PRESIDENCY UNIVERSITY, BENGALURU
SCHOOL OF ENGINEERING

Max Marks: 30 | Max Time: 55 Mins | Weightage: 15 % | **Set A**

TEST-3

II Semester 2016-17 | Course: **CE A 208 Strength of materials** | 20 April 2017

Instructions:

i. Write legibly
ii. Scientific and non-programmable calculators are permitted

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Part A

(2 Q x 5 M= 10 Marks)

1. Define the following
   a) Bending Moment at a point
   b) Shear Force at a point
2. Draw shear force and bending moment diagrams [SFD and BMD] for a simply supported beam subjected to three point loads as shown in the Figure 1.

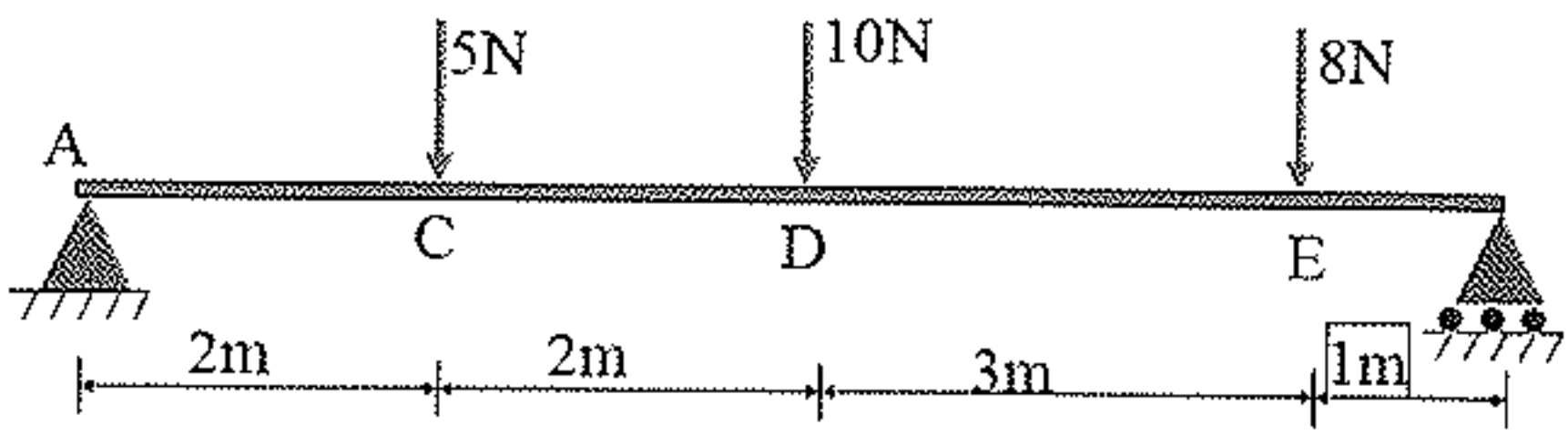

Figure 1

Part B

(1 Q x 10 M= 10 Marks)

3. For the state of plane stress shown in Figure 2, determine (a) the principal planes, (b) the principal stresses, (c) the maximum shearing stress and the corresponding normal stress.

