Code No: R1622012 **R16** SET - 1

II B. Tech II Semester Regular Examinations, April - 2018
STRENGTH OF MATERIALS-II
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) Write about maximum principal stress theory. (3M)
   b) Define modulus of rupture. (2M)
   c) Define Shear stress? (2M)
   d) What are the effects of eccentric loads on a short column? (2M)
   e) What is the difference between symmetrical and unsymmetrical bending? (2M)
   f) Write the steps of method of sections. (3M)

PART -B

2. a) The principal stresses at a point across two perpendicular planes are 75 MN/m^2 (T) and 35 MN/m^2. Find the normal, tangential stresses and the resultant stress and its obliquity on a plane at 20^0 with the major principal plane. (7M)
   b) Mention the different theories of failure. Explain about any one. (7M)

3. a) What must be the length of a 5mm diameter Aluminium wire so that it can be twisted through one complete revolution without exceeding a shear stress of 42 MN/m^2.Take C = 27 GN/m^2 (7M)
   b) Derive the equation of torsion for hollow circular shaft. (7M)

4. A steel tube having 88mm outer diameter, 66mm inner diameter and 2.8m long is used as a strut with both ends hinged. The load is parallel to the axis of the strut but is eccentric. Find the maximum value of eccentricity so that crippling load on strut is 60 percent of the Euler's crippling load (14M)

5. Calculate the earth pressure of a retaining wall by Rankine's formula. (14M)

6. Determine the stresses and deflection for the mid section of the L beam by unsymmetrical method. Also determine the position of the neutral axis. (14M)
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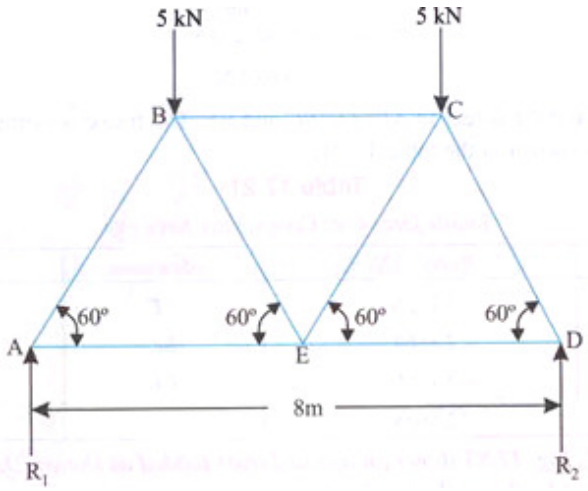
7. Determine the forces in members by method of sections (14M)



Code No: R1622012 **R16** SET - 2

II B. Tech II Semester Regular Examinations, April - 2018
STRENGTH OF MATERIALS-II
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) Write about maximum shear stress. (2M)
   b) What is angle of twist and what is its importance? (3M)
   c) What are the limitations f Euler's theorems? (2M)
   d) What is mid third rule? (2M)
   e) What is shear center? (2M)
   f) What is the difference between method of joints and method of sections? (3M)

PART -B

2. a) Determine the normal, shear and resultant stress in magnitude and direction in a plane, the normal of which makes an angle of 30^0 with the direction of $40MN/m^2$ stress (T) The value of other tensile stress is $20MN/m^2$. (7M)
   b) A mild steel shaft is subjected to a maximum torque of 10kNm and a maximum bending moment of 7.5 kNm at a particular section. If the allowable equivalent stress in simple tension is $160MN/m^2$ find the diameter of the shaft according to the maximum shear stress theory. (7M)

3. Derive the Torsion equation. (14M)

4. Derive Prof.PREYY'S formula (14M)

5. A short column of hollow cylindrical section 30cm outside diameter and 20 cm inside diameter carries a vertical load of 500kN along one of the diameter planes 10cm away from the axis of the column. Find the extreme stresses. (14M)

6. Derive the deflection of beams due to unsymmetrical bending. (14M)
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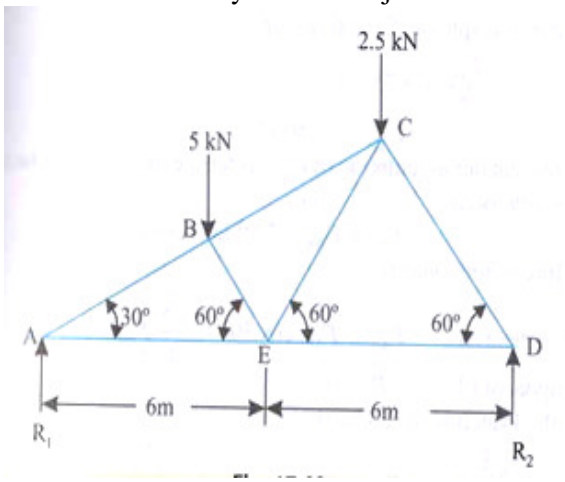
7. Determine the forces in members by method of joints (14M)



