Roll No. .....

24476

B. Tech. 7th Semester (ME)
(Common with Special Chance)
Examination – December, 2019

STRENGTH OF MATERIAL-II

Paper : ME-401-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 : Attempt any ***five*** questions in all. Question No. **1** is ***compulsory***. Attempt other ***four*** questions by selecting ***one*** question from each Section. All questions carry equal marks.

1. Define : $10 \times 2 = 20$

(a) Strain Energy
(b) Spring Index
(c) Helix Angle
(d) Product of Inertia
(e) Proof Resilience
(f) Principal Axis
(g) Open coil helical spring
(h) Flexural Axis
(i) Principal moment of inertia
(j) Unsymmetrical Bending

SECTION – A

2. (a) Derive an expression for strain energy stored in a body under impact loading. 10

(b) Write down the parallel axis theorem for product of inertia & explain each term. 10

3. A mild steel hollow shaft of 10 cm external diameter & 5 cm internal diameter is subjected to a twisting moment of 8kN-m & a bending moment of 2.5 kN-m. Poissions ratio is 0.25 calculate the principal stresses & find the direct stress which acting alone, would produce the same : (a) Maximum elastic strain energy (b)Maximum elastic share strain energy as produce by the principal stress acting together. 20

SECTION – B

4. Explain the expression for stresses in a thin cylindrical vessel. 20

5. A thin cylindrical shell of dia. 300 mm and wall thickness 6 mm has hemispherical ends. If there is no distortion of the junction under pressure, determine the thickness of hemispherical ends.

Take E-208GN/m^2 & Poisson's ratio-0.3 20

SECTION – C

6. A proving ring is 25 mm diameter 40 mm wide & 6 mm thick, max stress permitted is 550MN/m^2. Find out load to cause this stress & load to give 6 mm deflection along the load line. E-200GN/m^2. 20

7. Explain radial & hoop stresses and strains in thick and spherical shells subjected to internal fluid pressure only. 20

SECTION – D

8. Two concentric springs are subjected to an axial load of 6KN. The maximum allowable deflection of the springs is 4cm & the solid length is 5 cm. If the springs are made of the same material having G = 84 GPA and the maximum allowable shear stress is 850 MPA, calculate : 20

(a) Load shared by springs

(b) Wire diameters

Take inner springs diameter = 8 cm & radial clearance 0.25 cm.

9. Explain Lame's equations. Derive and explain Castigliano's theorem for deflection of ring. 20