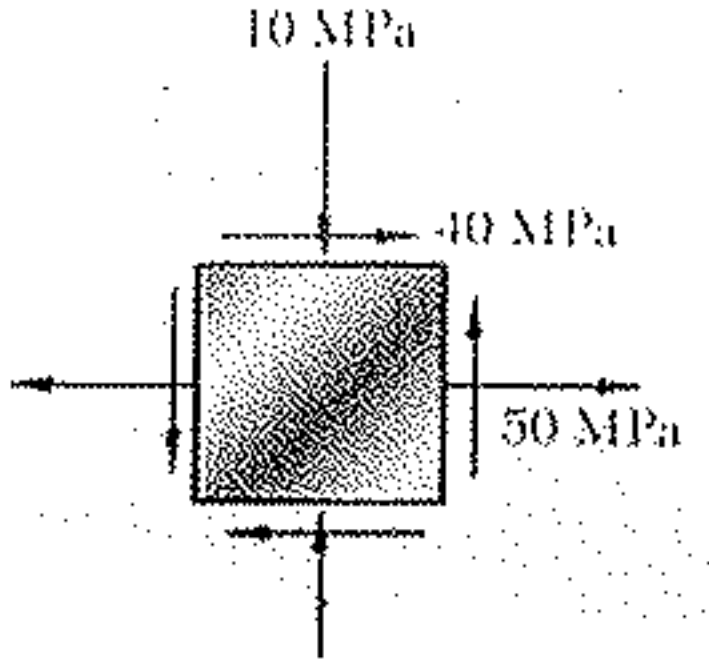

Figure 2

Part C

(1 Q x 10 M= 10 Marks)

4. For the timber beam and loading shown in figure 3, draw the shear and bend-moment diagrams and determine the maximum normal stress due to bending.

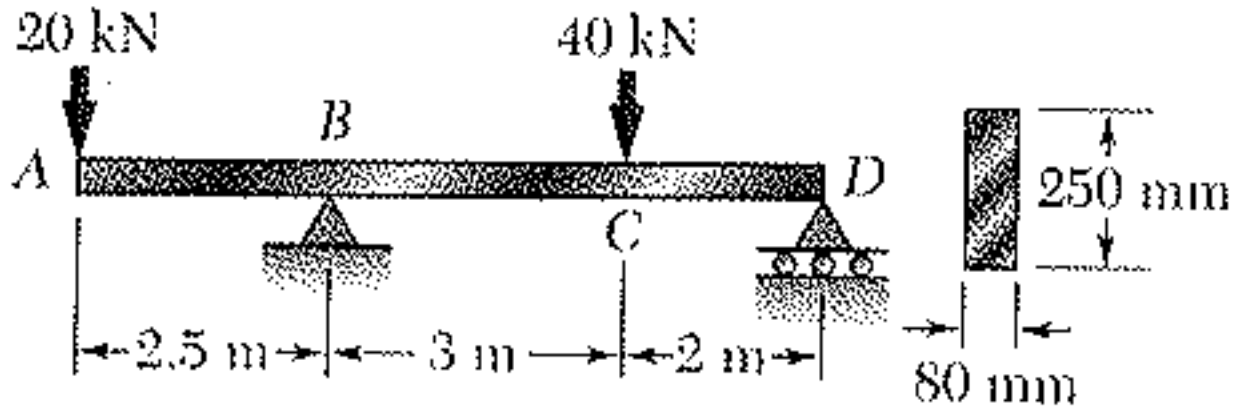

Figure 3

PRESIDENCY UNIVERSITY, BENGALURU
SCHOOL OF ENGINEERING

Max Marks: 30 | Max Time: 55 Mins | Weightage: 15 % | **Set A**

TEST-2

II Semester 2016-17 | Course: **CE A 208 Strength of materials** | 23 March 2017

Instructions:

i. Write legibly
ii. Scientific and non-programmable calculators are permitted

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Part A

(2 Q x 5 M= 10 Marks)

1. A nylon thread is subjected to a 8.5-N tension force. Knowing that E = 3.3 GPa and that the length of the thread increases by 1.1%, determine
   a) The diameter of the thread
   b) The stress in the thread
2. In a standard tensile test, a steel rod of 22-mm diameter is subjected to a tension force of 75 kN shown in figure 1. Knowing that μ= 0.3 and E = 200 GPa, determine
   a) The elongation of the rod in a 200-mm gage length,
   b) The change in diameter of the rod.

