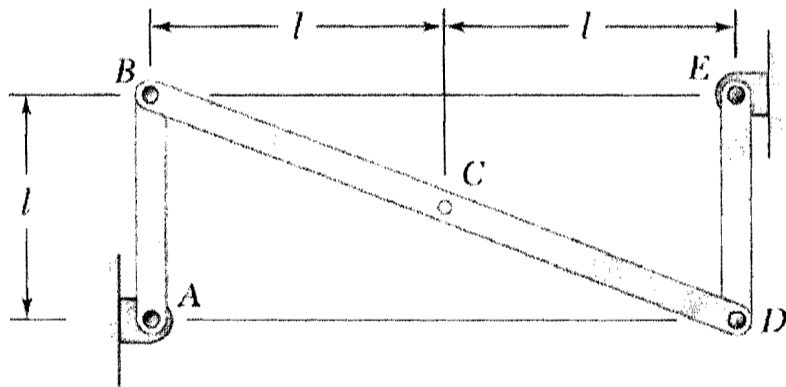

Figure 4.