Code No: RT22013 **R13** SET - 1

II B. Tech II Semester Supplementary 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 **THREE** Questions from **Part-B**

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PART –A

1. a) What is Mohr's circle of stresses? (4M)
   b) Draw springs in series and springs in parallel (4M)
   c) What are the different types of columns? (3M)
   d) Define bending stress &Direct stress (4M)
   e) What are the stresses in beam subjects to unsymmetrical bending? (4M)
   f) Define degree of freedom (3M)

PART -B

2. Derive expressions for principal stresses, principal planes and max shear stress if there are like direct stresses accompanied by a state of simple shear (16M)

3. A shaft transmits 300kW power at 120rpm. Determine the necessary diameter of solid circular shaft and the necessary diameter of hollow circular section, the inside diameter being 2/3 of the external diameter. The allowable shear stress is 70N/mm^2. Taking the density at material as 77N/m^3, calculate the %saving in the shaft if hollow shaft is used. (16M)

4. A column having a T section with a flange 120 mm x 16 mm and web 150 mm x 16mm is 3m long. Assuming the column to be hinged at both ends, find the crippling load by using Euler's formula. E = 2 x 10^6 Kg/cm^2 (16M)

5. A beam of rectangular cross section is subjected to pure bending with a moment of 20kNm. The trace of the plane of loading is inclined at 45^0 to the YY axis of the section. Identify the N.A of the section and calculate the bending stress induced at each corner of the beam section (16M)
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6. a) Explain in brief how stresses in beams due to unsymmetric bending is considered. (8+8M)
   b) Explain in brief the method of locating shear centre

7. Determine the forces in all the members of the frame by method of joints. (16M)