Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–IV EXAMINATION – WINTER 2015

Subject Code: 141301 **Date:22/12/2015**

Subject Name: Design of Environment Structure

Time: 02:30pm to 05:00pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Use of I.S. 456-2000,I.S. 800-1984I.S. 875, Part I,II,III,and Steel Table is permitted.**
5. **For analysis and design of R.C.C. structure use M20 grade of concrte and Fe 415 HYSD. And for steel structure use yield stress 250MPa, unless specified otherwise.**

Q.1	**(a)**	Write down the basic assumptions made in limit state method for flexure design and calculate the value of P_t lim for M20 & Fe415 Grade.	**07**
	(b)	A singly reinforced beam of section 250 X 450 mm effective is reinforced with 3 # 20. Calculate moment of resistance of section.	**07**
Q.2	**(a)**	Calculate the moment of reinforcement of doubly reinforced beam of size 300 X 600 mm over all,is reinforced with 4# 16 as compression reinforcement and 4# 25 as tensile reinforcement. Take efetive cover 50 mm at top & bottem.	**07**
	(b)	A singly reinforced rectangular beam of size 230 X 480 mm effective depth has to carry a factored moment of 90 kN-m. Calculate area of steel.	**07**
		OR	
	(b)	A singly reinforced beam is subjected to factored shear force of 180kN. The effective size of the beam is 300 X 500. The beam is reinforced with 1.2 % of steel. Find spacing of 2 legged 8 # vertical stirrups.	**07**
Q.3	**(a)**	Design one way slab for clear span 3.2m,and thickness ofsupport 300 mm. Take live load 2.5 kN/m^2, and floor finish 1.0 kN/m^2 Design slab for flexure only.	**07**
	(b)	Design a R.C.C. short square column for axial load of 3000 kN. Assume 1% steel	**07**
		OR	
Q.3	**(a)**	Design a square footing for an asolated column 500 X 500 mm size carry axial load 1600 kN.SBC of soil 200 kN/m^2. (Dimension and steel only)	**07**
	(b)	Determine load carrying capacity of short braced column of 450 mm diameter reinforced with 8 nos. of 12 mm dia.	**07**
Q.4	**(a)**	Calculate the strength of ISA 40 X 25 X6 when used as a tension member with longer leg connected to gusset plate (1)14 mm thick, (2) fillet weld	**07**
	(b)	A discontinuos strut 1.75 m effective length consists of 2 equal angle 50 X 50X 6 mm . it is connected same side gusset plate by two rivets at each angle at both ends. Calculate load which strut can carry.	**07**
		OR	
Q.4	**(a)**	Design suitable base for column ISHB 300@ 63 kg/m, carrying axial load of 1200kN. The SBC is 180 kN/m^2. Permissible bearin pressure 4 N/mm^2.	**07**
	(b)	Design column using I section subjected to axial load of 1400 kN. The length of the member 3.8 m. both ends are hinged.	**07**
Q.5	**(a)**	Design simply supported beam of span 6m carrying total load of 25 kN/m. prvide only check for deflection.	**07**

	(b)	(1)States the provisions for main (longitudinal) steel and transverse steel in in column.	**04**
		(2) States merits and demerits of R.C.C. structures.	**03**
		OR	
Q.5	**(a)**	(1) What are the advantage of riveted connection on welded connection.	**04**
		(2) List the failure modes that may control the strength of rivet joints.	**03**
	(b)	An unequal tension member 90 X60 X 6 has to resist 120 kN load. Design weld connection. Assume permissible stress in weld 108 MPa.	**07**

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