

INSTRUCTIONS TO PAPER SETTERS:**MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only one question from each unit.
3. Use of relevant Indian Codes/Standards/Guidelines will be permitted.

UNIT – I

Concrete making materials – Cement, mineral additives, aggregates, water, admixtures. Types of structural steel and their properties. Batching plant and equipment, types of mixers, transportation, pumping and placing of concrete, nominal mixes and design mixes, Design codes and handbooks.

Properties of hardened concrete: Effects of water cement ratio, compaction, age, curing on strength of concrete. Compressive strength, grades of concrete, bond strength, shrinkage and creep, durability, chemical attack, sulphate attack, resistance to abrasion, resistance to fire, marine atmosphere.

[No. of Hours: 10]**UNIT – II**

Reinforced concrete design philosophies, Working stress design. Concept of limit states. Limit states design, partial safety factors. Codal recommendations. Characteristic and design values, Factored loads, design stress strain curves.

Limit state of Collapse: Flexure, Shear, bond and torsion, Compression, Limit state of Serviceability.

[No. of Hours: 11]**UNIT – III**

Analysis and design of singly and doubly reinforced simply supported cantilever and continuous beams and flanged beam section, lintels, Design principles of retaining walls.

Design of simply supported, cantilever slabs, one way and two way slabs.

[No. of Hours: 10]**UNIT – IV**

Design of short and slender columns under axial load, under uniaxial and biaxial bending and shear force.

Design of isolated footing for vertical load and Moment, Design of combined footings.

[No. of Hours: 11]**Text and Reference Books:**

1. M.L.Gambhir, “Reinforced Concrete Design”, Prentice Hall of India
2. Neville, “Concrete Technology”, Pearson Education.
3. M.S.Shetty, “Concrete Technology”, S.Chand & Co.
4. A.K. Jain, “Limit State Design of Reinforced Concrete Structures”, Nem Chand Publishers, Roorkee.
5. M.L. Gambhir, “Concrete Technology”, McGraw Hill Publications.
6. Neville, “Properties of Concrete”, Pearson Education.
7. Krishna Raju, “Reinforced Concrete”, New International Publications.
8. S.N.Sinha, “Reinforced Concrete Design”, McGraw Hill Publications.
9. P.C. Varghese, “Limit State Design of Reinforced Concrete”, PHI Publications.
10. A.R. Santha Kumar, “Concrete Technology”, Oxford Publications.
11. S. Unikrishna Pillai, “Reinforced Concrete Design”, Tata McGraw Hill Publications.