

GUJARAT TECHNOLOGICAL UNIVERSITY
BArch- SEMESTER- 4 EXAMINATION – SUMMER 2016

Subject Code: 1045003

Date: 12/05/2016

Subject Name: Structure-IV

Time: 10.30AM – 12.30PM

Total Marks: 50

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1**
- (a) Necessity of Doubly R.C. Beam & Difference between Singly and Doubly beam. **06**
- (b) For a limiting section 200mm X 300mm effective, determine the following, if it is reinforced with an effective cover of 50mm. Take M-20 conc. Mix and $f_y=250$ N/mm². **10**
- (i) Maximum compression stress in concrete and maximum tensile stress.
- (ii) Lever arm
- (iii) Total tension and total compression.

- Q.2**
- (a) A singly RC beam has effective dimension of 250mm X 450mm. It is reinforced with 3-20mm dia. of Fe 415. Find out moment of resistance of beam. Use M20. **06**
- (b) A doubly reinforced beam of 300mm X 600mm overall is reinforced with 4-20mm dia. bars as compression reinforcement and 6-20mm dia. bars as tensile reinforcement. Effective cover on both sides is 50mm. M-25 grade of concrete and Fe-415 grade of steel bar is used. Compute moment of resistance. **10**

OR

- (b) A short R.C.C column of size 300mm X 400mm is reinforced with 6 bars of 20mm dia. Determine the safe load column can carry if M-20 grade of concrete and Fe 250 steel is used. Also find the spacing of lateral ties and draw required sketch. **10**
- Q.3** Design an Isolated square footing for a square column 400mm X 400mm for axial load of 800 kN. Use M-20 grade of concrete and Fe-250 steel grade. Take safe bearing capacity of soil 120 kN/m². Check for shear is not required. Also draw neat sketch showing sectional elevation and plan. **18**

OR

- Q.3**
- (a) Design a simply supported two-way slab of 3.0m X 3.0m clear span supported on 300mm thick walls on four sides. **09**
- Live load = 3 kN/m², Floor finish = 1 kN/m². M-20 concrete and Fe-415 grade steel. Corners are not held down. Draw reinforcement details.
- (b) A one meter wide single flight R.C.C stair is to be provided for a height 3.20m in a residential building. Stair is supported at top and bottom risers by beams 300mm wide. Waist slab is 150mm thick. Riser is 160mm and tread is 300mm. Evaluate : (i) the effective span (ii) design load (iii) reinforcement in waist slab. Prepare a sketch. Use M-20 grade of concrete and Fe-250 grade of steel. **09**
