Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 08

M.Tech Structural Design EL-III (2016 & Onwards) (Sem.–3)

ADVANCED REINFORCED CONCRETE DESIGN

Subject Code : MTSD-303

Paper ID : [74807]

Time : 3 Hrs. Max. Marks : 100

INSTRUCTIONS TO CANDIDATES :

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carry TWENTY marks.

Q1. a) Write the assumptions in limit state of collapse in flexure. [8]

b) Find the M.R. of a singly reinforced concrete beam of 200 mm width and 400 mm effective depth, reinforced with 3 bars of 16 mm dia. of Fe 415 steel. Take M 20 concrete. Determine the actual stresses when the section is subjected to the limiting moment of resistance. [12]

Q2. A cantilever beam 3m long carries a UDSL' of 16kN/m out of which 50% load is due to permanent loads. The beam, rectangular in section of width 350mm and total depth 600mm, is reinforced with 3 nos of 23 mm bars on tension side. Compute the short term deflection. [20]

Q3. A reinforced concrete deep girder is continuous over spans of 9 m apart from center to center it is 4.5 m deep, 300 mm thick, and the supports columns 900 mm in width. If girder supports a uniformly distributed load of 200 kN/m including its own weight, design the necessary steel assuming M 20 concrete and Fe 415 steel. [20]

Q4. Design a shear wall of length 6 m and thickness 275 mm subjected to the following forces (fig.l). Assume moderate exposure condition. Assume fc k = 30 Mpa and fy = 415 N.mm^2 and the wall is a high wall with the following loadings : Sketch the reinforcement details. [20]

Loading	*Axial* Force (KN)	Moment (KNm)	Shear (KN)
Dead load + Live load	2050	650	40
Seismic load	300	5200	650

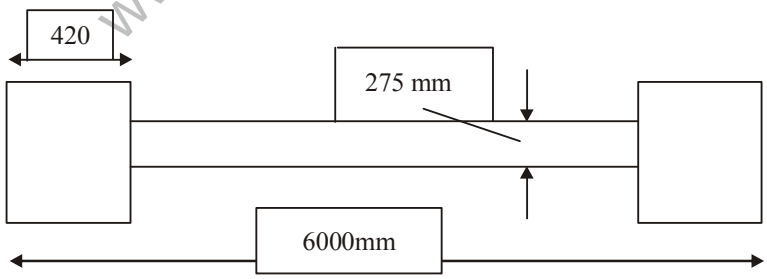

Fig. -1 shear wall

Q5. Explain ductile detailing of RCC structures. [20]

Q6. Determine the curvature ductility of RC beam reinforced with 3-20mm dia bars on tension side only. The width and depth of beam is 300mm and 600mm, respectively. Use M20 grade concrete and Fe415 steel. [20]

Q7. Explain in detail about earthquake forces. [20]

Q8. a) What are the types of shear failure in beam? [10]

b) Define ductility of RCC structure. How it can be increased? [10]