Code No: R1622012 **R16** SET - 3

II B. Tech II Semester Regular Examinations, April - 2018
STRENGTH OF MATERIALS-II
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1.	a)	What are principal stresses?	(2M)
	b)	Define shaft and what type of loads it can be subjected ?	(3M)
	c)	What are the assumptions of Euler's theorem?	(2M)
	d)	What is the condition for no tension in a section?	(2M)
	e)	What is unsymmetrical bending?	(2M)
	f)	Write the steps in method of joints	(3M)

PART -B

2.	a)	Determine the normal, shear and resultant stress in magnitude and direction in a plane, the normal of which makes an angle of 30^0 with the direction of $30MN/m^2$ stress (T) The value of other tensile stress is $15MN/m^2$.	(7M)
	b)	A mild steel shaft 120mm diameter is subjected to a maximum torque of 20kN/m and a maximum bending moment of 12kN/m a particular section. Find the factor of safety according to the maximum shear stress theory if the elastic limit in simple tension is $220MN/m^2$	(7M)
3.	a)	Write the assumptions of pure torsion.	(4M)
	b)	A hollow circular shaft 20mm thick transmits 294 kW at 200rpm.Determine the diameters of the shaft if the shear strain due to torsion is not to exceed 8.6×10^{-4} .Take Modulus of Rigidity as $80GN/m^2$	(10M)
4.		Derive the equation for long columns subjected to eccentric loading	(14M)
5.	a)	Draw the stress distribution diagram for a eccentrically loaded columns.	(7M)
	b)	Calculate the core of a hollow rectangular section.	(7M)
6.		Derive the stresses due to unsymmetrical bending	(14M)
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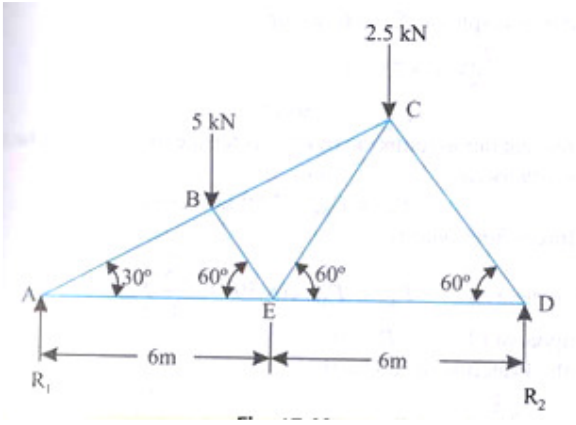
7. Determine the forces in members by method of sections (14M)



Code No: R1622012 **R16** SET - 4

II B. Tech II Semester Regular Examinations, April - 2018
STRENGTH OF MATERIALS-II
(Civil Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. Answer **ALL** the question in **Part-A**
3. Answer any **FOUR** Questions from **Part-B**

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PART –A

1. a) What are principal strains? (2M)
   b) What is torsion rigidity? (2M)
   c) What is slenderness ratio? (2M)
   d) Calculate the core of a circular section. (3M)
   e) What are the reasons for unsymmetrical bending? (3M)
   f) What are different types of beams? (2M)

PART -B

2. a) The principal stresses at a point across two perpendicular planes are 80 MN/ m^2 and 40 MN/m^2 (T). Find the normal, tangential stresses and the resultant stress and its obliquity on a plane at 30^0 with the major principal plane. (7M)
   b) A mild steel shaft is subjected to a maximum torque of 12kNm and a maximum bending moment of 10 kNm at a particular section. If the allowable equivalent stress in simple tension is 180MN/m^2 find the diameter of the shaft according to the maximum shear stress theory. (7M)

3 Derive the equation $T/I = \tau/R=C\theta/l$ (14M)

4. A steel tube having 100mm outer diameter, 80mm inner diameter and 3.8m long is used as a strut with both ends hinged. The load is parallel to the axis of the strut but is eccentric. Find the maximum value of eccentricity so that crippling load on strut is 60 percent of the Euler's crippling load (14M)

5. A short column of hollow cylindrical section 25cm outside diameter and 15 cm inside diameter carries a vertical load of 400kN along one of the diameter planes 10cm away from the axis of the column. Find the extreme stresses. (14M)

6. Determine the stresses and deflection for the mid section of the I beam by unsymmetrical method. (14M)
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7. Determine the forces in members by method of joints (14M)