Q.P. Code: 19CE0122 **R19**

Reg. No: | | | | | | | | | | |

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech III Year II Semester Regular Examinations August-2022

STRUCTURAL DESIGN

(Civil Engineering)

Time: 3 hours Max. Marks: 60

(Answer all Five Units **5 x 12 = 60** Marks)

UNIT-I

1	A singly reinforced concrete beam 300x550mm is reinforced with 5 bars of 16mm diameter with an effective cover of 50mm.The beam is simply supported over a span of 5m. Find the safe uniformly distributed load the beam can carry use M20 grade concrete and Fe 415 grade steel.	L3	12M
	OR		
2	Design the reinforcement for a reinforced concrete beam 250 mm wide and 550 mm deep of M20 grade concrete to resist an ultimate moment of 200 kNm and effective cover is 50 mm. Use Fe415 grade steel.	L3	12M

UNIT-II

3	A reinforced concrete beam of rectangular section 300 mm wide is reinforced with four bars of 25 mm diameter at an effective depth of 600 mm. The beam has to resists a factored shear force of 400 kN at support section. Assume f_{ck}= 25 N/mm^2 and f_y = 415 N/mm^2, design vertical stirrups for the section.	L4	12M
	OR		
4	Design a reinforced concrete slab to carry a live load of 3 kN/m^{2}on an effective span of 3.5 m. Use M 20 grade concrete and Fe 415 grade steel. Assume floor finish is 1 kN/m^2.	L4	12M

UNIT-III

5	Design a short axially loaded square column 500 mm x 500 mm for a service load of 2000 kN. Use M20 grade concrete and Fe 415 HYSD bars.	L4	12M
	OR		
6	Design a reinforced concrete footing of uniform thickness for a reinforced concrete column of 400 mm x 400 mm size carrying an axial load of 1200 kN. Use M 20 grade concrete and Fe 415 steel. The safe bearing capacity of soil is 220 kN/m^2.	L4	12M

UNIT-IV

7	Design a lap joint between the two plates each if width 120mm if the thickness of one plate is 16mm and the other is 12mm.The joint has to transfer a design load of 160kN.The plates are of Fe410 grade.Use bearing type bolts.	L3	12M
	OR		
8	Design a double angle tension member connected on each side of a 10 mm thick gusset plate to carry an axial factored load of 375 kN. Use 20 mm black bolts, Assume shop Connection.	L4	12M

UNIT-V

9	Design a single angle strut connected to the gusset plate to carry 180 kN factored load. The length of the strut between center to center connections is 3m.	L4	12M
	OR		
10	A column 4 m long has to support a factored load of 6000 kN. The column is effectively held at both ends and restrained in direction at one of the ends. Design the column using beam sections and plates.	L4	12M

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