BACHELOR OF TECHNOLOGY (C.B.C.S.) (2014 COURSE)
B.Tech.Sem - VI CIVIL : : SUMMER - 2022
SUBJECT : STRUCTURAL DESIGN-II

Day : Monday
Date : 13-06-2022

S-13609-2022

Time : 02:30 PM-06:30 PM
Max. Marks : 60

N. B. :

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Use of I.S. 456-2000, interaction charts, non-programmable electronic calculator is **ALLOWED**
4) Assume suitable data whenever necessary and mention it clearly.
5) Your answer will be valued as a whole.

Q. 1 **a)** What is semi-probabilistic approach in limit state method? **(05)**

b) How the modulus of elasticity of concrete is determined? Elaborate with relevant figure. **(05)**

OR

Q. 1 **a)** What are the various types of reinforcements used in R. C. section? Draw relevant figures, with their locations. **(05)**

b) What are the factors affecting the compressive strength of concrete? **(05)**

Q. 2 **a)** What is a flanged beam? What are the conditions under which a beam is designed as a flanged beam? **(05)**

b) A singly reinforced R. C. beam simply supported over a span 5 m has a cross-section of 230 mm × 600 mm. The beam is reinforced with 3 # 16. The beam carries a dead load of 6 kN/m inclusive of self-weight. Calculate the maximum permissible live load the beam can carry? Use M 20. Fe 415. **(05)**

OR

Q. 2 A T-beam slab floor is with 150 mm thick slab spanning between T-beams. The beams are 7 m long and spaced 3.2 m centre to centre. Slab supports live load of 3 kN/m^2 . Using M 20. Fe 415, design the intermediate T-beam. **(10)**

Q. 3 **a)** What is a bond? What are types of bond? At which locations, the check for bond is given? Calculate the development lengths of a # 20 bar in compression of grade Fe 415. **(05)**

b) How the load from a 2-way slab is transferred to the connecting beams? Elaborate with figure. **(05)**

OR

Q. 3 A simply supported beam 230 mm × 600 mm is subjected to a dead load (including self-weight) of 20 kN/m and live load of 20 kN/m. Span of the beam = 6 m. Design the beam and shear reinforcement using vertical stirrups. Use M 20, Fe 415. Draw detailing of the beam with shear reinforcement. **(10)**

P. T. O.

Q. 4 **a)** How the safety against deflection of slab in ensured while designing the slab? Illustrate for both one-way and two-way slab. **(04)**

b) Design a cantilever balcony of span 1.8 m of a residential building. Use M 25, Fe 415. The balcony supports a brick parapet wall of 1 m height. **(06)**

OR

Q. 4 Design a one way simply supported slab of span 3.8 m for the floor of a residential building. Use M 20. Fe 415. Draw the detailing of reinforcement. **(10)**

Q. 5 **a)** What are interaction charts? Write its salient features. How they are used for column design? **(04)**

b) Design the reinforcement for a short axially loaded square column of size 400 mm × 400 mm to support a load of 1200kN.
Use M 20, Fe 415. **(06)**

OR

Q. 5 Design a short R.C. column of effective length 3.5 m, carrying a load of 800 kN and moment of 110 kN/m bisecting the depth of the column.
Use M 20. Fe 415. **(10)**

Q. 6 A 375 mm × 375 mm square R. C. column is supporting an axial load of 1200 kN. Design a pad footing for the column. Use M 20 Fe 415. Safe Bearing Capacity = 210 kN/m^2. **(10)**

OR

Q. 6 **a)** Describe the various checks to given in design of footing? **(04)**

b) Decide the dimension of footing of a RCC column of size 450 mm × 600 mm to carry an axial load at 1500 kN. Use Safe Bearing Capacity = 200 kN/m^2 and M 20 Fe 415. **(06)**

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