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BAR-044

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BACHELOR OF ARCHITECTURE (BARCH)

Term-End Examination

June, 2014

BAR-044 : THEORY OF STRUCTURES-V

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt **any four** questions. **All** questions carry **equal** marks. Use of calculator and IS - 456 code is **permitted**.*

1. Determine the ultimate moment of resistance of the beam section as shown in Figure 1. Use of M 20 concrete and Fe 415 steel may be assumed. **17½**

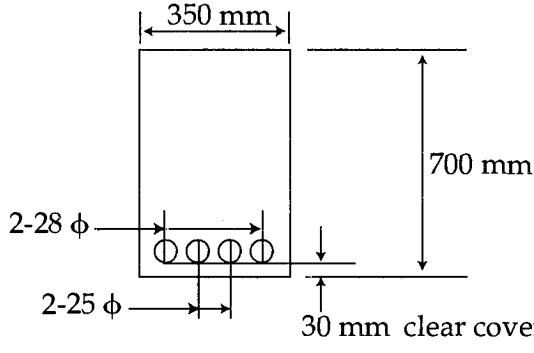

Figure 1

2. A rectangular reinforced concrete beam, located inside a building in a coastal town, is simply supported on two 230 mm thick and 6-m apart masonry walls (centre to centre). The beam has to carry, in addition to its own weight, a distributed live load of 10 kN/m and a dead load of 5 kN/m. Design the beam section for flexure for maximum moment at midspan. Assume Fe 415 steel and M 20 concrete. Exposure condition may be taken as moderate. 17½

3. Design a rectangular roof slab, simply supported on all its four edges (on four walls of a room) of effective span 3 m × 5 m. Imposed load may be taken as 2 kN/m^2. Take M 20 grade concrete and Fe 415 steel. Nominal cover may be taken as 20 mm. 17½

4. Design the reinforcement for a circular column, of 400 mm diameter, subjected to a factored load of 1500 kN. The column has an unsupported length of 3.4 m and is traced against sidesway. Use M 25 concrete and Fe 415 steel. 17½

5. Design the shear reinforcement in the form of vertical stirrups of 8 mm ϕ for a rectangular beam cross section of 300 × 500 mm. The beam is reinforced with 4 - 20 ϕ steel and resists 150 kN shear force. Use M 25 concrete and Fe 415 steel for main reinforcement and for transverse reinforcement. 17½

6. Design a reinforced concrete footing for a 230 mm thick masonry wall which supports a load (inclusive of self weight) of 200 kN/m order service loads. Assume a safe bearing capacity of 150 kN/m^2 at a depth of 1 m below ground. Assume M 20 grade concrete and Fe 415 grade steel. 17½

7. Write short notes on the following :

(a) Ductile design for earthquake resistant structures. 6

(b) Design philosophy of working stress method and limit state method. 6

(c) Estimating effective length of column. 5½