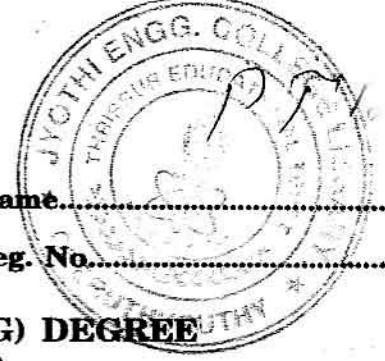


D 51471

(Pages 2)

Name.....

Reg. No.....



**THIRD SEMESTER B.TECH. (ENGINEERING) DEGREE
EXAMINATION, DECEMBER 2008**

CE 04 303—MECHANICS OF SOLIDS

(2004 admissions.)

Time : Three Hours

Maximum : 100 Marks

Part A

- I. (a) Define strain energy. Derive expression for strain energy due to axial load.
- (b) Discuss on strain Rosette.
- (c) Mention assumptions made in theory of pure (simple) bending.
- (d) Write short note on shear centre.
- (e) Discuss on method of superposition.
- (f) Compare moment area method and conjugate beam method.
- (g) Discuss on Slenderness ratio.
- (h) Discuss on Lamé's equation for analysing cylinders.

(8 × 5 = 40 marks)

Part B

- II. (a) A copper rod 30 mm diameter is surrounded tightly by a cast iron tube of 60 mm outside diameter, the ends being firmly fastened together. When put to a compressive load of 15 kN, what will be the load shared by each? Also estimate the amount by which the compound bar shortens in a length of 500 mm. Assume E of cast iron = 1.2×10^5 N/mm² and E of copper = 1×10^5 N/mm².

Or

- (b) (i) The principal stresses at a certain point in a strained material are 120 N/mm² and 48 N/mm², both tensile. Find normal and tangential stresses on a plane inclined at 20° with the major principal plane.

(9 marks)

- (ii) At a point in two dimensional system, the normal stresses on two mutually perpendicular planes are P and P^1 (both alike) and shear stress is q . Show that one of the principal stresses is Zero if $q^2 = pp^1$.

(6 marks)

Turn over

from A, the bearings of C and B are 320° and 230° respectively, AB being 25 metres. Find the width of the river.

b) Find the hypotenusal allowance per chain of 20m length if

- i) The angle of slope is 10°
- ii) The ground rises by 4m in one chain length

10. List out and explain the various errors in plain tabling and also add a short note on local attraction

OR

11. Explain in detail with the help of sketches the three point problem in plain table surveying

12. Explain in detail the temporary and permanent adjustments of a level.

OR

13. The following perpendicular offsets were taken at 10m interval from a survey line to an irregular boundary line:

3.25, 5.60, 4.20, 6.65, 8.75, 6.20, 3.25, 4.20, 5.65 (Meters). Calculate the area enclosed between the survey line, the irregular boundary line and the first and last offsets by the application of

- a) Trapezoidal rule
- b) Simpsons rule

14. Write short notes on a) Elements of a curve
b) Temporary adjustments of a theodolite

OR

15. The following consecutive readings were taken with a dumpy level : 6.21, 4.92, 6.12, 8.42, 9.81, 6.62, 7.91, 8.62, 9.71, 10.21 (Meters). The level was shifted after 4th, 6th and 9th readings. The reduced level at first point was 100m. Rule out a page of your answer book as a level field book and fill all the columns. Use collimation system and apply the usual arithmetical check. Indicate the highest and lowest points.

(4x10 marks = 40 marks)
