Q.P. Code: 18CE0115 **R18**

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

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR

(AUTONOMOUS)

B.Tech III Year I Semester Supplementary Examinations December-2021

STRUCTURAL DESIGN

(Civil Engineering)

Time: 3 hours Max. Marks: 60

PART-A

(Answer all the Questions **5 x 2 = 10** Marks)

1	a	What is the partial safety factor for material and partial safety factor for load.	L1	2M
	b	State the minimum requirement of shear reinforcement.	L2	2M
	c	Define axially loaded column.	L2	2M
	d	Write types of loads to act on structures.	L2	2M
	e	Draw the column base plate diagram.	L2	2M

PART-B

(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

2		A singly reinforced rectangular beam of width 230mm and 535mm effective depth is subjected to a bending moment of 90KNm at working loads. Find the steel area required. The material used are M20 grade concrete and Fe 415 grade steel.	L3	10M

OR

3		Design a rectangular simply supported reinforced concrete beam over a clear span of6m. The superimposed load is 30KN/m and support width is 230mm each. Use M20 grade concrete and Fe 415 grade steel. Check the design for deflection.	L4	10M

UNIT-II

4		Design a two-way slab for a room of size 4 m x 5 m with discontinuous and simply supported edges on all the sides with corners prevented from lifting to support a live load of 4 KN/m^2 and weight of weathering course over the slab is 0.6 KN/m^2.AdoptM 20 grade concrete and Fe 415 grade steel.	L4	10M

OR

5		Design a reinforced concrete beam of clear span 5m to support a design working live load of 10 KN/m. Adopt M20 concrete and Fe 415 grade steel.	L4	10M

UNIT-III

6		Design a circular column to carry an axial load of 1000 KN. Use M 20 grade concrete and Fe 415 steel.	L4	10M

OR

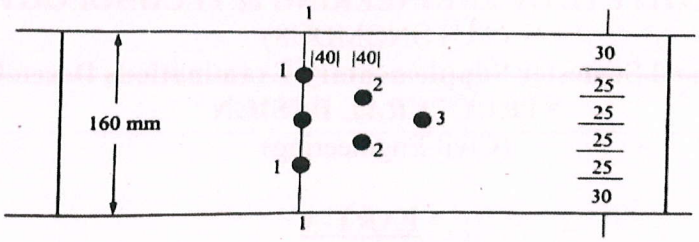
7		Design the reinforcements in a short column 400 mm x 600 mm subjected to an ultimate axial load of 1600 KN together with ultimate moments of 120 KNm and 90 KNm about the major and minor axis respectively. Use M 20 grade concrete and Fe 415 steel.	L4	10M

UNIT-IV

8	a	Explain the various types of bolted connections with neat sketches.	L2	5M
	b	A 18mm thick plate is joined to 16mm plate by 200 mm long (effective) butt weld. Determine the strength of joint if (i) A Double V butt weld is used and (ii) A Single V butt weld is used.	L4	5M

OR

9 Determine the design tensile strength of 160 x 8 mm plate with the holes for 16mm bolts as shown in figure. Plates are of steel, grade Fe 415. **L4 10M**



UNIT-V

10 Design a slab base for a column ISHB 300 @ 577 N/m carrying an axial factored load of 1000 KN. M20 Concrete is used for the foundation. Provide welded connection between column and base plate. **L4 10M**

OR

11 Design a single angle strut connected to the gusset plate to carry 200 KN factored load. The length of the strut between center-to-center connections is 3m. **L4 10M**

END