Code No: RT21032 **R13** SET - 1

II B. Tech I Semester Supplementary Examinations, October/November - 2019
MECHANICS OF SOLIDS
(Com. to ME, AME, AE, MTE)

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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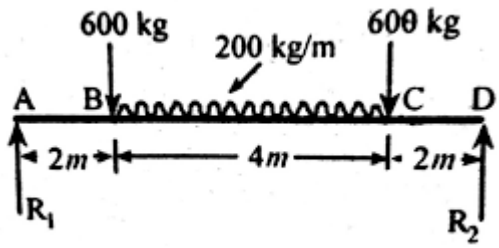
PART –A

1. a) Define fixed and overhanging beams with help of diagrams. (2M)
   b) Define toughness and resilience. (2M)
   c) Draw shear force and bending moment diagram for simple beam subjected to uniformly distributed load over entire span. (5M)
   d) Draw stress-strain diagram for any ductile material and mark all salient points on it. (3M)
   e) A simple beam of length 6m is subjected to uniformly distributed load of intensity 20KN/m over the entire span. Calculate slope at the ends and deflection at the center. Take E=210GPa, I=9500 cm^4 (5M)
   f) Explain importance of calculating stresses in cylindrical shells. (3M)
   g) Write torsion formulae and discuss all parameters. (2M)

PART –B

2. A specimen of steel 25mm diameter with a gauge length of 200mm is tested to destruction. It has an extension of 0.16mm under a load of 80KN and load at the elastic limit is 160KN. The maximum load is 180KN. The total extension at fracture is 56mm and diameter at neck is 18mm. Find i) stress at elastic limit ii)Young's modulus iii) percentage elongation iv) percentage reduction area v) ultimate tensile stress (16M)

3. Draw the Shear force and bending moment diagram for the loaded beam as shown in figure. (16M)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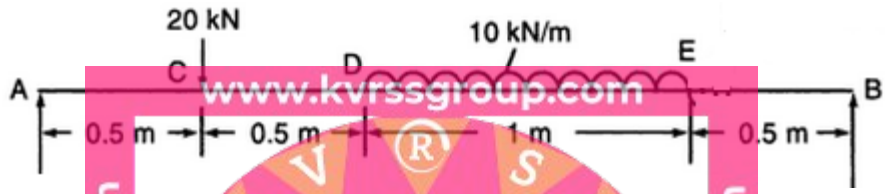
4. A cast iron beam has an I section with top flange 100mmx40mm, web 140mmx20mm and bottom flange 180mmx40mm. If tensile and compressive stresses are not to exceed 35MPa and 95MPa respectively, what is the maximum uniformly distributed load the beam can carry over a simply supported span of 6m if the larger flange is in tension. (16M)

5. Determine deflection and slope at C for the beam loaded as shown in fig. The beam has a cross section 40 mm wide and 100 mm deep. E= 200 GPa. (16M)



6. A cylindrical shell 3 meters long which is closed at the ends has an internal diameter of 1m and wall thickness of 15 mm. Calculate the circumferential and longitudinal stresses induced and also changes in dimensions of the shell, if it is subjected to an internal pressure of 1.5 N/mm^2. Take E = 2 X 10^5 N/mm^2 and also and μ = 0.3 (16M)

7. Determine the maximum and minimum hoop stress across the section of a pipe of 400mm internal diameter and 100mm thick, when the pipe contains a fluid at a pressure of 8 N/mm^2. Also sketch the variation of hoop and radial stress distribution across the thickness. (16M)