Reg. No. :

Question Paper Code : 40810

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2018
Sixth Semester
Civil Engineering
CE 6601 : DESIGN OF REINFORCED CONCRETE AND BRICK MASONRY STRUCTURES
(Regulations 2013)

Time : Three Hours | Maximum : 100 Marks

Use of IS 456-2000 and SP-16 is Permitted.

Answer ALL questions.

PART – A (10×2=20 Marks)

1. Write the types of Retaining walls.
2. State Rankine's theory of Earth pressure.
3. What are the three different patterns of cylinder stress ?
4. List the types of water tanks.
5. Write the advantages of flat slab construction.
6. Mention the classification of stairs.
7. Write the characteristics features of yield lines.
8. Write the two methods to determine the ultimate load capacity of reinforced concrete slab.
9. List the multiplying factors used in allowable compressive stress in brick masonry.
10. Mention the types of masonry walls used in building construction.

PART – B (5×13=65 Marks)

11. a) Design a stem of RCC cantilever retaining wall having a 5 m tall stem. The wall retains soil level with its top. The soil weighs 18000 N/m^3 and has an angle of repose of 30°. The safe bearing capacity of the soil is 200 kN/m^2. Use M20 concrete and Fe 415 steel. (13)

(OR)

b) Analyse the stability of a counterfort retaining wall to the following particulars. (13)

Height of the wall above the general ground level = 5.5m
Safe bearing capacity of the soil = 160 kN/m^2
Angle of repose of the soil = 30°
Weight of soil = 16000 N/m^3
Use M20 concrete and Fe 415 steel.

12 a) Design the long wall of an underground tank of internal dimensions 6m × 3m × 3m. The soil surrounding the tank always remains dry. The tank shall be provided with a roof slab. The soil weighs 16000 N/m^3 having an angle of repose of 30°. Use M20 concrete and Fe 415 steel. (13)

(OR)

b) Design a circular tank 12 m diameter and 4 m high. The tank rests on firm ground. The walls of the tank are restrained at the base. Use M20 concrete and Fe 415 steel. (13)

13. a) Design a single stair to reach a roof slab at a height of 2.7 m. Rise and thread of the steps may be taken as 180 mm and 250 mm respectively. The stairs shall be 1 m wide. Use M20 concrete and Fe 415 steel. (13)

(OR)

b) Design an interior panel of a flat slab for a live load of 4000 N/m^2. The slab is provided with a floor finish weighing 1000 N/m^2. The panels are 6m × 6m. Drops shall be provided. Use M20 concrete and Fe 415 steel. (13)

14. a) A rectangular slab 3.5m × 5m in size simply supported at the edges. The slab is expected to carry a service live load of 3 kN/m^2 and a floor finishing load of 1 kN/m^2. Use M20 concrete and Fe 415 steel. Design the slab if (a) it is isotropically reinforced and (b) if it is orthotropically reinfoced with $\mu = 0.75$. (13)

(OR)

b) Design a reinforced circular slab for the following data :

Diameter of slab : 5.5 m

Service live load : 4 kN/m^3

Floor finishing load : 1 kN/m^2

Grade of concrete : M20

Grade of steel : Fe 415

The slab is simply supported along the edge. (13)

15. a) Design an interior cross wall of two story building to carry 100 mm thick R.C. C slab with 3m ceiling height. The wall is stiff and it support 2.65 m wide slab. The live load on roof and floor is 1.5 kN/m^2 and 2 kN/m^2. Adopt crushing strength 10 MPa mortar M_1 (13)

(OR)

b) Design an exterior wall of two storied building using nominal bricks of 230 ×100 × 75 mm. The wall supports R.C.C roof slab of 100 mm thick. Clear height of each floor is 3 m. Center to center distance between cross wall is 2.8 m and continuous along one direction only, effective width of slab supported by the wall is 1.7 m. Live load from roof slab is 1.5 N/m^2 and live load from slab is 2.5 N/m^2. (13)

PART – C (1×15=15 Marks)

16. a) Design an upright slab of counterfort retaining wall to the following particulars. (15)

Overall height of the wall = 7m

Weight of soil = 16000 N/m^3

Angle of repose of the soil = 35°

Surcharge angle = 15°, Use M20 concrete and Fe 415 steel.

(OR)

b) The main stair of an office building has to be located in a stair measuring 3.5 × 5.5 m. The vertical distance between the floors is 3.75 m. Design the stairs. Allow a live load of 2000 N/m^2. Use M20 concrete and Fe 415 steel. (15)