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SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech III Year I Semester Regular Examinations Feb-2021

STRUCTURAL DESIGN

(Civil Engineering)

Time: 3 hours

Max. Marks: 60

PART-A

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

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| 1 | a | Write about depth of neutral axis and limiting depth of neutral axis. | 2M |
| | b | State the minimum requirements for shear reinforcement. | 2M |
| | c | What is the minimum eccentricity to be adopted while designing columns? | 2M |
| | d | What are the different types of steel structures? | 2M |
| | e | Define Slenderness ratio. | 2M |

PART-B

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

UNIT-I

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|---|--|-----|
| 2 | A T- beam of effective flange width of 740 mm, thickness of slab 100mm,width of rib 240mm and effective depth 400mm is reinforced with 5 numbers of 20mm diameter bars. Determine the moment of resistance of the section. The materials are M15 grade concrete and Fe250 grade steel. | 10M |
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OR

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| 3 | 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. | 10M |
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UNIT-II

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| 4 | 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 resist a factored shear force of 400 KN at support section. Assume $f_{ck} = 25 \text{ N/mm}^2$ and $f_y = 415 \text{ N/mm}^2$, design vertical stirrups for the section. | 10M |
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OR

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| 5 | Design a two-way slab for a room of size 4m x 5m 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 . Adopt M20 grade concrete and Fe415 grade steel. | 10M |
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UNIT-III

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| 6 | Design the reinforcement in a column of size 400mm x 600mm, subjected to an axial working load of 2000 KN. The column has an unsupported length of 3m and is braced against side way in both directions. Use M20 grade concrete and Fe415 steel. | 10M |
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OR

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| 7 | Design a square footing of uniform thickness for a reinforced concrete circular column of diameter 400mm carrying an axial load of 1000 KN. The safe bearing capacity of soil is 200 KN/m^2 . Use M20 grade concrete and Fe415 steel. | 10M |
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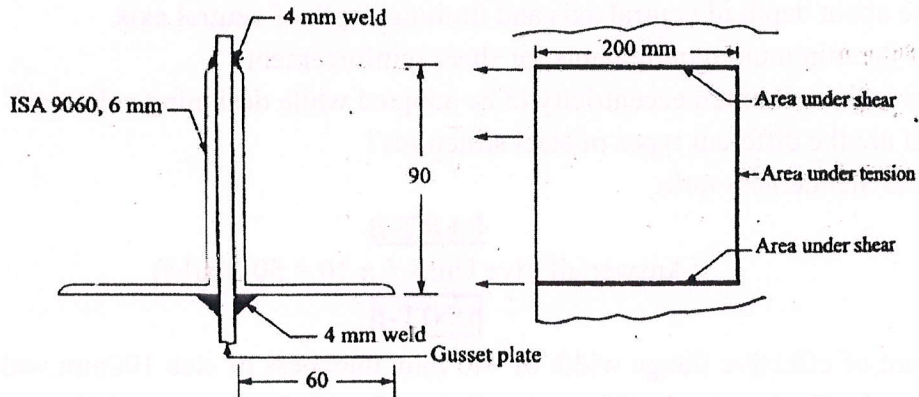
UNIT-IV

Q.P. Code: 18CE0115

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

OR

- 9 Determine the tensile Strength of a roof truss member 2ISA 9060,6 mm connected to the gusset plate of 8mm thickness by 4 mm weld as shown in figure below. The effective length of weld is 200mm. 10M



UNIT-V

- 10 A column 4m 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. 10M

OR

- 11 Design a simply supported beam of 10 m effective span carrying a total factored load of 60 KN/m. The depth of beam should not exceed 500mm. The compression flange of the beam is laterally supported by floor construction. Assume stiff end bearing is 75mm. 10M

END