Uni. Roll No. …......................
Program/Course: B. Tech. (Sem. 6th)
Subject: Design of Concrete Structures - II
Subject Code: CE–310
Paper ID: A0622

Time Allowed: 03 Hours   Max. Marks: 60

Note:

1. Section – A is compulsory.
2. Attempt any four questions from Section – B, any two questions from Section – C.
3. Use of Indian Standards is allowed.
4. Use M20 concrete and Fe 415 reinforcement.
5. Any missing data may be assumed appropriately

Section – A

Q 1.   a) Tabulate development length required for following combination of materials: 2
           1) M20 and Fe 415
           2) M30 and Fe 500
           for both tension and compression cases.

        b) Draw shape of bending moment and shear force for a strap beam of a strap   2
           footing.

        c) Find hoop force in a ring beam of size 300 mm x 200 mm. The meridian   2
           force of 50 kN / m transferred by dome at an angle 30° measured with respect
           to horizontal.

        d) Under what circumstances, raft footing is recommended?   2

        e) How circular footing is designed for circular columns?   2

        f) How torsion is takes care, in case of beams curved in plan?   2

        g) Sketch Intze tank, and label its all structural components.   2

        h) Why shells have relatively smaller thickness?   2

        i) Draw shape of shear force and bending moment for a trapezoidal footing.   2

        j) What type of stresses are induced in conical dome due to self weight?   2

Q 2.   Design stem of a counterfort retaining wall, which is 7 m high above the top of base slab. Retained soil has unit weight 16 kN / m^3, angle of repose is 30°. The counterforts are 300 mm thick and are spaced at 3.5 m c/c.   5

Q 3.   Design footing for a column of size 300 x 300, loaded with a load of 250 kN. The safe bearing capacity of soil is 150 kN / m^2.   5

Q 4.   Design a circular water tank, resting on ground, to have water height of 3 m. Take internal diameter as 4 m.   5

Q 5.   Derive expression for membrane stresses for a spherical dome subjected to uniformly distributed load.   5

Q 6.   Design dome for a circular hall. The diameter of hall is 20 m, and dome is subjected to imposed load of 1.0 kN/ m^2.   5

Section – C

Q 7.   Design base slab of a cantilever retaining wall, to retain 3.2 m height of level soil having unit weight 16 kN / m^3, angle of repose is 30°. Take 1.2 m depth of footing, where safe bearing capacity of soil is 150 kN / m^2.   10

Q 8.   Design a rectangular footing, 6 m long to support two columns of size 450 mm x 450 mm, spaced 4 m c/c. Each column transfers a load of 1250 kN. The safe bearing capacity of soil is 120 kN / m^2.   10

Q 9.   Find coefficients for bending moment and shear force at salient point of a ring beam supported on 6 columns, when it is loading by uniformly distributed load.   10

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