

GANPAT UNIVERSITY

B. Tech. Semester: VII Civil Engineering

Regular Examination Nov-Dec 2016

2CI701 Design of Concrete Structures

Time: 3 Hours

Total Marks: 70

- Instruction:** 1 This Question paper has two sections. Attempt each section in separate answer book.
2 Assume suitable data if required.
3 Figures to the right indicate full marks.
4 Code IS 456-2000 is allowed.

SECTION - I

- 1 (A) Determine Negative Reinforcement (A_{st}) in column strip. If The total panel moment is 92.55 kNm. Take $d_{eff.} = 175$ mm. (06)
Use M 20 grade concrete, Fe 415 grade steel and Width of Column strip is 2500 mm.
- (B) Determine total Design-moment (M_o) of interior Panel size (6 m \times 6 m) of flat slab (06)
supported by column of size (500 mm \times 500 mm). Provide suitable drop. Take LL = 4 kN/m² and Floor Finish load = 1 kN/m².
Use M20 grade concrete and Fe415 grade steel.
Determine: (i) Dead load (ii) Factored load (ii) Total panel moment.

OR

- 1 Design an interior panel of flat slab having equal panels of 6 m \times 6 m. The internal columns are 500 mm in diameter and the column head 1000 mm in diameter. The storey height above and below slab is 4m. Design the flat slab with drop and column head. Take live load 4 kN/m² and Floor Finish load = 2.7 kN/m². Use M 20 concrete and Fe 415 steel. (12)
- 2 Draw S.F.D & B.M.D of Trapezoidal combined footing .The c/c spacing between Column C₁ (0.4 m \times 0.4 m) and Column C₂ (0.6 m \times 0.6 m) is 4.5 m. The center of column C₁ is 0.6 m away from property line of footing. The working Load Of Column C₁ and C₂ on footing are 1200kN and 1700 kN respectively. SBC of Soil=150 kN/m². (12)

OR

- 2 Draw S.F.D & B.M.D of Rectangular combined footing of length 8 m and width 2 m. The c/c spacing between Column C_1 (0.4 m x 0.4 m) and Column C_2 (0.6 m x 0.6 m) is 5 m. The center of column C_1 is 0.8m away from property line of footing. The working Load Of Column C_1 and C_2 on footing are 800 kN and 1200 kN respectively. Assume min. percentage of steel in footing = 0.2. Also Do check for the Punching shear. (12)
- 3 A continuous Beam ABCD is subjected to Factored dead load 22 kN/m and Factored live load 14 kN/m over a span of Beam. Supports A, B, C and D are 6 m apart from each other. Draw S.F.D and B.M.D of Beam. (11)

SECTION - II

- 4 Draw a figure showing Curtailment of tension Reinforcement in flexural members. (11)
- 5 (A) Draw neat sketches showing criteria for minimum clearance between individual bars, reinforcement spacing rules for crack controls and side reinforcement in beam. (06)
- (B) Draw figures showing Bar spacing requirements in Rectangular and Circular Column. (06)
- OR**
- 5 (A) Draw a Typical details of column footing. (06)
- (B) Write Do's for Detailing General, Beam and Slab. (06)
- 6 (A) A Circular concrete column 330 mm diameter is reinforced with 6 nos. 25 mm diameter bar, is braced and hinged at ends. The column carries an axial factored load of 700 kN. The length of column is 5.7 m. Take $k_1 = 0.149$ and $k_2 = 0.201$ for circular column. Use M 20 Concrete, Fe 415 steel and effective cover 50 mm. Find total design moment induced in column only. (06)

- (B) Draw a neat sketch of beam showing its General reinforcement requirements. (06)

OR

- 6 Design a Rectangular water tank resting on ground for a capacity of 80000 liters. The materials are M20 grade concrete and HYSD steel of grade Fe415. (12)

END OF PAPER