Code No: RT21013 **R13** SET - 1

**II B. Tech I Semester Supplementary Examinations, May/June - 2016**
**STRENGTH OF MATERIALS - I**
(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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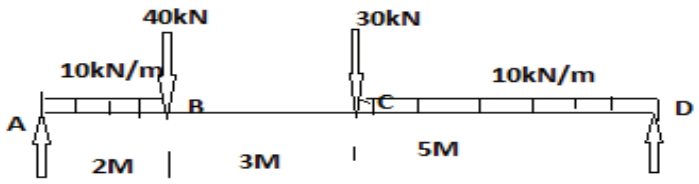
## PART –A

1. a) Draw the stress strain for mild steel with salient features. (4M)
   b) What are the different types of beams? (4M)
   c) What are the assumptions of simple bending? (4M)
   d) Draw the shear stress distribution diagram for a I beam. (3M)
   e) Derive the slope and deflection of a cantilever beam carrying a point load at free end. (4M)
   f) Derive the longitudinal stress of thin cylinder (4M)

## PART –B

2. a) A specimen of steel 30mm diameter with a guage length of 300mm is tested to destruction .It has an extension of 0.18mm under a load of 90kN and the load at elastic limit is 180kN .The maximum load is 200kN.The total extension at fracture is 60mm and diameter at neck is 18mm.Find the (i) stress at elastic limit (ii) Young's modulus (iii) Percentage of elongation (iv) Percentage of reduction in area and (v) Ultimate tensile stress. (10M)
   b) Derive the expression of strain energy for gradual loading. (6M)

3. a) Draw SFD and BMD for the beam shown below (12M)




   b) Derive the relation between SF, BM and rate of loading. (4M)



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4. a) A circular pipe of external diameter 70mm and thickness 8mm is used as a simply supported beam over an effective span 2.5m.Find the maximum concentrated load that can be applied at the centre of the span if permissible stress in tube is 150N/mm$^2$. (12M)
   b) Find the section modulus of a triangular section. (4M)

5. The T- section of flange 100mm x 12mm and web 12mm x 88mm is subjected to a shear force of 20 kN. Draw the shear stress distribution across the depth marking values at salient points. (16M)

6. a) Determine the slope and deflection of a simply supported beam carrying a udl of 30kN/m throughout the span. (10M)
   b) State and prove the Mohr's theorems I and II. (6M)

7. Derive Lami's equation for thick cylinders (16M)