

Roll No. ....

**3027**

**B. Tech. 3rd Semester (Civil Engg.)  
Examination – December, 2022**

**ENGINEERING MECHANICS**

Paper : PCC-CE-203-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 :** Attempt *five* questions in all, selecting *one* question from each Unit. Question No. 1 is *compulsory*. All questions carry equal marks.

1. Write short notes on :
- |                     |              |
|---------------------|--------------|
| (a) Principal Axes. | 2.5 × 6 = 15 |
| (b) Hooke's Law.    |              |
| (c) Shear Force.    |              |
| (d) Strain Energy.  |              |

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- (c) Resilience:  
 (d) Buckling Load.

**UNIT - I**

2. Explain stress strain Diagram for Ductile Materials ?  
 Derive the relationship between elastic constant. 15
3. The principal stresses at a point across two perpendicular planes are  $75 \text{ MN/m}^2$  (tensile) and  $35 \text{ MN/m}^2$  (tensile). Find the normal, tangential stresses and resultant stress. Its obliquity on a plane at  $20^\circ$  with major principal planes 15

**UNIT - II**

4. Draw shear force and bending moment diagram for SSB AB of span 9m carrying udl  $1800 \text{ N/m}$  run on the part CD of span so that  $AC = 2\text{m}$ ,  $CD = 4\text{m}$  and  $BD = 3\text{m}$ . 15
5. Derive the Bending equation for the simple bending of a beam. List the assumption made therein. 15

**UNIT - III**

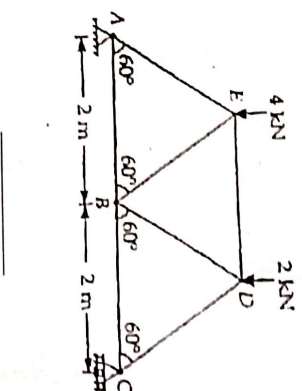
6. Prove that the maximum stress induced in a body due to suddenly applied load is twice the stress induced when the same load is applied gradually. 15

3027-1750-(P-3)/(Q-9)/(22) ( 2 )

7. Derive the expression for critical load when both ends are fixed. 15

**UNIT - IV**

8. If principal stresses at a point in an elastic material are  $2l$  tensile,  $f/2$  compressive. Calculate value of  $f$  according to five different theories.  $\sigma_{y1} = 200 \text{ N/mm}^2$ ,  $\nu = 0.3$ . 15
9. Determine the forces in all the members of Truss. 15



3027-1750-(P-3)/(Q-9)/(22) ( 3 )