B.Tech. SEM -VI (Civil) 2014 Course (CBCS) : WINTER - 2018

SUBJECT: STRUCTURAL DESIGN-II*

Day: Tuesday **W-2018-2449** Time: 10.00 AM TO 02.00 PM

Date: 13/11/2018 Max. Marks: 60

N.B:

1) All questions are **COMPULSORY.**
2) Use of I.S. 456- 2000 and interaction charts and electronic non programmable **CALCULATOR** is allowed.
3) Draw neat labeled diagrams **WHEREVER** necessary.
4) Figures to the right indicate **FULL** marks.
5) Assume suitable data, if necessary.

Q.1 **a)** Draw a creep-time curve for concrete? Define creep coefficient. How it is used in determining the Modulus of Elasticity of concrete? **(05)**

b) What are the various types of reinforcements used in R.C.C.? Discuss their use and suitability. **(05)**

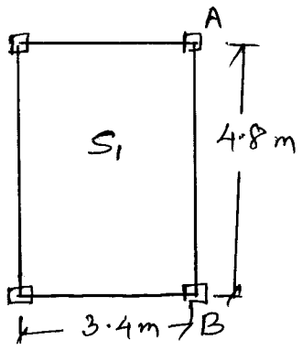
OR

Q.1 **a)** What do you understand by 'M20'? How it is determined? What are the factors affecting it? **(05)**

b) How 'Modulus of Elasticity' of concrete is determined? Differentiate between short-term and long-term Modulus of Elasticity. **(05)**

Q.2 **a)** What is a flanged beam? What are the necessary conditions under which the beam is designed as a flanged beam? **(03)**

b) Slab S_1 is 110mm thick and carries a u.d.l. of 6.75 kN/m. The beam AB carries a wall 230mm thick and 3.0 m high. Design the beam AB for flexure. Use M20, F_e 415. **(07)**



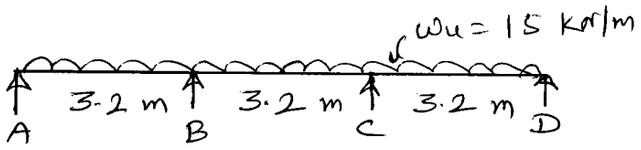
OR

Q.2 **a)** What are the balanced design parameters? What are the values of kulim for F_e 250, F_e 415 and F_e 500? Derive them. **(04)**

b) A R.C. beam of rectangular section 230 mm wide and 300 mm deep is reinforced with 3 bars of 12mm diameter. Calculate the ultimate moment of resistance of the section if M20, F_e 415 is used. Also determine the maximum uniformly distributed load a simply supported beam of this section can carry over a span of 3m. **(07)**

P.T.O.

Q.3

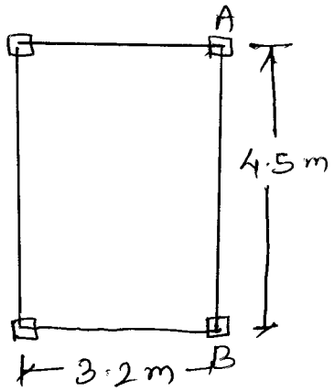


(10)

Design the continuous beam A-B-C-D completely for flexure and shear.

OR

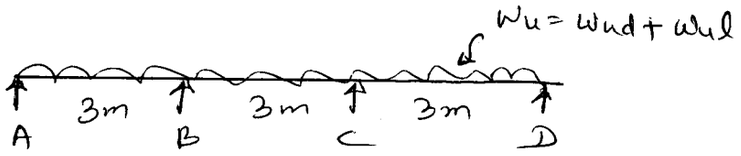
Q.3 The slab 'S' is 110mm thick carrying a factored load of 7KN/m. The beam 'AB' carries an external wall of 3m height. Design the beam AB complete for flexure and shear. **(10)**



Q.4 Design a floor slab of an office building of dimensions 3.5m × 4.8m. Use M25, F_e 500. **(10)**

OR

Q.4 Design a 3 span continuous slab of an office building of each slab of 3m span. Use M25, F_e 500. **(10)**



Q.5 **a)** What are the requirements for a column to be purely axially loaded? How these are satisfied while designing an axially loaded column? **(04)**

b) Design an axially loaded short column carrying a factored load of 1200kN. Effective length = 3.8m. Use M20, F_e 415. **(06)**

OR

Q.5 **a)** How many types of columns exist in any building? How their designs differ from each other? **(04)**

b) Design a short R.C. column of size 230 mm × 600 mm carrying an axial factored load of 1050 KN and a factored moment of 45 kNm acting about an axis bisecting the depth of the column. Effective length of the column = 3.7 m. Use M20, F_e 415. **(06)**

Q.6 Design the footing for a square column of size 500 mm. The column supports a load of 1800 kN and safe bearing pressure on soil is 220 kN/m^2. Use M20, F_e 415. **(10)**

OR

Q.6 Design the footing for a column of size 300 mm × 600 mm carrying an axial load of 1500 kN. Safe bearing capacity of soil is 210 kN/m^2. Use M25, F_e 500. **(10)**

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