Department of Civil Engineering
NATIONAL INSTITUTE OF TECHNOLOGY SRINAGAR

Major Examination
Subject: CIV-704: DOS-III
Max marks: 90

Session: Autumn-2019
Semester: 7th
Time: 3 Hrs.

Note:

- ***Do any five questions. Assume appropriate permissible stresses and other relevant data wherever required. Use of BIS codes of practice SP-16, 456, 1343 and 3370 is allowed.***
- ***Use M-20 grade concrete and Fe-415 grade reinforcing steel wherever not mentioned.***

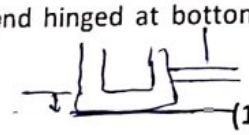
Q1. Design an R.C.C. strip footing for wall (long wall only) of a two storey class room building of size 9m x 13m. The thickness of walls is 350 mm and height of each storey is 4m. The roof is flat and thickness of slabs is 150mm overlain by a floor finish of 70mm thick. Snow depth over the roof is assumed to be 700mm. The safe bearing capacity of soil is 100 kN/m^2 at a depth of 1.0m below n.s.l. Show reinforcement details in a neat sketch.

(4, 14) (CO1)

Q2. Design heel of a cantilever retaining wall retaining an inclined soil fill of 4.5 m from n.s.l.The inclination of the soil fill is 15° with the horizontal. The unit weight of soil and its angle of repose are 18kN/m^3 and 30^0 respectively. The safe bearing capacity of soil at 1.0m depth is 120kN/m^2. The coefficient of friction between soil and base slab is 0.5. Adopt total base width as 5.0m and toe projection as 1.5m. The thickness of stem is 350 mm uniform.

(18) (CO2)

Q3. Design a cylindrical water tank to store 1,00,000 Gallons of water using IS code method. The water height of tank is restricted to 4m. The tank rests on firm ground at a depth of 1m below n.s.l. and the walls of the tank are assumed to be free at top and hinged at bottom. Show reinforcemnt details in a neat sketch.



(18) (CO3)

Q4. (a) What are the advantages of pre-stressed concrete sections over reinforced concrete traditional construction?

(b) A post-tensioned prestressed beam of symmetric I Section is to be designed for an imposed load of 30kN/m, uniformly distributed on a span of 12m. The flange & web thickness is 150mm, whereas, flange width & web depth is 350mm. The stress in the concrete must not exceed 17N/mm^2 in compression and 1.4 N/mm^2 in tension at any time and the loss of prestress may be assumed to be 15%.

(5, 13) (CO4)

(K.T.O)

Q5. (a) Obtain design reinforcement for an interior slab of stem of a counter forte retaining wall which has a total height of 10 m from foundation lelvel. If the thickness of heel slab is 400mm and centre to centre spacing of counter fortes is 3.0m. Total width of base slab is 4.5m and heel slab portion excluding stem is 3.0m. Show all reinforcement details in neat sketches.

(b) Design a spherical dome for the circular tank given in Q.3 and having a rise of 3m. The live load due to snow including wind load may be taken as 5.0kN/m^2.

(12, 6) (CO2, CO3)

Q6. (a) What is a deep foundation? What are the advantages of deep foundations and where these are preferred over shallow foundations?

(b) Design an RCC rectangular footing for a column of size 300 mm x 450 mm carrying a concentric load of 900kN. The width of the footing is restricted to 2.5 m. The SBC of the soil is 100 kN/m^2 at a depth of 1.0 m.

(6, 12) (CO1)

Course outcomes

CO1	Design of RCC footings, Isolated footings and various types of combined footings, design of masonry foundations
CO2	Design of cantilever and counter-fort type RCC retaining walls. Design of masonry retaining walls.
CO3	Design of underground, circula and rectangular water tanks with reference to IS:3370. Design of domes and ring beams.
CO4	Design of Rectangular, T and I section beams of pre stressed concrete.