R20

Reg. No: ⬜⬜⬜⬜⬜⬜⬜⬜⬜⬜

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)
B.Tech III Year I Semester Regular Examinations March-2023
STRUCTURAL DESIGN
(Civil Engineering)

Time: 3 hours   Max. Marks: 60

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

UNIT-I

1	a	State the assumptions made in limit state of collapse in bending for the design of a reinforced concrete section.	CO1	L1	6M
	b	Draw the strain and stress distribution for singly reinforced beam and derive expression for depth of neutral axis, leaver arm and moment of resistance with respect to concrete and steel.	CO1	L2	6M

OR

2		Design a singly reinforced concrete beam of clear span 5m to support a design working live load of 10 kN/m. Adopt M20 grade concrete and Fe 415 grade steel.	CO1	L4	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.	CO2	L4	12M

OR

4		Design a simply supported RCC slab for an office floor having clear dimensions of 4m x 10 m with 230 mm wall all-round. Using M20 grade concrete and Fe415 grade steel. Live load on the slab is 4 kN/m^2 and weight of weathering coarse over the slab is 1.5 kN/m^2.	CO2	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.	CO3	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 20grade concrete and Fe 415 steel. The safe bearing capacity of soil is 220 kN/m^2.	CO3	L3	12M

UNIT-IV

7	a	Define welding. Explain various types of weld connections with neat sketches.	CO5	L2	6M
	b	What are the advantages and disadvantages of welded connections?	CO5	L1	6M

OR

8		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.	CO5	L3	12M

UNIT-V

9		Determine the design axial load capacity of the column ISMB300@577 N/m, if the length of the column is 3m and its both ends pinned.	CO6	L3	12M

OR

10		Design a beam 4m effective length subjected to 50 kN/m UDL (Including self weight) the flanges are embedded in slab and simply supported at both the ends.	CO6	L4	12M

*** END ***

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(Civil Engineering)

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Time: 3 hours   Max. Marks: 60

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

UNIT-I

1. a. State the assumptions made in limit state of collapse in bending for the design of a reinforced concrete section.   CO1   L1   6M

   b. Draw the strain and stress distribution for singly reinforced beam and derive expression for depth of neutral axis, lever arm and moment of resistance with respect to concrete and steel.   CO1   L2   6M

OR

2. Design a singly reinforced concrete beam of clear span 5m to support a design workload of total of 16 kN/m. Adopt M30 grade concrete and Fe 415 grade steel.   CO1   L4   12M

UNIT-II

3. A reinforced concrete beam of rectangular section 300 mm wide is reinforced with four steel of 25 mm diameter at an effective depth of 600 mm. The beam has to resist a factored shear force of ... kN at support section. Assume fck = 25 N/mm and Fe 415 steel, design vertical stirrups for the section.   CO2   L4   12M

OR

4. Design a T-beam supported RCC slab for an office floor having clear dimensions of 4m x 10m each wall all-round. Using M20 grade concrete and Fe415 grade steel. It is fixed on the slab of 4 kN/m, and weight of maintaining loads over the slab is 1.5 kN/m.   CO2   L4   12M

UNIT-III

5. Design a short axially loaded square column 700 mm x 300 mm for a service load of 2000 kN. Use M20 grade concrete and Fe 415 HYSD bars.   CO3   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 M20 grade concrete and Fe 415 steel. The safe bearing capacity of soil is 200 kN/m.   CO3   L3   12M

UNIT-IV

7. a. Define riveting. Explain various types of weld connection with neat sketches.   CO5   L2   6M

   b. What are the advantages and disadvantages of welded connections?   CO5   L1   6M

OR

8. Design a lap joint between the two plates each of width 120mm. If the thickness of one plate 14mm and the other 16 mm. The joint has to transfer a design load of 60kN. The plates are of Fe410 grade. Use bearing type bolts.   CO4   L5   12M

UNIT-V

9. Determine the design axial load capacity of the column ISMB300 @ 577 N/m if it has height of the column is 3m and is in both ends pinned.   CO6   L3   12M

OR

10. Design a beam of effective length supported to ... kN/m pt. spanning 5m section that laterally embedded in wall and simply supported at both the ends.   CO6   L3   12M