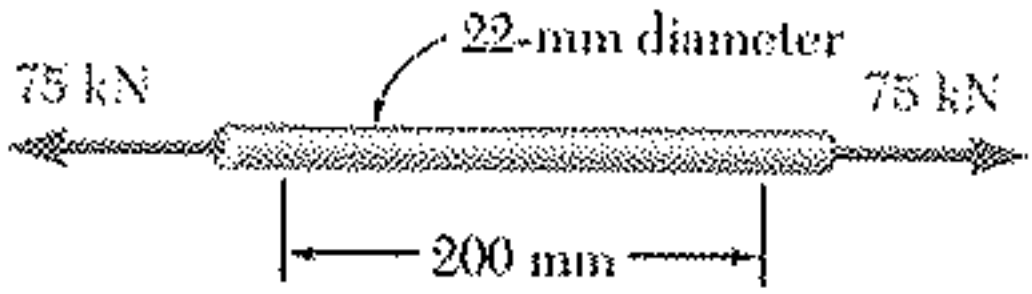

Figure 1

Part B

(1 Q x 10 M= 10 Marks)

3. A rod consisting of two cylindrical portions *AB* and *BC* is restrained at both ends shown in figure 2. Portion *AB* is made of steel (E_s= 200 GPa, α_s= 11.7 x 10^{-6}/ ^{0}C) and portion *BC* is made of brass (E_b = 105 GPa, α_b= 20.9 x 10^{-6}/ ^{0}C)). Knowing that the rod is initially unstressed, determine the compressive force induced in *ABC* when there is a temperature rise of 50^{0}C.

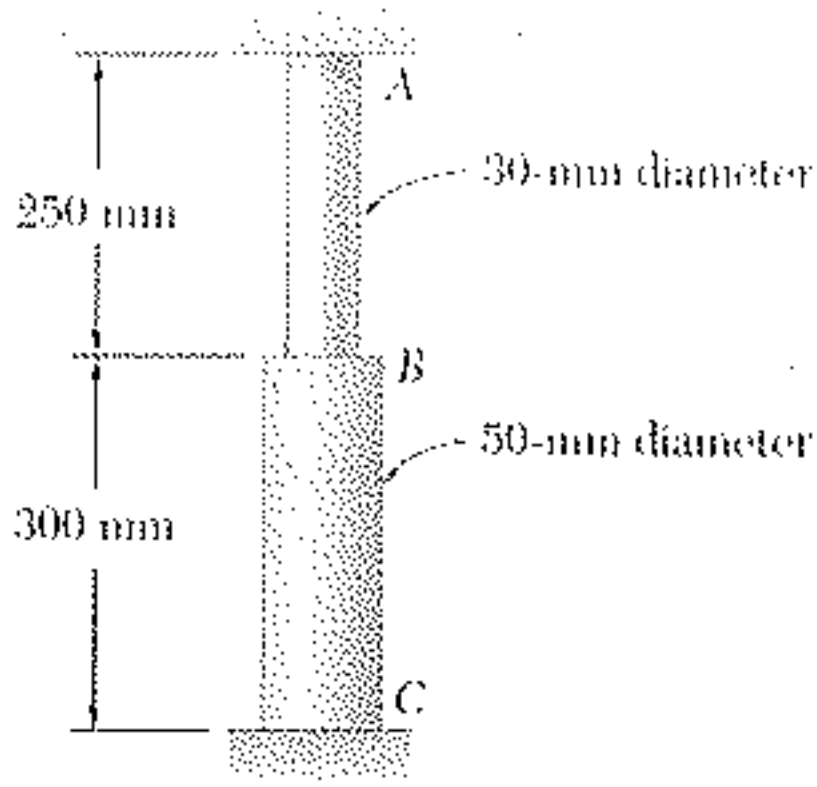

Figure 2

Part C

(1 Q x 10 M= 10 Marks)

4. A rigid body bar BDE is supported by two links AB and CD shown in figure 3: Link AB is made of aluminum (E= 70 Gpa) and has a cross sectional area of 500 mm^2, link CD is made of steel (E= 200 Gpa) and has a cross sectional area of 600 mm^2. For 30 KN force shown find dellection/deformation at 1) of B 2) of D and 3) of E.

