U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

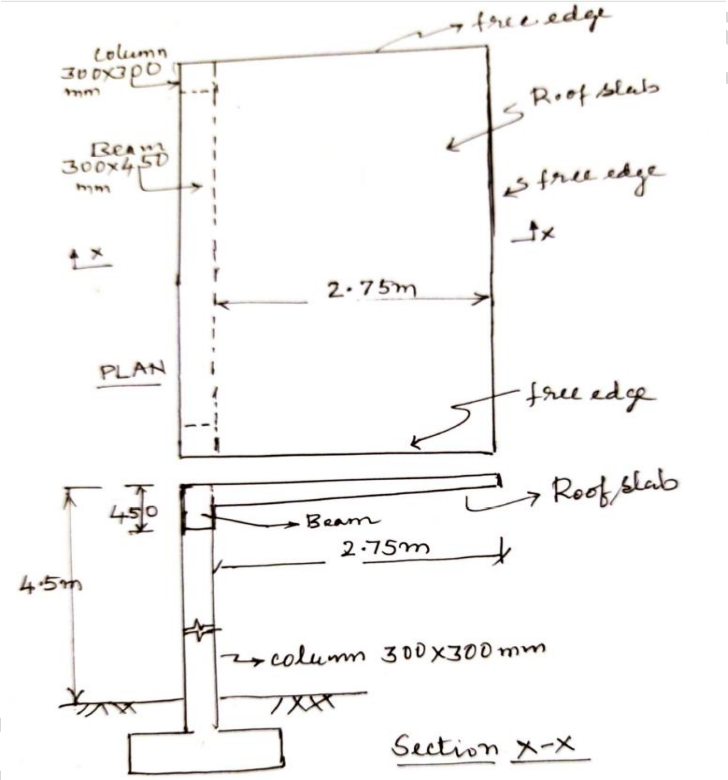
September / October 2024 Supplementary Examinations

Programme: B.E. **Semester: V**
Branch: Civil Engineering **Duration: 3 hrs.**
Course Code: 22CV5PCDRC **Max Marks: 100**
Course: Design of RCC structural elements

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.
3. Use of IS 456-2000 and only SP-16 charts for column design permitted

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			UNIT - 1	CO	PO	Marks
1	a)	The IS code limits the compressive strength of concrete in structural design to 0.67fck and not f_{ck}. Explain the statement.		CO1	PO1	**4**
	b)	Explain the stress block. Obtain the expression for depth of critical neutral axis for a section if M25 concrete and Fe 415 steel is used		CO1	PO1 PO2	**6**
	c)	A rectangular beam of overall size 350 x 600 mm is reinforced with 4 bars of 25 mm diameter on the tension side and 4 bars of 16 mm diameter bars on the compression zone. Find the permissible central concentrated load the beam can carry over a simply supported span of 6 m. Assume M20 Concrete and Fe 415 steel. Level of exposure is moderate.		CO1	PO1 PO2	**10**
		OR				
2	a)	Explain the term Limit State. Discuss the various limit states to be considered in reinforced concrete design		CO1	PO1	**5**
	b)	Calculate the moment of resistance of a T-section with the following data; (i)Effective flange width =2100 mm (ii) Depth of flange 125 mm (iii)Width of web=250 mm (iv) overall depth 650 mm (v) Reinforcement consists of 6 bars of 25 mm diameter(vi) Materials used –M25 concrete and Fe500 steel (vii) level of exposure –moderate What safe udl a beam of 6m effective simply supported span can carry if the given T-section is used.		CO1	PO1 PO2	**15**

			UNIT -2			
	3		The floor of a hall is 7.5 m x10.5m to the center of supports, width of support being 300 mm. There are two beams spaced at 3.5 m c/c spanning the short length of the hall. The thickness of the floor slab is 100 mm. Live load on the floor is 4.5 KN/m^2 .Load due to floor finishes is 1 KN/m^2. Design the intermediate T-beam using M20 concrete and Fe 500 steel	*CO1*	PO1, PO2, PO3	**20**
			UNIT-3			
	4	a)	Distinguish between one-way and two –way slabs	CO2	PO1	**4**
		b)	Design the roof slab of a way side bus stand shelter having a clear span of 2.75m as shown in Fig. Check the adequacy of your design by applying all necessary checks. The live load on slab may be assumed as 1.75 KN/m^2. Material used are M20 concrete and Fe 415 steel. Sketch the reinforcement details 	C O2	PO1 PO2 PO3	**16**
			OR			
	5		Design a rectangular slab (supported on all its four edges) over a class room of size 4.75 m x 6 m. The two adjacent edges of the slab are discontinuous and the remaining two edges are continuous. A finishing surface of concrete of 20 mm thick is provided over the slab. The live load on the slab is 3.5 KN/m^2. Use M20 concrete and Fe415 grade steel. Sketch the reinforcement details.	CO2	PO1 PO2. PO3	**20**

			UNIT-4			
	6	a)	Explain the need for providing lateral ties in RC columns.	CO 1	PO1	**4**
		b)	A corner column 300 mmx 450 mm located in the lower most storey of braced frames is subjected to factored loads Pu=1200 KN, Mux =200 KNm , Muy=110 KNm. The un supported length of the column is 3.5 m. Design the reinforcement in the column assuming M25 concrete and Fe415 steel.	*CO2*	PO1, PO2 , PO3	**16**
			UNIT-5			
	7		Design an isolated rectangular footing of uniform thickness for column carrying a service load of 2000 KN. The bearing capacity of the soil is 200 KN/m^2. Use M20 concrete and Fe 415 steel . Sketch the reinfocement details.	CO2	PO1, PO2 , PO3	**20**

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