GAIN MORE KNOWLEDGE
REACH GREATER HEIGHTS

ROLL NO:	

PRESIDENCY UNIVERSITY, BENGALURU

SCHOOL OF ENGINEERING

Weightage: 20 % Max Marks: 40 Max Time: 1 hr. Monday, 24th September 2018

TEST – 1

Odd Semester 2018-19 Course: **CIV 201 Strength of Materials** III Sem. Civil

---

Instructions

(i) Read the question properly and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and Non-programmable calculators are permitted

---

Part A

(3 Q x 4 M = 12 Marks)

1. Define youngs modulus and modulus of rigidity.
2. State Hooke's law. Include equation.
3. Give the relationship between:
   a) Youngs Modulus, Shear Modulus and Bulk Modulus.
   b) Youngs Modulus, Shear Modulus and Poissons ratio.

Part B

(2 Q x 8 M = 16 Marks)

4. Determine change in length of the section that is subjected to loads as shown in the figure1. Take E = 2.1×10^5 N/mm^2.

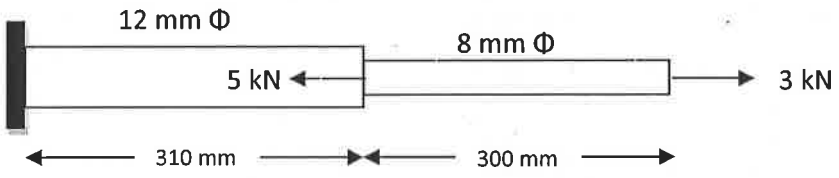


fig 1.

5. A) A bar of uniform cross section 500 mm^2 is acted upon by forces as shown in figure 2. Determine the total elongation and total strain of bar. Take E = 200 GPa.

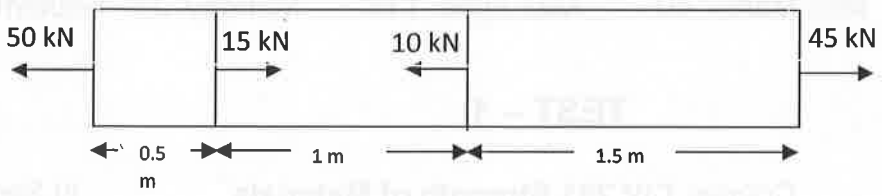


fig 2.

Part C

(1 Q x 12 M = 12 Marks)

6. An 18 mm diameter steel rod passes centrally through a copper tube of 26 mm internal diameter and 38 mm external diameter. The composite rod is 750 mm long and is closed at each end by a rigid plate. If the composite rod is subjected to an axial pull of 35 kN, find the stress induced in the steel rod and copper tube. Take $E_s = 2x10^5$ N/mm^2 and $E_c = 1x10^5$ N/mm^2.

ROLL NO:

PRESIDENCY UNIVERSITY, BENGALURU

SCHOOL OF ENGINEERING

TEST 2

Odd Semester: 2018-19 | **Date**: 27 November 2018

Course Code: CIV 201 | **Time**: 1 Hour

Course Name: Strength of Materials | **Max Marks**: 40

Branch & Sem: CIV & III Sem | **Weightage**: 20%

Instructions:

(i) Read the question properly and answer accordingly

(ii) Question paper consists of 3 parts

(iii) Scientific and Non-programmable calculators are permitted

Part A

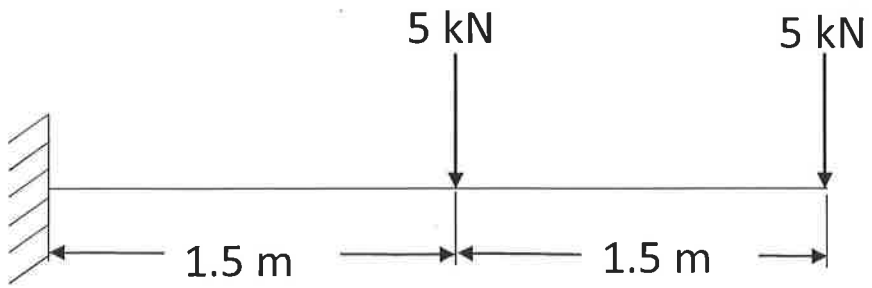
Answer **all** the Questions. **Each** question carries **four** marks. (3x4=12)

1. Explain different types of support with neat sketches.
2. List the assumptions in simple bending theory.
3. Draw shear stress diagram for these cross-sections of beams (a) Symmetrical I section, (b) Rectangular Section. Also show location of maximum shear stress.

