Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

B.ARCH - SEMESTER– IV • EXAMINATION – SUMMER 2017

Subject Code: 1045003 Date: 05/05/2017

Subject Name: Structure –IV

Time:10.30AM to 12.30PM Total Marks: 50

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Use of IS –456 (2000) and SP-16 is permitted**

Q.1	**(a)**	Write merits and demerits of limit state method	**04**
	(b)	Define: (1) Characteristic load (2) Partial safety factor (3) Limit state	**03**
	(c)	Explain long column and short column with sketch.	**03**
Q.2	**(a)**	Differentiate between under reinforced and over reinforced beam	**05**
	(b)	State and explain various types of slabs based on L/B ratio and support conditions.	**05**
		OR	
	(b)	Write design steps to design two-way slab simply supported on masonry walls.	**05**
Q.3		Design a rectangular R C beam as per IS 456 having 300 mm width. The beam is simply supported on effective span of 3.6 m. and subjected to factored load of a UDL 45 kN/m including self weight. Use M 20 concrete and Fe-415. Sketch details.	**10**
		OR	
Q.3		Explain(1) Balanced, Over reinforced and Under reinforced section (2) Various types of footings with sketches	**10**
Q.4		A short column of size 300 mm x 400 mm is reinforced with six bars of 20 mm diameter. Determine the safe load a column can carry if M-20 grade of concrete and Fe-250 steel is used. Also find the spacing of lateral ties and sketch the details of reinforcement.	**10**
		OR	
Q.4		Design an isolated square pad footing for the RCC column of size 400 mm x 400 mm to transmit axial load of 800 kN. The safe bearing capacity of soil is 160 kN/m^2 . Use M-20 concrete and steel Fe-415. No check for shear is required. Sketch the details in plan in cross section.	**10**
Q.5		Design a slab for office room of 3.2 m x 8.5 m size. The slab is resting on 300 mm thick wall and resisting live load of 2.5 kN/m^2 . Use M-20 concrete mix and Fe-415 steel. Check the slab for control of deflection. Sketch details.	**10**
		OR	
Q.5		Draw details of reinforcement of single flight stair having (1) Landing width= 1.2 m, Riser= 125 mm, Tread=300 mm ,Waist slab thickness=200 mm, effective cover=25 mm (2) Main steel= 16 mm dia. Bars at 100 mm c/c (3) Distribution steel=8 mm dia. bars at 150 mm c/c.(4) Assume landing on both side and no. of steps=12 nos.	**10**

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