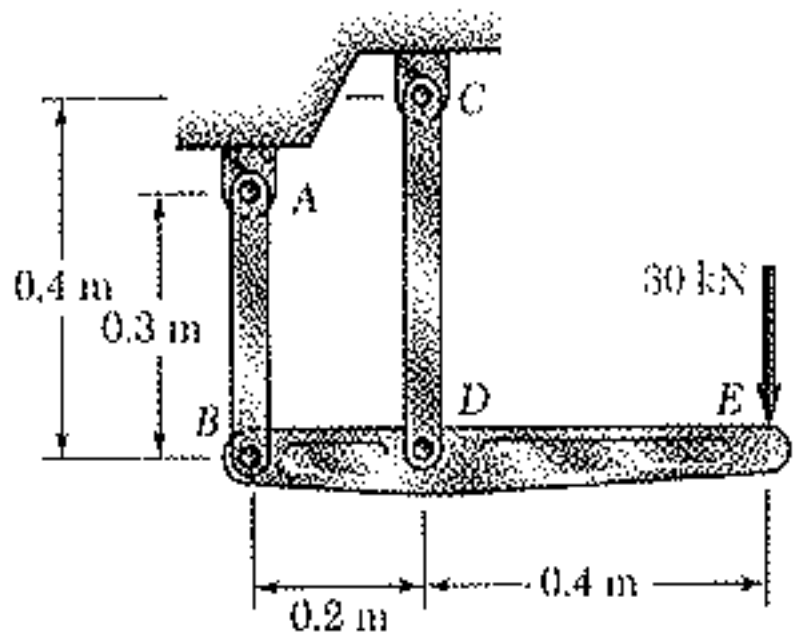

Figure 3

PRESIDENCY UNIVERSITY, BENGALURU
SCHOOL OF ENGINEERING

Max Marks: 30 | Max Time: 55 Mins | Weightage: 15 % | **Set A**

TEST-1

II Semester 2016-17 | Course: **CE A 208 Strength of Materials** | 23 February 2017

Instructions:

i. Write legibly
ii. Scientific and non-programmable calculators are permitted

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Part A

(2 Q x 5 M= 10 Marks)

1. An electric light fixture weighing 25 N hangs from a point C, by two strings AC and BC. The string AC is inclined at 60° to the horizontal and BC at 45° to the vertical; as shown in figure 1. Determine the forces in the strings AC and BC.

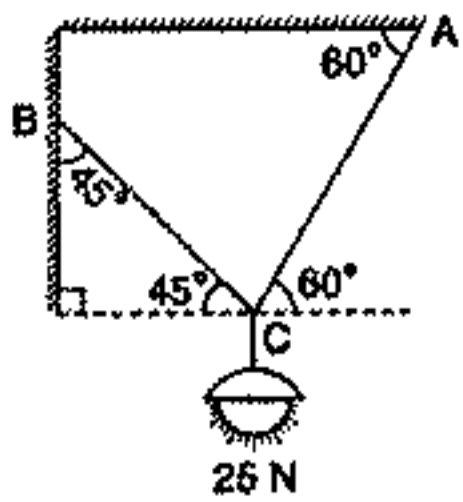

Figure 1

2. Determine the support reactions for the beam shown in Figure 2 at A and B.

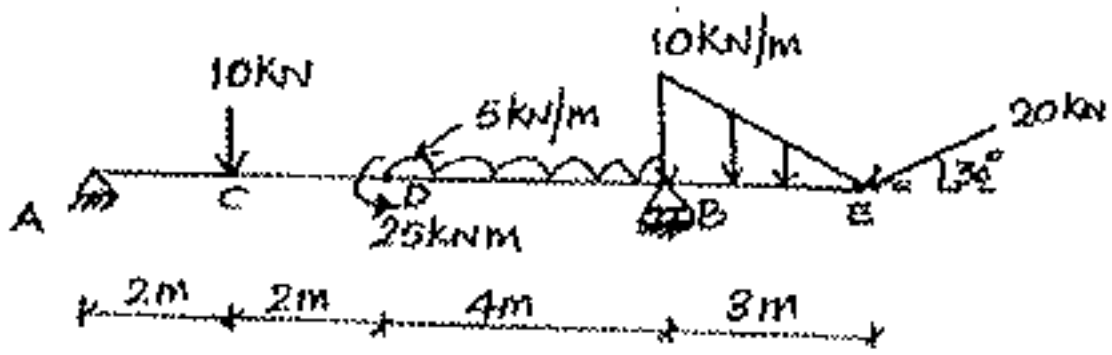

Figure 2

Part B

(1 Q x 10 M= 10 Marks)

