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Question Paper Code: 57101

B.E./B.Tech. DEGREE EXAMINATION, NOV 2018

Seventh Semester

Civil Engineering

15UCE701 -DESIGN OF REINFORCED CONCRETE AND BRICK

MASONRY STRUCTURES

(Regulation 2015)

(IS 456:2000, IS 1905, IS 3370 : Part-II and SP16 are permitted)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. The total active earth pressure acts at _____ above the base of the retaining wall CO1- R
(a) H/2 (b) H/3 (c) H/4 (d) H/6
2. The minimum grade of concrete to be used in R.C water tank as per IS 456-2000 CO2- R
(a) M20 (b) M25 (c) M30 (d) M35
3. Which of the following is/are the method of determination of shear force and bending moment in flat slab CO3- R
(a) Direct design method (b) Equivalent frame method
(c) Portal method (d) Both (a) and (b)
4. Which of the following is/are the method of analysis of yield line theory CO4- R
(a) Equilibrium method (b) Virtual work method
(c) Both (d) None of the above

5. The basic stress in masonry units having height to width ratio of 1.5 may be increased by a factor
- (a) 1.2 (b) 1.4 (c) 1.6 (d) 2
- CO5- R

PART – B (5 x 3= 15 Marks)

6. Define Active Earth pressure. CO1 R
7. What are the methods available for the analysis of circular tank? CO2 R
8. Define flat slab. CO3 R
9. What is meant by yield lines? CO4 R
10. Define slenderness ratio of masonry wall. CO5 R

PART – C (5 x 16= 80Marks)

11. (a) Design the stem of a cantilever retaining wall (T type) to retain earth for a height of 4m. the backfill is horizontal. The density of soil is 18kN/m^3 . Safe bearing capacity of soil is 200 kN/m^2 . Take the co-efficient of friction between concrete and soil as 0.6. The angle of repose is 30 degrees. Use M20 concrete and Fe415 steel. CO1- App (16)

Or

- (b) A R.C.C. retaining wall with counter forts is required to support earth to a height of 7 m above the ground level. The top surface of the backfill is horizontal. The trial pit taken at the site indicates that soil of bearing capacity 220 kN/m^2 is available at a depth of 1.25 m below the ground level. The weight of earth is 18 kN/m^3 and angle of repose is 30° . The coefficient of friction between concrete and soil is 0.58. Use concrete M 20 and steel grade Fe 415. Design the toe slab and do the usual stability check. CO1 -App (16)
12. (a) Design a circular water tank of capacity 400 kilolitres resting on the ground and having a fixed base condition due to rigid joint between the wall and the base slab. The materials to be used are M 25 grade concrete and HYSD steel grade Fe 415. Use IS method. CO2- App (16)

Or

- (b) Design the Dome and top ring beam of a circular tank of capacity of 400 kilolitres. The depth of water is to be 4 m, including a free board of 200 mm. The tank is to be supported on masonry tower. CO2 -App (16)
13. (a) Design the interior panel of a flat slab floor system for a warehouse 24m x 24m divided into panels of 6 m. Loading class = 5 kN/m². Materials = M25 grade concrete, Fe415 grade steel, Column size = 400 mm dia. CO3- App (16)

Or

- (b) Explain the step by step procedure of designing a reinforced concrete wall. CO3-U (16)
14. (a) Derive the ultimate design moments for a square slab fixed on all edges using yield line approach CO4- App (16)

Or

- (b) A rectangular slab 3.5 x 4.5 m is isotropically reinforced with 8 mm dia bars spaced at 150 mm both ways. The average effective depth may be taken as 80 mm and the total depth of the slab is 100 mm. If Fe415 steel and concrete grade M20 are used, determine the safe service live load. The dead load of floor finishing may be assumed as 1.5 kN/m². CO4- App (16)
15. (a) Design the exterior wall of a building to carry 100 mm thick RC slab of 3 m ceiling height and support conditions is fixed, restrained. Live load on roof is 2 kN/m². Adopt crushing strength of brick unit as 10 N/mm². Mortar type is M₁ mortar. CO5- App (16)

Or

- (b) Determine the allowable axial load on the column of size 30 cm x 60 cm constructed in first class brick work in 1:6 mortar using modular brick size of 200 x 100 x 200 mm, height of pier between the footing and the slab 5.1 m. Strength of unit may be taken as 10 MPa. CO5- App (16)

