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SF-7051

B. E. - III (Sem. VI) (Civil) Examination

May / June - 2011

Structural Design & Drawing - II

Time : 4 Hours] [Total Marks : **100**

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ B. E. - 3 (SEM. 6) (CIVIL)

Name of the Subject :

☛ STRUCTURAL DESIGN & DRAWING - 2

☛ Subject Code No. : 7 0 5 1 ☛ Section No. (1, 2,.....) : NIL

Seat No. :

Student's Signature

(2) Use of IS 456 and IS 875 is permitted.

(3) Wherever not mentioned, the materials are M_{20} and Fe415.

(4) Assume suitable data if necessary and mention them clearly.

(5) Neatly drawn pencil sketches will earn special credits.

1 (a) A hall has clear dimension 2.5 m x 6.5 m with wall thickness 230 mm. The live load on the slab is 3 kN/m^2 and a finishing load of 1 kN/m^2 may be assumed. Design of slab must include all checks and draw clear view of slab with reinforcement details. **15**

OR

(a) A T-beam of effective flange width 1300 mm, thickness of slab 100 mm, width of rib 250 mm and effective depth 450 mm is reinforced with 4-20 mm dia bars. Calculate the ultimate moment of resistance. Materials are M_{15} and FE415 grade of steel. **15**

If it is reinforced with 4-25 mm dia bar, calculate ultimate moment of resistance.

(b) Determine the anchorage length of bars shown in fig. 1 at the simply supported end of the RCC beam; if it is subjected to an ultimate shear force of 200 kN. **10**

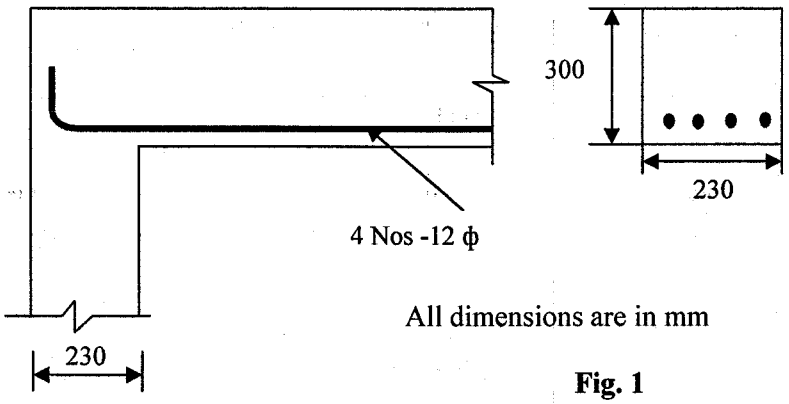

Fig. 1

2 Design a three span continuous beam ABCD supporting a 120 mm thick slab as shown in fig.2 Consider Live load 4 kN/m^2 and Floor finish 1 kN/m^2.

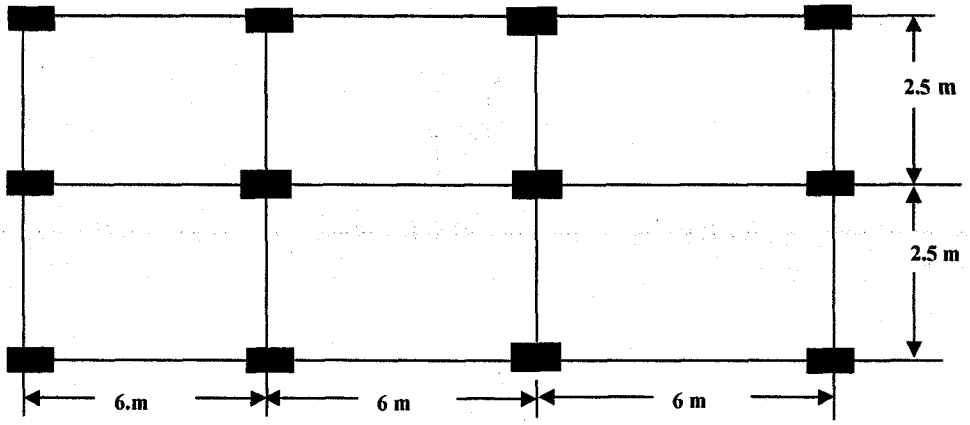

Fig. 2

(a) Show complete analysis of beam for shear force and bending moments. Also draw SFD and BMD. **10**

(b) Work out all structural design calculations for two types of sections (Tee beam and doubly reinforced beam) Structural design must be supported by proper checks and neat details sketches of reinforcement in both cases. **15**

.3 Determine the safe axial load for a short circular column 400 mm in diameter, reinforced with 6 bars of 22 mm diameter. It is provided with 8 mm diameter helical reinforcement at a pitch of 45 mm. Use M20 grade concrete and FE415 steel. **10**

OR

3 Design a square R.C.C. column to carry an axial load of 1600 kN. The effective length of the column is 2.70 m. The grades of concrete and steel are M20 and Fe415 respectively. **10**

4 Design a square footing for a square column of size 500 mm x 500 mm. The column carries an axial load of 1700 kN. The safe bearing capacity of the soil is 240 kN/m^2. Assume grade of concrete M20 and grade of steel Fe415. Check for one way and two way shear. Also sketch the reinforcement details. **15**

5 The main stair of an office building has to be located in a stair measuring 3.5 m x 5.5 m. The vertical distance between the floors is 3.75 m. Design the stairs. Assume L-L of 2500 N/m^2, grade of concrete M20 and grade of steel Fe415. **25**