Roll No. .....

24171

B. Tech. 4th Semester (ME) Examination – May, 2017

STRENGTH OF MATERIALS - I

Paper : ME-206-F

Time : Three Hours] *[Maximum Marks : 100*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : There are 9 questions in total and students have to attempt 5 questions in total. Q. No. 1 is ***compulsory***. Atleast ***one*** question must be attempted from each Section.

1. Mention the terms : 20

(a) Poison ratio.

(b) Mohr's circle.

(c) Point of contraflexure.

(d) Gordon's formulae.

(e) Method of integration.

(f) Hook's law.

(g) Slenderness ratio.

(h) Shear stress.

(i) Elastic constants.

(j) Two-dimensional stress system.

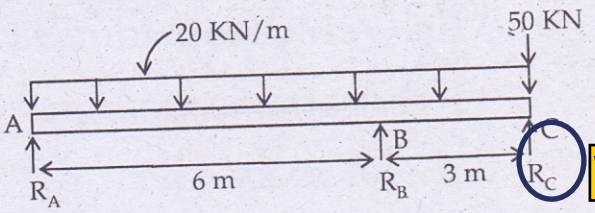
SECTION – A

2. Derive the relationship between elastic constants. 20

3. A cast iron block of 5 cm^2 cross-section carries an axial compressive load of 50 KN, calculate the magnitude of normal and shear stresses on a plane, whose normal is inclined at 30° to the axis of block. Also determine the maximum shear stress in the block. 20

SECTION – B

4. Draw the S.F. & B.M. diagram for the overhanging beam carrying load as shown in Fig. Mark the values of principal ordinates and locate the point of contraflexure if any. 20



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5. (a) Describe the advantages of hollow shafts over solid shafts. 10

   (b) Prove that a hollow shaft of same weight and material as that of a solid shaft can resist more torque. 10

SECTION – C

6. Explain applications of bending stresses to beams of circular, rectangular, IT and channel sections. 20

7. A tubular steel strut is 8 cm external diameter and 5 cm internal dia., 3 m long and has hinged ends. This is subjected to eccentric load. Find the maximum eccentricity for a crippling load of 60% of Euler load. The yield stress being 300 MPa and E=200 GPa. 20

SECTION – D

8. Derive an expression of uniformly distributed load on simply supported beam. 20

9. Derive and explain moment area method for fixed beam. 20
