B.TECH SEM – VI (2007 COURSE) (CIVIL ENGG.) :

WINTER - 2017

SUBJECT: STRUCTURAL DESIGN – II

10.00 AM TO 02.00 PM

Day: **Tuesday** | **W-2017-2500** | Time: __

Date: **21/11/2017** | Max. Marks: 80

N.B.:

1) **Q. No. 1 and Q. No. 5** are **COMPULSORY**. Out of the remaining attempt any **TWO** questions from each section.
2) Figures to the right indicate **FULL** marks.
3) Answers to both the sections should be written in **SEPARATE** answer book.
4) Use of **IS 456-2000** and interaction charts is allowed.
5) Draw neat diagrams **WHEREVER** necessary.
6) Assume suitable data if necessary.

SECTION –I

Q.1 **a)** Draw the actual and idealized stress –strain curve for concrete. Write its salient features. **(05)**

b) Determine the basic design parameter for concrete of M25, Fe 500, as per LSM. **(05)**

c) What is the reason for providing minimum stirrups in a R.C beam? **(04)**

Q.2 **a)** What do you understand by creep of concrete? Draw the creep- time curve and define creep coefficient of concrete. "Constructing a brick wall on a freshly laid concrete is to be avoided". Why? **(07)**

b) What is a semi-probabilistic approach as applied to LSM? How it is used in determining the partial safety factors? **(06)**

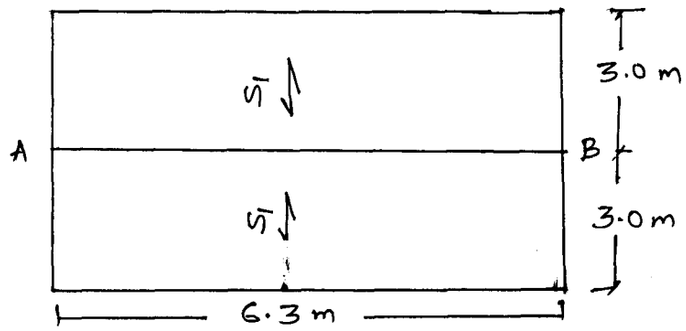
Q.3 **a)** What do you understand by under –reinforced, balanced and over-reinforced section? Justify you answer with the help of strain variation diagram. **(06)**

b) A singly reinforced rectangular R.C. beam has cross section of 230 mm × 525 mm. The beam is reinforced with 3 bars of 20 mm diameter. Determine the amount of uniformly distributed load the beam can carry on a simply supported span of 4.8m. Use WSM . M20, Fe 415 is used. **(07)**

Q.4 **a)** Explain the modes of failure of a beam subjected to flexure. **(06)**

P. T. O.

b) Design beam AB completely and show the detailing of reinforcement. Slab S_1 is 125mm thick and carries a total load of 8 kN/ m^2. The beam also supports a 230mm thick brick masonry wall of 3.2 m height. Use M25, Fe 415. **(07)**



SECTION-II

Q.5 **a)** How the loading on going and loading portion of a staircase flight is calculated? **(05)**

b) What is an interaction diagrams for column? Write its salient features. **(05)**

c) A square column of size 400mm × 400 mm is reinforced with 8bars of 20mm diameter. A footing of size 2000mm × 2000 mm × depth 600mm is provided for the column. Reinforcement along X- axis is 20#10mm. Reinforcement along y –axis is 21 # 10mm. **(04)**
Draw the details of column –footing reinforcement.

Q.6 **a)** Design a two way slab 3m× 5m with two opposite edges discontinuous. The slab carries a live load of 3kN/m^2. Using M20 Fe 415, design the slab completely. Show the details of reinforcement. **(10)**

b) What is a distribution steel? Why and where it is provided? How it is determined? **(03)**

Q.7 **a)** Design a short R.C. column with material M20, Fe 415 for an effective length of 3.8 m. The column carries an axial load of 850 kN and moment about major axis = 45 kNm. Design the column by assuming size as 230mm × 600 mm and draw the reinforcement details. **(10)**

b) Write functions of longitudinal reinforcement in a column. **(03)**

Q.8 A short RC column of size 230 mm × 600 mm is subjected to an axial load of 1200 kN. Design an isolated pad footing for the column. Safe bearing capacity of soil is 210 kN/m^2. Use M20, Fe 415. Sketch the details of the reinforcement. **(13)**

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