3. Two solid cylindrical rods AB and BC are welded together at B and loaded as shown in figure 3. Knowing that the average normal stress must not exceed 150 MPa in either rod, determine the smallest allowable values of the diameters d1 and d2.

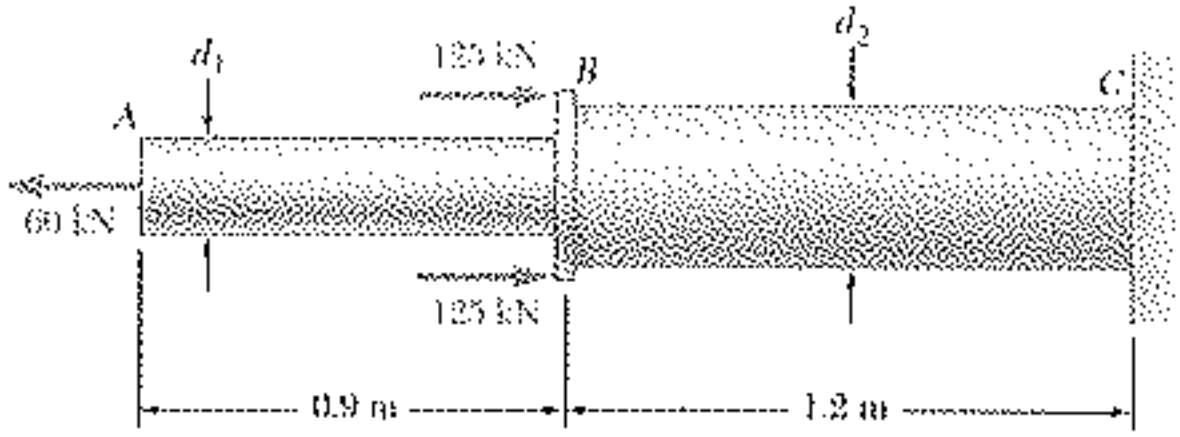

Figure 3

Part C

(1 Q x 10 M= 10 Marks)

4. Three forces, each of magnitude P = 4 kN, are applied to the mechanism shown in figure 4. Determine the cross-sectional area of the uniform portion of rod BE for which the normal stress in that portion is +100 MPa.

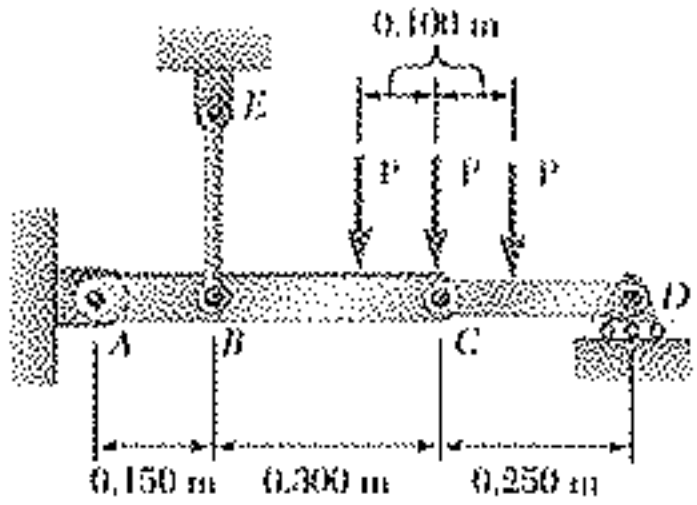

Figure 4