



Year and Program: 2018-19

School of Technology

Department of Civil Engineering  
(M. Tech. Structural  
Engineering)  
Semester – I

Course Code: CSE 5071

Course Title: Advanced Design of  
Concrete Structures

End Semester Examination (ESE)

Day and Date

Monday

24-12-2018

Time: Max Marks: 100

L 10 am to 1 P.M.

Instructions:

- 1) All question are compulsory.
- 2) Assume suitable data wherever necessary.

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|-----|---|----|----------------|-----|
| Q.1 | Determine the reinforcement, when the column is braced against sidesway and is bent in double curvature. Use the following data: $P_u = 2000$ kN, concrete grade = M 20, steel grade = Fe 415, unsupported length $l = 8.0$ m, $l_{ex} = 7.0$ m, $l_{ey} = 6.0$ m, $A_{sc} = 6381$ mm <sup>2</sup> (12-25 mm diameter bars), lateral tie = 8 mm diameter @ 250 mm c/c, $d = 60.5$ mm, $D = 500$ mm and $b = 400$ mm. The factored moments are: 70 kNm at top and 40 kNm at bottom in the direction of larger dimension and 60 kNm at top and 30 kNm at bottom in the direction of shorter dimension | 25 | L <sub>6</sub> | CO1 |
| OR  |   |    |                |     |
| Q.1 | Design the typical interior panel of a flat slab floor of size 5 m x 5 m with suitable drop to support a live load of 4 kN/m <sup>2</sup> . The floor is supported by columns of size 450 mm x 600 mm. Use M20 concrete and Fe 415 steel. Sketch the reinforcement details by showing cross sections<br>(i) at column strip, (ii) at middle strip.  | 25 | L <sub>6</sub> | CO2 |
| Q.2 | Design a simply supported deep beam with width is 300 mm, overall depth is 3000 mm, width of supports is 500 mm and clear span is 8 m. Live load on the beam is 200 kN/m at service state. Adopt M 20 grade concrete and Fe 415 steel.  | 25 | L <sub>6</sub> | CO3 |
| OR  |   |    |                |     |
| Q.2 | A rectangular overhead water tank 4m x 6m in plan and 3m high supported by six column 4m above ground. Design bottom slab and wall of tank for M20 concrete and Fe415 steel.  | 25 | L <sub>6</sub> | CO4 |
| Q.3 | a) What are assumptions made in theory of yield lines?  | 05 | L <sub>5</sub> | CO5 |
|     | b) Design a slab for a live load of 4.0 kN/m <sup>2</sup> and floor finish at 1.0 kN/m <sup>2</sup> . Size of slab being 5m x 4m. It is restrained on four edges. Adopt M20 concrete and Fe415 grade steel. Use yield line  | 20 | L <sub>6</sub> | CO5 |

theory

Q.4	a)	Elaborate anchorage requirement as per ACI 318.	05	L <sub>6</sub>	CO6
	b)	Design of an exterior column beam joint for following data.	20	L <sub>6</sub>	CO6
		5) Column 550 x 550 mm with 2% steel with a maximum load on the column 5000 kN, bar diameter 30mm.			
		6) Main beam, 500 x 600 mm ultimate capacity 430 kNm and tension steel 5 nos 25mm			
		7) Spandrel beam 450 x 750 mm			
		8) M30 grade concrete and Fe415 steel used.			
		9) Story height is 3.0m			

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