QUESTION BANK
MODULE:1

1. Calculate the base shear for a five storey hospital building having special moment resisting frame(SMRF) located in Ahmedabad on medium soil with following data using seismic coefficient method.
   (i) No. of bay in x and y-direction = 4
   (ii) Width of each bay = 5 m
   (iii) Thickness of slab =150 mm
   (iv) Storey height = 3 m
   (v) Size of beam and column = 300 mm x 450 mm
   (vi) Amount of damping = 10 % of critical damping
   (vii) Live load = 4 kN/m2
   Assume any additional data if required and neglect the weight of the infill wall panels. Calculate the lateral forces at each floor level of hospital building of using seismic coefficient method.

2. Calculate base shear in the critical direction only for BSNL office in Kohima with following data by seismic coefficient method. (a) No. of storey = 4 (b) No. of bay in x direction = 3 (c) No. of bay in y direction = 1 (d) storey height = 3 m (e) Width of each bay = 5 m (f) Total DL on roof = 12 kN/m2 (g) Total DL on floor = 10 kN/m2 (h) LL = 4 kN/m2 (i) Thickness of slab = 120 mm All columns having their longer side in X direction. Neglect weight of infill walls. Assume suitable data if required. Write all your assumptions & clauses of IS 1893 (2002). Building is provided with additionl viscous dampers which will increase damping by 3%. Calculate lateral forces in the critical direction only at each floor level along with diagram of distribution of lateral force at each floor level.

3. If a column of size 350 mm × 550 mm is having the longitudinal reinforcement of 1.65 % of the gross cross sectional area. Detail the longitudinal reinforcement of the column satisfying all criteria of IS 13920- 1993 and workout the special confining hoop reinforcement as per the code along with neat sketch of longitudinal section. Take the clear height of the column = 4 m. Take concrete grade = M20, steel grade = Fe 415 and clear cover to longitudinal reinforcement = 40 mm.

4. Explain concept of ductile detailing & explain factor affecting the ductility of structures in detail. Explain ductile detailing of beam as per IS 13920 – 1993.

5. Draw and detail the typical qualitative reinforcement detailing of two span reinforced concrete continuous rectangular beam of dimension 300 mm × 550 mm as per IS 13920-1993 (ductile detailing provisions).

MODULE:2

1. Fix the basic dimensions of Intz type container of an elevated water tank to store 7.5 lacs liter of water and design the top dome.
2. Design a circular tank for the following data. Diameter of tank= 6 m, Depth of water= 3.75 m. The tank rests on ground. The wall and base slabare not monolithic.
3. A circular water tank with flexible base, 12m diameter and 8m height is provided at ground level. Calculate the thickness of cylindrical wall required & design the wall at bottom. Assume concrete grade M25 and Fe415 grade steel.

MODULE:3

1 For the cantilever retaining wall of height 4m, fix the basic dimensions of the various elements. Angle of repose of soil is 30o. SBC of soil is 150kN/m2 and density of soil is 17 kN/m^3. Friction coefficient between soil and concrete is 0.55. Design the retaining wall. Stability check for sliding and overturning.

2 For the counterfort retaining wall of height 6m, fix the basic dimensions of the various elements. Angle of repose of soil is 25° SBC of soil is 140kN/m^2 and density of soil is 18kN/m^3. Friction coefficient between soil and concrete is 0.45. Design the retaining wall. Stability check for sliding and overturning are not required.

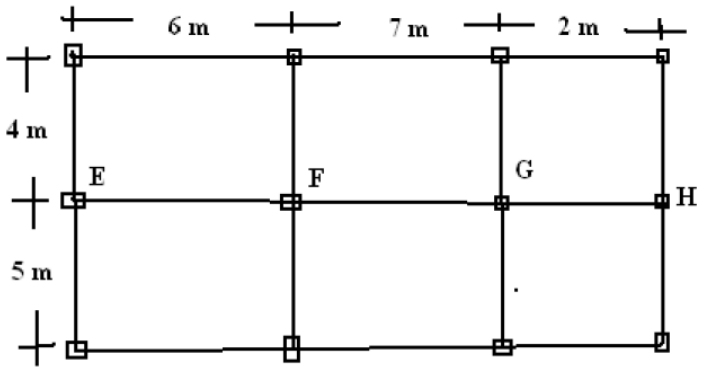
3 A cantilever retaining wall is designed to retain the earth 5 m high behind the wall. The unit weight of soil is 18 kN/m^3 and angle of internal friction is 220. The bearing capacity of soil is 130 kN/m^2 and coefficient of friction between base and soil is 0.4. Use M20 – Fe 415. Assume depth of foundation is as 1.0 m. Fix the dimension of retaining wall and design only stem. Also carry out stability checks.

MODULE:4

1 Prepare a typical structural lay out for G+3 storey building having 4 bays of 4 m in X –direction and 5 bays of 3 m in Y-direction. Prepare structural layout and plot load distribution diagrams for typical floor. Design and detail a typical continuous beam of the chosen building.

2. A fifteen storied building in Ahmedabad on plane ground has 6 bay of 4m in length and 4 bay of 5m in width. Height of each storey is 3.0 m. Plot wind pressure diagram as per provisions of IS:875 (part-III).

3. Figure shows typical floor plan (layout) of building. Find load (in terms of UDL) on beam E-F-G-H. Assume slab thickness of 120mm, Floor finish of 0.5 kN/m2 and Live load of 3.0kN/m2. All exterior walls are of 230 mm thick and interior wall of 115mm thick. Assume beam size of 230 x 415 mm throughout. Show also load distribution diagram from slab to beam.



MODULE:5

1. Explain various elements and their behavior of FLAT SLAB.
2. Explain the needs of drops and column heads in flat slab construction with necessary sketches
3. Explain the situations under which flat slab has to be provided. Write the limitation of direct design method used for the design of flat slab.
4. Design intermediate panel of flat slab having grid of 4m X 5m loaded with 4 kN/m2 live load. Use M 20 Fe 415.