Total No. of Questions – [4] Total No. of Printed Pages 2

G.R. No.	

U218-154 (T2)

OCTOBER 2018/ IN-SEM (T2)

S. Y. B. TECH. (MECHANICAL ENGINEERING) (SEMESTER - I)

COURSE NAME: STRENGTH OF MATERIALS

COURSE CODE: MEUA21174

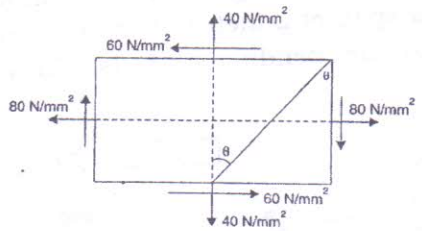
(PATTERN 2017)

Time: [**1Hour**] [Max. Marks: **30**]

(*) Instructions to candidates:

1) **Answer Q.1 OR Q.2 and Q.3 OR Q.4.**
2) **Figures to the right indicate full marks.**
3) **Use of scientific calculator is allowed**
4) **Use suitable data wherever required**

Q.1) a) Determine normal stress, tangential stress and resultant stress on a plane inclined at an angle of 45^0 to the axis of minor tensile stress. Use Mohr's circle method. [6 marks]

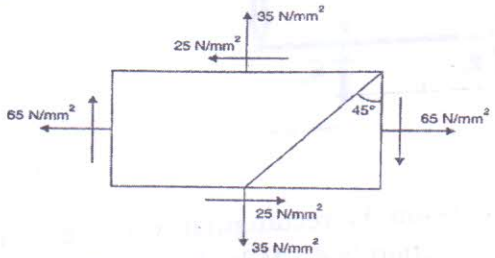


b) List various theories of failure and explain maximum principal stress theory. [6 marks]

c) Describe Principal plane and Principal stress with neat sketch [4 marks]

OR

Q.2) a) Determine normal stress, tangential stress and principal stresses. Use graphical method. [6 marks]



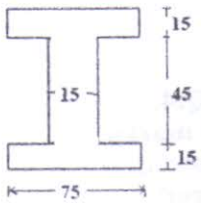
b) Derive the equation for member subjected in two mutually perpendicular direct stresses. [6 marks]

c) Explain the theory of failure used for Ductile material [4 marks]

Q.3) a) What are the assumptions in Theory of pure bending? Derive the following relation. [6 marks]

$$\frac{M}{I} = \frac{E}{R} = \frac{\sigma}{y}$$

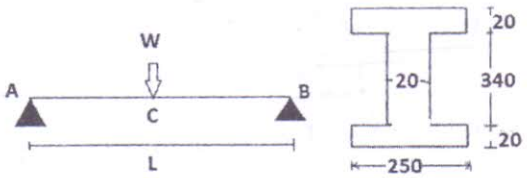
b) The beam of cross section as shown in following figure and subjected ending maximum bending moment of 8 kNm. Determine the maximum bending stresses. [4 marks]



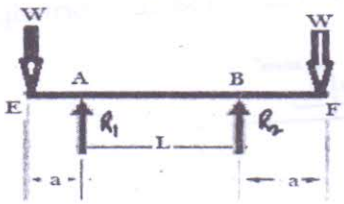
c) Prove that the shear stress on the triangular section is 3/2 times of average shear stress [4 marks]

OR

Q.4) a) A simply supported beam having I section as shown in figure carries a central load W KN over a span of L meter. If the maximum shear stress is to be 45 N/mm^2 when maximum bending stress is 150 N/mm^2. Calculate W and L. [6 marks]



b) Prove that the following loading diagram is a case of pure bending. Support the explanation with an example. [4 marks]



c) The cross section of the beam is rectangular 60 × 80 mm deep. The maximum shear stress in the section is 45 MPa. Calculate the shear stress at a section 40 mm above neutral axis and 20 mm above neutral axis. [4 marks]

*****Best Luck***