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| ***C:\Users\india\Desktop\tkrcet-logo.jpgR20 Regulation…….. Subject code: C33PC3***  TKR COLLEGE OF ENGINEERING AND TECHNOLOGY  (Autonomous, Accredited by NAAC with ‘A’ Grade)  *Model paper*  **B.Tech. II Year I Semester Regular Examinations, February 2022**  **Subject: *(MECHANICS OF SOLIDS)***  ***(MECHANICAL)***  ***Maximum Marks: 70*** Duration: 3 hours  **Note:** **1.This question paper contains two parts A and B.**  **2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.**  **3. Part B consists of 5 Units. Answer any one full question from each unit.**  **4. Each question carries 10 marks and may have a, b, c, d as sub questions.** | | | | | | | | |
| Part-A | | | | | | | | |
| **All the following questions carry equal marks (10 X 2M=20 Marks)** | | | | | | | | |
| Q.NO | | QUESTIONS | Marks | | CO attainment | | Blooms Taxonomy Level | |
| 1 | | Draw the stress-strain curve for mild steel and indicate salient points. | 2 | | 1.5 | | Remembering | |
| 2 | | Define Volumetric strain and Factor of safety? | 2 | | 2 | | Understanding | |
| 3 | | Draw the shear force and bending moment diagram for a cantilever beam of length  L and carrying a point load F at the free end. | 2 | | 2 | | understanding | |
| 4 | | What is beam ? Explain types of beams. | 2 | | 1.5 | | Remembering | |
| 5 | | What is the section modulus for a triangular cross section? | 2 | | 1 | | Remembering | |
| 6 | | What assumptions are made in theory of simple bending? | 2 | | 1.5 | | Remembering | |
| 7 | | What are the axial stresses and compound stresses? | 2 | | 1 | | Remembering | |
| 8 | | What is maximum principal stress theory? | 2 | | 2 | | understanding | |
| 9 | | What is polar modulus? | 2 | | 3 | | Application | |
| 10 | | What is hoop-stress and volumetric strain in shells? | 2 | | 2 | | Evaluate | |
| Part-B | | | | | | | | |
| Answer All the following questions. (**5 X 10 M=50Marks)** | | | | | | | | |
| 11 | A bar of 25 mm. diameter is subjected to a pull of 70 kN. The extension measured on a gauge length of 200 mm is 0.1 mm and change in diameter is 0.004 mm. Find Poisson’s ratio and values of three moduli. | | | 10 | | 2 | | Analyze |
|  | OR | | |  | |  | |  |
|  | A straight bar 500 mm long is 25 mm diameter and 300 mm length is 15 mm dia. for the remaining length. If the bar is subjected to an axial pull of 15 kN, find the extension of the bar. Take E = 200 Gpa. | | | 10 | | 1.5 | | Analyze |
| 12 | A horizontal beam 10 m long carries a uniformly distributed load of 100 N/m over its entire span and in addition a concentrated load of 200 N at the left end. The beam is supported at two points 8 m apart. Draw the shear force and bending moment diagrams. | | | 10 | | 1.0 | | Apply |
|  | OR | | |  | |  | |  |
|  | A simply supported beam of span 9 m has UDL of 15 kN/m over 4 m from left support and a concentrated load of 20 kN at the centre. Draw the SF and BM diagrams. | | | 10 | | 1.5 | | Apply |
| 13 | A cantilever of length 10 m has a cross section of 100 mm × 130 mm has UDL of 10 KN/m over a length of 8 m. from the left support and a concentrated load of 10 KN at the right end. Find bending stress in the beam. | | | 10 | | 1.0 | | Apply |
|  | OR | | |  | |  | |  |
|  | A wooden beam 100 mm wide, 250 mm deep and 3 m long is carrying a uniformly distributed load of 40 kN/m. Determine the maximum shear stress and sketch the variation of shear stress along the depth of the beam. | | | 10 | | 1.0 | | Apply |
| 14 | A point in a strained material is subjected to a tensile stress of 120 MPa and a clockwise shear stress of 40 MPa. What are the values of of normal and shear stresses on a plane inclined at 450 with the normal to the tensile stress. | | | 10 | | 1.0 | | Apply |
|  | OR | | |  | |  | |  |
|  | A plane element in a boiler is subjected to tensile stresses of 400 MPa on one plane and 150 MPa on the other at right angles to the former. Each of the above stresses is accompanied by a shear stress of 100 MPa such that when associated with the minor tensile stress tends to rotate the element in anticlockwise direction. Find (a) Principal stresses and their directions. (b) Maximum shearing stresses and the directions of the plane on which they act. | | | 10 | | 1.0 | | Apply |
| 15 | A cylindrical shell of 1.3 m diameter is made up of 18 mm thick plates. Find the circumferential and longitudinal stress in the plates, if the boiler is subjected to an internal pressure of 2.4 MPa. Take efficiency of the joints as 70% | | | 10 | | 1.0 | | Apply |
|  | OR | | |  | |  | |  |
|  | A hollow shaft is to transmit 400 KW power at 120 rpm. if the shear stress in not to exceed 60 N/mm2 and internal dia. is 0.65 of the external dia. Find internal and external diameters assuming that the maximum torque is 1.5 times the mean? | | | 10 | | 1.0 | | Understanding |

Note: 1.Set the question paper as per Syllabus. 2. Descriptive each question carries 10 marks and may have a,b,c,d or i,ii,iii,iv as sub questions.