T.Y. B. Tech (Civil)
Structural Design-II
(CE 304)
(END Semester Examination)

Duration: 3 Hrs.   Date : 26/04/2013 time : 2 pm to 5 pm   Max. Marks: 50

Instructions to candidate:
1) All questions are compulsory.
2) Assume suitable data, if necessary.
3) Use of non-programmable electronic calculators is allowed.
4) Use of IS 456 -2000 is permitted. Use of other reference/ document is restricted.

Q.1

A Rectangular RC beam of concrete is fixed at one end and free at other end has following details.

Span = 5 m
Material M25 & Fe 500,

Size : 300 mm wide and 750 mm at fixed end and 300 mm x 400 mm at Free end.

(Clear cover 30 mm at top and bottom)

Top steel 10 # 32 mm dia. throughout

Bottom steel   2 # 16 mm dia throughout.[Anchor Bars]

If the total load is applied on beam is 80 kN/m, check the safety of the beam for flexure.
In case of inadequacy, suggest the safe load on beam.

(10)

Q.2   A two span fixed beam has following details.

Effective span AB = 7 m and BC = 7 m.

Support A and C are fixed and B is continuous

Dead load = 40 kN/m

Live load = 30 kN/m

Design the beam for flexure action with redistribution of moments. Comply the IS provisions. use M 25 and Fe500. Show the details of   reinforcement.   **(10)**

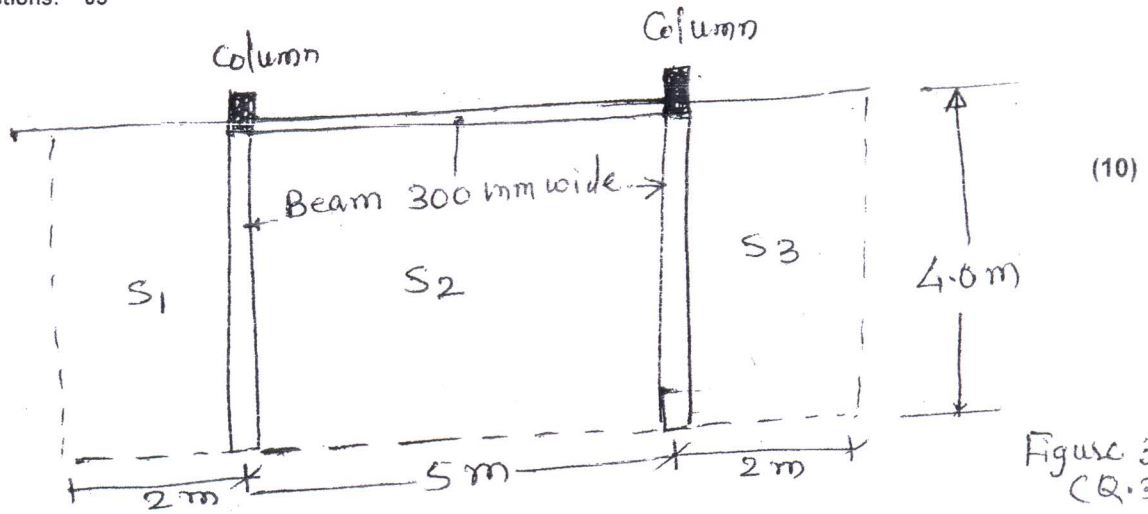**Q.3** Design a Porch Slab [S1, S2 & S3] as shown in figure 3.0.

Live load = 10 kN/sq.m

Floor Finish = 3 kN/sq.m

Imposed dead load 5 kN/sq.m

Material , M30 and Fe 500.

Make suitable assumption and design the slab as per IS provisions. Show the details of reinforcement.

Figure 3.0 (Q.3).

Q. 4

a) Justify the use of over-reinforced section is uneconomical as compared to under-reinforced section.

b) Compare the working stress method and Limit state method with salient features..

c) Design a reinforced beam for shear and torsion as per IS provisions

Depth 400 mm and width 600 mm

Span = 5.00 m , fixed at both ends .

Percentage of tension reinforcement = 0.7 % at support and mid span .

Shear = V = 210 kN

Torsion = 45 kN-m

Material M25 and Fe 415 show the details of reinforcement

(10)

Q.5

• Design the isolated footing for the following data. [Refer Figure 5.0]

• Column Axial Load = 2500 kN

• Un-axial Moment in column = 150 kN-m

• Size of column = 600 mm x 600 mm

• SBC of soil = 500 kN/sq.m

• The gap between footing and soil is
allowed to maximum 20 % of total area.

• Material : M-30, Fe 500

• Comply all relevant clauses of IS : 456 - 2000
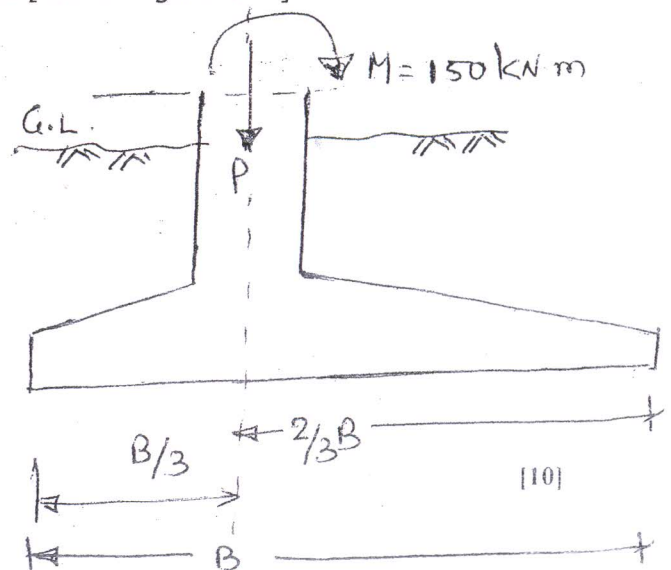
• Show the details of reinforcement.

Figure 5.0 (Q.5)

[10]