Reg. No. : | | | | | | | | | | | | |

Question Paper Code : X 60262

B.E./B.Tech. DEGREE EXAMINATIONS, NOV./DEC. 2020
Seventh Semester
Civil Engineering
CE 2401/CE 1351/10111 CE 701/CE 71 – DESIGN OF REINFORCED CONCRETE AND BRICK MASONRY STRUCTURES.
(Common to PTCE 2401 – Design of Reinforced Concrete and Brick Masonry Structures for B.E. (Part-Time) Fifth Semester – Civil Engineering – Regulations 2009)
(Regulations 2008/2010)

Time : Three Hours | Maximum : 100 Marks

IS 456-2000, IS 1905-1987, SP 16-1980 and IS : 3370 (Part 2 and 4) – 1967 Design Charts tables are permitted)
Use of relevant BIS standard and hand book is permitted.
Answer ALL questions.

PART – A **(10×2=20 Marks)**

1. State the stability requirements of a retaining wall.
2. Describe the structural action of a counter fort in a counter fort retaining wall.
3. What are the factors considered for design of tank ?
4. What are the types of joints in water tank ?
5. What are flat slab and give the different types ?
6. What is the thickness of flat slab with drops and without drops ?
7. Sketch the yield line pattern in a rectangular slab fixed on all edges and subjected to a uniformly distributed load.
8. State the principle used in the virtual work method of yield line analysis.
9. Define slenderness ratio of a masonry wall.
10. List out any two factors which affect the permissible stress of a masonry.

PART – B **(5×16=80 Marks)**

11. a) Design a cantilever retaining wall to retain the earth 3 m above basement level. The angle of repose of soil is 30°. The unit weight of soil is 16 kN/m^3. The coefficient of friction between soil and concrete is 0.60. The bearing capacity of soil is 100 kN/m^2. Use M20 concrete and Fe 500 steel.

(OR)

b) Design a counterfort retaining wall to support difference in ground elevation of 9 m. The foundation depth may be taken as 1.5 m below ground level, with a safe bearing capacity of 160 kN/m^2. Assume a level backfill with a unit weight of 16 kN/m^3 and an angle of repose 30°. Assume coefficient of friction = 0.5 between soil and concrete. Check the stability of wall.

12. a) A reinforced concrete dome of 6m base diameter with a rise of 1.25 m is to be designed for a water tank. The uniformly distributed live load including finish on dome may be taken as 2 kN/m^2. Adopting M20 concrete and Fe415 grade steel, design the dome and the ring beam.

(OR)

b) Design an RC tank of internal dimensions 10 m × 3m × 3m. The tank is to be provided under ground. The soil surrounding the tank is likely to get wet. Angle of response of soil in dry state is 30° and in wet state is 6°. Soil weights 20 kN/m^3. Adopt M 20 grade concrete and Fe 415 grade steel.

13. a) Design an interior floor slab panel of 4.5m × 6 m (inner dimensions) of a reinforced concrete building. Assume live load as 4 kPa and finish load as 1 kPa. Sketch the reinforcement details. Concrete of grade M20 concrete and HYSD steel of grade Fe 415 are used. Adopt limit State method of design.

(OR)

b) Design a reinforced concrete wall 3.2 m high, 4.5 m long and 110 mm thickness to carry a factored load of 620 kN/m. Use M20 concrete and Fe415 steel.

14. a) Using virtual work method, obtain the expression for ultimate moment per unit length of the yield line in the case of an isotropically reinforced square slab fixed on all edges and subjected to a uniformly distributed load.

(OR)

b) Design a rectangular slab of 6 m × 4 m simply supported at the edges carrying a service live load of 4 kN/m^2. Assume the co-efficient of orthotrophy as 0.7. Materials used are M20 grade of concrete and Fe415 steel bars.

15. a) Determine the allowable axial load on column 300 mm × 60 mm constructed in first class brick work in CM 1 : 6 using modular bricks 200 mm ×10 mm × 100 mm the height of pier between the footing and top of slab is 5.2 m. The strength of units may be assumed as 10.5 MPa.

(OR)

b) Write short note on :

i) Classification of walls **(5)**

ii) Effective length and effective height of walls. **(5)**

iii) Permissible stress in brick masonry. **(6)**

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