Part B

Answer **all** the Questions. **Each** question carries **eight** marks. (2x8=16)

4. Find support reactions and draw shear force diagram (SFD) and bending moment diagram (BMD) for the beam given below.



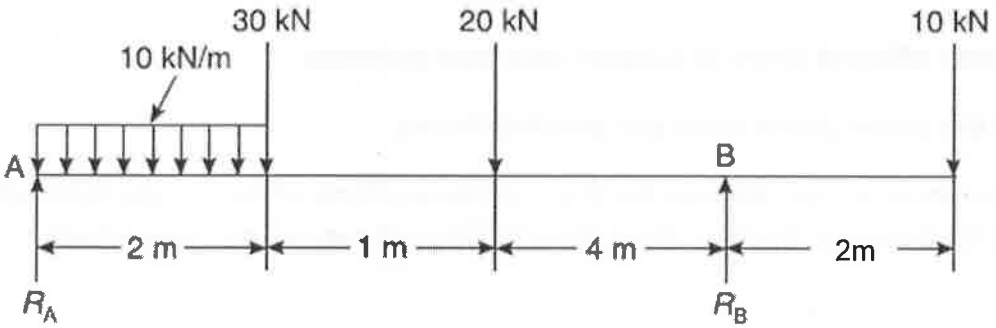
5. (a) Calculate the maximum bending stress induced in a steel pipe of external diameter 30 mm, internal diameter 10 mm and length of 4 m when the pipe is simply supported at its ends and carries a point load of 60 N at its center.

5. (b) A rectangular section - 250 mm wide and 500 mm thick is subjected to shear force of 100 kN. Calculate the maximum and average shear stresses. Draw the shear stress distribution diagram along the cross-section.

Part C

Answer the Question. Question carries **twelve** marks. (1x12=12)

6. Find support reactions and draw shear force diagram (SFD) and bending moment diagram (BMD) for the beam given below



Roll No.												

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING — SET B

END TERM FINAL EXAMINATION

Odd Semester: 2018-19 | **Date**: 24 December 2018

Course Code: CIV 201 | **Time**: 2 Hours

Course Name: Strength of Materials | **Max Marks**: 80

Programme & Sem: CIV & III Sem | **Weightage**: 40%

Instructions:

(i) *Read the question properly and answer accordingly.*

(ii) *Question paper consists of 3 parts.*

(iii) Scientific and Non-programmable calculators are permitted.

Part A

Answer **all** the Questions. **Each** question carries **five** marks. (4Qx5M=20)

1. Write Rankine's formula. Explain the terms
2. List the effective lengths for columns with various support conditions.
3. Write torsional formula. Explain the terms.
4. What are the assumptions of Torsion theory?

Part B

Answer **all** the Questions. **Each** question carries **ten** marks. (4Qx10M=40)

5. Derive Euler's formula for column with both ends fixed.
6. A solid round bar of 50 mm diameter and 3 m length is used as a column. Find the safe compressive load for the column if both ends are hinged. Take E = 2 x 10^5 N/mm^2 and factor of safety = 2.5.
7. A cast iron column 150 mm wide, 200 mm deep and 6m long is fixed at both ends. Calculate: Critical load as per Euler's criterion *and* safe load of column with factor of safety 3. Take E = 100 x10^3 N/mm^2.
8. Determine the maximum shear stress induced in a solid circular shaft of 100 mm diameter when the shaft transmits 150 kW power at 250 rpm.

Part C

Answer **both** the Questions. **Each** question carries **ten** marks (2Qx10M=20)

9. Derive Torsion formula for circular shaft.
10. A solid steel shaft has to transmit 100 kW of power at 200 rpm. Find the suitable diameter of the shaft if allowable shear stress is 75 N/mm^2 and angle of twist must not exceed 1° (0.01745 rads) over a length of 3m. Use C or G = 85 x10^3 N/mm^2.

Roll No.												

PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF ENGINEERING — SET A

END TERM FINAL EXAMINATION

Odd Semester: 2018-19 | **Date**: 24 December 2018

Course Code: CIV 201 | **Time**: 2 Hours

Course Name: Strength of Materials | **Max Marks**: 80

Programme & Sem: CIV & III Sem | **Weightage**: 40%

Instructions:

(i) *Read the question properly and answer accordingly.*

(ii) *Question paper consists of 3 parts.*

(iii) Scientific and Non-programmable calculators are permitted.

Part A

Answer **all** the Questions. **Each** question carries **five** marks. (4Qx5M=20)

1. Explain: (a) Slenderness ratio (b) Long Columns
2. List the effective lengths for columns with various support conditions.
3. What are the assumptions of Torsion theory?
4. Write torsional formula. Explain the terms.

Part B

Answer **all** the Questions. **Each** question carries **ten** marks. (4Qx10M=40)

5. Derive Euler's formula for column with both ends pinned or hinged.
6. A solid round bar of 60 mm diameter and 2.5 m length is used as a column. Find the safe compressive load for the column if both ends are hinged. Take E = 2 x 10^5 N/mm^2 and factor of safety = 3.
7. A cast iron column 120 mm wide, 180 mm deep and 6m long is fixed at both ends. Calculate: Critical load as per Euler's criterion *and* safe load of column with factor of safety 2. Take E = 100 x10^3 N/mm^2.
8. Determine the maximum shear stress induced in a solid circular shaft of diameter 125 mm when the shaft transmits 150 kW power at 175 rpm.

Part C

Answer the Question. Question carries **twenty** marks. (2Qx10M=20)

9. A solid steel shaft has to transmit 75 kW of power at 180 rpm. Find the suitable diameter of the shaft if allowable shear stress is 70 N/mm^2 and angle of twist must not exceed 1^o (0.01745 rads) over a length of 4m. Use C or G = 85 x10^3 N/mm^2.
10. Derive Torsion equation for circular shafts including polar moment of inertia.