



B.E DEGREE EXAMINATIONS: APRIL/MAY 2016

(Regulation 2013)

Sixth Semester

CIVIL ENGINEERING

U13CET602 : Design of Masonry and Reinforced Concrete Structures

(Use of relevant ES456, 3370, IRC, Masonry code are permitted)

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

- The strength of brick masonry in 1:6 cement mortar is
 - 300kN/m²
 - 400 kN/m²
 - 500 kN/m²
 - 600 kN/m²
- The minimum thickness of walls built in cement mortar 1:6 for single storey building ismm.
- Total pressure on the vertical face of a retaining wall of height h acts parallel to the free surface and from the base at a distance
 - h/4
 - h/3
 - h/2
 - 2h/3
- The base slab thickness of a retaining wall generally provided is equal to
- In case of water tanks for wall thickness up to 100mm, the minimum percentage of reinforcement should be
 - 0.2%
 - 0.3%
 - 0.4%
 - 0.5%
- The reinforcement for hoop forces is to be given indirection.
- The moment capacity for isotropically reinforced simply supported square slab subjected to UDL over its entire surface is
 - Wl²/8
 - Wl²/12
 - Wl²/24
 - Wl²/48
- In virtual work method a failureline pattern is assumed.
- Drops are provided in flat slab to resist
 - Bending moment
 - Axial thrust
 - Shear
 - Twisting moment
- The number of treads in a flight of stair is equal to number ofminus one

PART B (10 x 2 = 20 Marks)

(Answer not more than 40 words)

11. How the permissible compressive stress in brick masonry calculated?
12. Name the various types of masonry walls used in building construction.
13. How the vertical stem of a counter fort retaining wall is designed?
14. What is shear key? When it is provided?
15. For what conditions the underground tanks are designed and checked?
16. Why bracings are provided in overhead water tanks?
17. Mention the important characteristics of yield lines.
18. Sketch the typical yield line pattern for rectangular slabs fixed on all four sides.
19. Under what circumstances flat slab construction is preferred?
20. List the different types of stairs.

PART C (5 x 14 = 70 Marks)

(Answer not more than 400 words)

Q.No. 21 is Compulsory

21. (i) Design a solid square brick masonry column of height 3.0m to carry an axial load of 100kN (8)
- (ii) Explain briefly the design criteria for an eccentrically loaded wall. (6)

22. (a) Design a cantilever retaining wall to retain an earthen embankment with horizontal top 3.5m above the ground level. The density of earth is 18kN/m^3 . Angle of internal friction = 30° . Safe bearing capacity of the soil = 200kN/m^2 . Coefficient of friction between the soil and concrete = 0.5. Adopt M20 concrete and Fe415 steel.

(OR)

- (b) Design the vertical stem of a counterfort retaining wall of height 5.5m above ground level. The density of earth is 18kN/m^3 . Angle of internal friction = 30° . Safe bearing capacity of the soil = 180kN/m^2 . Coefficient of friction between the soil and concrete = 0.5. Spacing of the counterforts is 3m centre to centre. Adopt M20 concrete and Fe415 steel.
23. (a) Design a circular water tank with flexible base resting on the ground to store 50,000litres of water. The depth of water tank may be kept as 4m. Adopt M25 concrete and Fe415 steel.

(OR)

- (b) Design the side walls of an underground water tank of size 3m x 8m and 3m depth for the following data:

Type of soil: Submerged sandy soil with density 16kN/m^3 and angle of repose 30° . The water table can rise up to ground level. The live load on the roof slab 2kN/m^2 . Adopt M25 concrete and Fe415 steel.

24. (a) Design a rectangular slab of size 4m x 6m which is simply supported along the edges and has to carry a service live load of 4kN/m^2 . Assume the coefficient of orthotropy as 0.75. Assume M20 concrete and Fe415 steel are used. Adopt yield line theory of slabs.

(OR)

- (b) A square slab of an interior panel of a multistory building is of size 4m x 4m. The live load acting on the floor slab is 3kN/m^2 . The load due to finishes is 1kN/m^2 . Analyze the slab using yield line theory and design the slab using M20 concrete and Fe415 steel.

25. (a) Design a dog legged stair for a building in which the vertical distance between the floors is 3.6m. The stair hall measures 2.5m x 5m. The live load may be taken as 2.5kN/m^2 . Adopt M20 concrete and Fe415 steel.

(OR)

- (b) Design an interior panel of a flat slab with panel size 6m x 6m supported by columns of size 500mm x 500mm. Provide suitable drops. The live load may be taken as 4kN/m^2 . Adopt M20 concrete and Fe415 steel.
