

Roll No.

3208

**B. Tech. 5th Semester (ME)
Examination – March, 2021**

SOLID MECHANICS

Paper : PCC-ME-303-G

Time : Three hours]

[Maximum Marks : 75

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 : Question No. 1 is *compulsory*. Attempt total *five* questions selecting *one* question from each Section. All questions carry equal marks.

1. (a) Define Modulus of Resilience.
- (b) What do you understand by term Theory of failure ?
- (c) What is the role of spring ? What are various types of springs ?
- (d) Explain unsymmetrical bending.

- (e) Explain Concentric spring.
- (f) Define and explain the term : unsymmetrical bending and shear centre.

SECTION – A

2. Prove that the maximum stress induced in a body due to suddenly applied load is twice the stress induced when the same load is applied gradually.
3. What do you understand by term Theory of failure ? Explain the important theories of failure.

SECTION – B

4. What do you mean by Lamé's equation ? How will you derive this equation ? <https://www.mdustudy.com>
5. Write down the parallel axis theorem for product of inertia & explain each of them.

SECTION – C

6. A Thick cylinder with internal radius of 8 cm and external radius of 16 cm is subjected to an internal fluid pressure of 80 MPa. Draw the variation of radial and hoop stress in the cylinder wall. Also find out the maximum shear stress in the cylinder wall.

7. Prove that the circumferential stress in a rotating cylinder with a pin hole at a centre is two times the maximum circumferential stress in solid cylinder.

SECTION – D

8. Derive the expression for the stresses in open coiled helical spring subjected to axial load and twisting couples.
9. Derive and explain Castigliano's theorem for deflection of ring.
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