(Please write your Exam Roll No.) Exam Roll No. 0031

END TERM EXAMINATION

FOURTH SEMESTER [B.TECH] MAY-JUNE-2015

Paper Code: ETCE 212 **Subject: Design of Concrete structure (Batch: 2013 onwards)**

Time : 3 Hours **Maximum Marks :75**

Note: Attempt any five questions including Q.No. 1 which is compulsory. Assume any missing data suitably. Use of IS456-2000 code is allowed.

Q1. Answer the following: **(5x5=25)**

(a) Write short note on Shrinkage, temperature and creep effect of concrete.

(b) Explain the major difference between limit and working stress method.

(c) A rectangular beam is 300 mm wide and has 550mm effective depth. Determine the area of tension reinforcement required in the section for it to be a balance section. M20 concrete and Fe 250 steel are used.

(d) What are the advantages of R.C.C. column with helical reinforcement?

(e) i) What are the criteria to calculate minimum eccentricity in column?
ii) List out the type of footing used in concrete structure indicating specific application.

Q2. (a) Briefly describe role of water cement ratio in concrete. **(4.5)**

(b) Design a beam for shear reinforcement having a cross section of bXd=250x500 reinforced with 4 no's of 20mm diameter bar. The factored shear force= 130 kN. Use M20 and Fe 415 steel. **(8)**

Q3. Determine the ultimate moment carrying capacity of the T beam. Given: bf=800mm, df=150mm, bw=300mm, d=420mm, Ast=5 Nos. of 20mm dia bars on tension side. Assume Fe 415 steel and M20 concrete. Also compute the maximum stresses in steel and concrete if it is subjected to a design moment of 100 kNm. **(12.5)**

Q4. Design a roof slab for a room of size 7.5X3.5m, simply supported on 200 mm thick masonry walls to support a live load of 4 KN/m². Adopt M20 concrete and Fe 415 steel. **(12.5)**

Q5. Design a simply supported rectangular RC beam, having a span 5.5m, subjected to a uniformly distributed load of 3.8KN/m. Compute the required reinforcement, assuming the breadth of beam as 230mm and effective cover for compression and tension reinforcement as 50mm. Assume the beam is supported by load bearing masonry of thickness 230mm. Use M20 concrete and Fe415 steel. **(12.5)**

Q6. Design an isolated footing for a column 300mm X 500mm reinforced with 6, 25mm dia bars with Fe 415 steel and M25 concrete, subject to a factored axial load Pu=100kN and a factored uniaxial moment Mux=120kNm (with respect to the major axis) at the column base. Assume that moment is reversible. The safe bearing capacity of soil may be taken as 300kN/m² at a depth of 1.25m. Assume M20 concrete and Fe415 steel for fotting. **(12.5)**

Q7. Design a circular column with helical reinforcement subjected to working load of 1500 kN. Diamater of the column is 450mm. The column has unsupported length of 3.5m and is effectively held in position at both ends but not restrained against rotation. use M25 concrete and Fe415 steel. **(12.5)**

Q8 Write comprehensive notes on the following:

a) Steps involved in concrete mix design. **(3)**

b) Behaviour of load bearing masonary wall. **(3)**

c) Limit states of Serviceability. **(3)**

d) Design of combined footings. **(3.5)**

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