**18CE303**

**Hall Ticket Number:**

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| **II/IV B.Tech (Regular / Supplementary) DEGREE EXAMINATION** | | | |
| **February, 2021** | **Civil Engineering** | | |
| **Third Semester** | **Solid Mechanics** | | |
| **Time:** Three Hours | | **Maximum: 5**0 Marks | |
| *Answer ALL Questions from PART-A.* | | | (1X10 = 10 Marks) |
| *Answer* ***ANY FOUR*** *questions from PART-B.* | | | (4X10=40 Marks) |
|  | | | **PART-A** |

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| 1. | a) | a) Draw the stress-strain graph for mild steel and indicate salient points on it. | CO1 |  |
|  | b) | b) Define Poission’s ratio. | CO1 |  |
|  | c) | c) Define thin cylinder. | CO1 |  |
|  | d) | d) Write the relation between load, shear force and bending moment. | CO2 |  |
|  | e) | e) What is point of contra flexure? | CO2 |  |
|  | f) | f) What do you understand about bending moment in beams? | CO2 |  |
|  | g) | g) Write any two assumptions made in Pure bending theory. | CO3 |  |
|  | h) | h) Write the expression to find shear stress in a beam subjected to vertical loads. | CO3 |  |
|  | i) | i) Sketch the shear stress distribution for a circular section and indicate maximum shear stress on it. | CO3 |  |
|  | j) | What is Sectional modulus? | CO4 |  |
| **PART-B** | | | | |
| 2. |  | Two vertical rods one of steel and the other of copper are each rigidly fixed at the top and 50cm apart. Diameters and lengths of each rod are 2cm and 4cm respectively. A cross bar fixed to the rods at the lower ends carries a load of 5000N such that the cross bar remains horizontal even after loading. Find the stress in each rod and the position of the load on the bar.Take Esteel = 2x105N/mm2 and Ecopper = 1x105N/mm2. | CO1 | 10M |
|  |  |  |  |  |
| 3. |  | a) Obtain the relation between E, G and K  b) A cylindrical pipe of diameter 1.5m and thickness 1.5cm is subjected to an internal fluid pressure of 1.2 N/mm2.Determine:  i) Longitudinal stress developed in the pipe  ii) Circumferential stress developed in the pipe. | CO1 | 10M |
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| 4. |  | Sketch the SFD and BMD for a simply supported beam shown in the following Figure. | CO2 | 10M |
|  |  |  |  |  |
| 5. |  | A simply supported beam carrying UVL as shown in Fig. 2. Calculate the position and magnitude of maximum bending moment.      **Fig.2** | CO2 | 10M |
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| 6. |  | Derive the Pure Bending Equation | CO3 | 10M |
|  |  |  |  |  |
| 7. |  | An I section beam 350mmx 150mm has a web thickness of 10mm and a flange thickness of 20mm.If the shear force acting on the beam is 40KN .Find the maximum shear stress developed in the I-section. **Fig.3**    **Fig.3** | CO3 | 10M |
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| 8. |  | Derive the relation for a circular shaft when subjected to Torsion as given below | CO4 | 5M |
|  |  |  |  |  |
| 9. |  | A closed coil helical spring is made with 12mm diameter wire and is having mean diameter of 150mm and 10 complete turns. The modulus of rigidity of of the material of spring is 80N/mm2.When a load of 450N is applied, Find  i) Maximum shear stress ii) Deflection produced iii) Stiffness of the spring | CO4 | 5M |

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