

DETAILED SYLLABUS FOR THE POST OF TRADESMAN
(STRENGTH OF MATERIAL) IN TECHNICAL EDUCATION -
DIRECT RECRUITMENT

(Cat. Nos: 422/2023)

Module 1. Simple stress and strain -10 marks

Material classification, Elasticity, Stress, Strain, Types of strain, Elastic limit, Hooke's law, Stress Strain curve, Simple problems based on stress strain relation, Stress in composite material, Thermal stress

Module 2. Elastic constraints -10 marks

Longitudinal strain, Lateral strain, Poisson's Ratio, Volumetric Strain, Bulk modulus, Relation between different strains, Shear stress, Modulus of Rigidity

Module 3. Strain energy and impact load -10 marks

Strain energy, Different types of loading, Resilience, Proof resilience, Modulus of resilience

Module 4. Centre of gravity -10 marks

Centre of gravity of geometrical figures (Rectangle, square, circle, triangle), Moment of inertia, Parallel axis theorem, Perpendicular axis theorem, Moment of inertia of Square, Rectangle and Circle.

Module 5. Framed structures -10 marks

Classes of frame, Perfect frame, Imperfect frame (deficient frame, redundant frame), Reactions of support.

Module 6. Shear force and bending moment of beams -10 marks

Types of beams, types of loading, Shear force and Bending moment of different types of beams, bending stress in beams, Point of Contraflupture, Theory of simple bending, Bending equation

Module 7. Deflection of beams -10 marks

Deflection of beams, Deflection of composite beams, Fixed beams, Continuous beams, Direct stress, Bending stress

Module 8. Column and struct -10 marks

Classification Of column, Failure of columns, Euler's equation and Condition of columns, Equivalent length and Effective length of columns, Slenderness ratio, Rankine's formula, Johnson's formula

Module 9. Torsion of shafts -10 marks

Torsional stress and strain in circular shafts, Polar moment of inertia, Torsion equation, Power transmitted by shafts, Composite shafts, Strength of shafts, Solid shaft and hollow shaft, Modulus of rupture, Spring, Bending spring, Torsional spring, Stiffness of spring

Module 10. Mechanical testing of materials 10 marks

Types of mechanical tests of materials, Hardness test, Tension test, Compression test, Shear test, bending test, Torsional test, Impact test, Buckling of long column test, Fatigue test

NOTE: - It may be noted that apart from the topics detailed above, questions from other topics prescribed for the educational qualification of the post may also appear in the question paper. There is no undertaking that all the topics above may be covered in the question paper.

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