**STATE BOARD OF TECHNICAL EDUCATION & TRAINING**

Question paper pattern for unit tests in the subject

**MECHANICS OF SOLIDS**

 PKG-302(C-14)

 Unit Test - I

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S.No | Chapter | Periods | Short answer questions | Essay questions |
| 1.  | Simple stress and Strain | 08 | 02 | 01 |
| 2 | Strain energy | 08 | 01 | 01  |
| 3 | Geometric properties of section | 10 | 02 | 01 |

Unit Test – II

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| S.No | Chapter | Periods | Short answer questions | Essay questions |
| 4 | Shear force and bending moment | 12 | 01 | 02 |
| 5 | Theory of simple bending | 08 | 01 | 01 |
| 6 | Torsion of shafts & springs | 08 | 02 | 01 |
| 7 | Thin Cylinders | 06 | 01 | 01 |

**UNIT TEST-I MODEL PAPER SET-I**

**STATE BOARD OF TECHNICAL EDUCATION & TRAINING**

**MECHANICS OF SOLIDS**

**Subject Code: PKG – 302, C-14**

 Time: 1 hrs Max marks: 20

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UNIT TEST – I

Section – A

 Answer all questions 3x2 = 6

1. Define Stress, strain and elasticity?
2. Define Strain energy and explain how it is stored in a body.
3. Define the terms Centre of gravity, Moment of inertia

Section – B

 Answer any two questions 2x7 = 14

4. A steel rod 20mm dia and 600mm long is subjected to an axial pull of 40kN.Determine the

 elongation of the rod if E = 2 x 105 N/mm²

5. A bar 3 m long and 50 mm diameter hangs vertically and has a collar securely attached to the lower end. Find the maximum instantaneous stress induced when a

 a) Weight of 2500 N falls through a height of 130mm on to the collar.

 b) Weight of 25000 N falls through a height of 13mm on to the collar.

 Take E = 2 x 105 N/mm2.

6. Find the Moment of Inertia channel section shown in fig..

 150 mm

 20mm

 120mm

 20mm

**UNIT TEST-I MODEL PAPER SET-II**

**STATE BOARD OF TECHNICAL EDUCATION & TRAINING**

**MECHANICS OF SOLIDS**

**Subject Code: PKG – 302, C-14**

Time: 1 hrs Max marks: 20

**Section – A**

 Answer all Questions 3 X 2 = 6

1. Define Hooke’s law?
2. Write short notes on

 a. Resilience

 b. Proof resilience

 c. Modulus of resilience

1. Define parallel axis theorem?

Section – B

 Answer any two Questions 2 X 7 = 14

4. Draw stress- strain diagram for mild steel and explain the silent points

5. Find the Moment of Inertia T- section shown in fig..

6. A rectangular beam 80 mm x 40 mm is 3m long and simply supported at the ends. It carries a load of 1 kN at the mid-span. Determine the maximum bending stress induced in the beam

**UNIT TEST-II MODEL PAPER SET-I**

**STATE BOARD OF TECHNICAL EDUCATION & TRAINING**

**MECHANICS OF SOLIDS**

**Subject Code: PKG – 302, C-14**

Time: 1 hrs Max marks: 20

**Section – A**

 Answer all Questions 3 X 2 = 6

1. Define shear force and bending moment?
2. State the bending equation and mention the units of each quantity in the equation?
3. What are the various types of springs, what is laminated spring?

Section – B

 Answer any two Questions 2 X 7 = 14

1. Draw the SF and BM Diagram for the Cantilever beam shown in fig.

5. A steel wire 6mm diameter is bent into circular shape of 6m radius. Determine the maximum strain induced in the wire Take E = 2 x 105 N/mm2.

6. Calculate the hoop and longitudinal stresses in the material of a thin cylindrical shell of 3 m diameter and 30 mm thick subjected to an internal pressure of 2 N/mm2.

**UNIT TEST-II MODEL PAPER SET-II**

**STATE BOARD OF TECHNICAL EDUCATION & TRAINING**

**MECHANICS OF SOLIDS**

**Subject Code: PKG – 302, C-14**

Time: 1 hrs Max marks: 20

**Section – A**

 Answer all Questions 3 X 2 = 6

1. Write the sign convention of SF and BM
2. Define (a) Moment of resistance (b) Section modulus
3. Define Hoop Stress and longitudinal stress?

Section – B

 Answer any two Questions 2 X 7 = 14

4. What is spring? Explain its uses?

5. An axial pull of 100 kN is gradually applied on a circular steel rod 3m long and 40mm diameter. Find the strain energy that can stored in the rod. If E for rod material is 2.0 x 105 N/mm2.

6. Calculate the hoop and longitudinal stresses in the material of a thin cylindrical shell of 5 m diameter and 45 mm thick subjected to an internal pressure of 3 N/mm2.