R09

Code No: C2004

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.Tech I - Semester Examinations, March/April-2011
ADVANCED REINFORCED CONCRETE DESIGN
(STRUCTURAL ENGINEERING)

Time: 3hours **Max. Marks: 60**

Answer any five questions
All questions carry equal marks
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1.a) Explain whether moment redistribution can be applied to reduce bending moments in columns.

b) Determine the ordinates of the bending moment diagram at every one-tenth point of beam AB of span 20 m with a uniformly distributed load 35 kN/m if the fixed moments at A is 1200 kNm and that at B is 700 kNm. [6+6]

2. Using yield line theory, design the floor slab of a class room of a multi-storeyed structure for the following data. Dimensions of the class room are 6 m x 6 m. The panel is continuous on all edges. Assume M30 concrete and Fe415 grade steel. Derive the formulae involved. Sketch the reinforcement details. Assume moderate exposure condition. [12]

3. Design a 5.5m x 5.5m wide flat slab, simply supported at the periphery, by a masonry wall 230 mm thick. Assume a live load of 4kN/m^2 and finish load of 1 kN/m^2. Use direct design method. Use M35 concrete and Fe 500 grade steel. Sketch the reinforcement details. Assume mild exposure condition. [12]

4. Design a ribbed slab 6 x 6 m continuous over two adjacent sides simply supported on the other two sides if it is beams so that beams are spaced at 1.5 x 1.5m. Assume factored udl of 12 kN/m^2. Use M30 concrete and Fe415 steel. [12]

5.a) What do you mean by the term ‘shear span’? Explain its effect on strength of RC members.

b) Design a corbel to carry a factored load of 630 kN at a distance of 250 mm from the face of a 300 x 300 mm column. Use M35 concrete and Fe 415 grade steel. [6+6]

6. A reinforced concrete deep girder is continuous over spans of 8 m apart, from center to center. It is 4.5 m deep, 300 mm thick and the supports are columns 800 mm in width. If the girder supports a udl of 250 kN/m including its self weight, design the necessary reinforcement. Use M25 concrete and Fe 415 grade steel. [12]

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7. Design a shear wall of length 6 m and thickness 275 mm subjected to the following forces (fig.1). Assume moderate exposure condition. Assume f_{ck} = 30 Mpa and f_y = 415 N.mm^2 and the wall is a high wall with the following loadings: Sketch the reinforcement details. [12]

Loading	Axial Force (kN)	Moment (kNm)	Shear(kN)
Dead Load + Live Load	2050	650	40
Seismic Load	300	5200	650

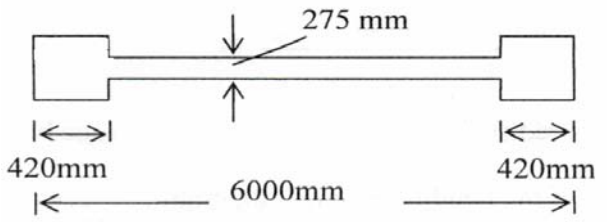


Fig.1 Shear wall

8.a) Distinguish between short-term and long-term deflections in RC members.

b) A simply supported one-way slab 180 mm having an effective span of 4.2 m is reinforced with 10 mm diameter bars spaced at 125 mm c/c at an effective cover of 25 mm. The slab is subjected to a live load of 4kN/m^2 and a surface finish of 1.6kN/m^2. Use M25 concrete and Fe 500 grade steel. Assume ultimate shrinkage strain = 0.0003 and creep coefficient = 1.6. Estimate the only the long-term deflection. [6+6]

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