

Reg.No. \_\_\_\_\_



# Karunya UNIVERSITY

(Karunya Institute of Technology & Sciences)  
(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

## End Semester Examination – Nov/Dec – 2016

Code : **14CE2029**  
Sub. Name : **Advanced Reinforced Concrete Structures**

Semester : **VI**  
Duration : **3hrs**  
Max. marks : **100**

### ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)

Q. No.	Sub Div.	Questions	Course Outcome	Marks
1.	a.	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 mmx450 mm. Use M20 concrete and Fe 415 steel. Sketch the reinforcement details by showing cross sections (i) at column strip (ii) at middle strip.	CO2	15
	b.	Label the components of flat slab and its types	CO1	5
(OR)				
2.	a.	Design the exterior panel of a flat slab of size 6 m x 6 m with suitable drop to support a live load of 5 kN/m <sup>2</sup> . The floor system is supported by columns of size 500 mmx500 mm. Floor to floor distance is 3.6 m. Use M20 concrete and Fe 415 steel.	CO2	20
3.	a.	Determine the maximum bending moment and shear force of a simply supported RC slab required for the deck of a road bridge having the following data : Clear width of roadway = 6m Foot paths = 1m on either side Clear span = 5 m Width of bearing = 400mm Thickness of wearing coat = 80mm Type of loading : IRC class AA or A , whichever gives the worse effect. Materials : M25 grade of concrete , Fe 415 grade HYSD bars	CO2	15
	b.	Discuss the limitations of Courbon's method	CO1	5
(OR)				
4.	a.	Analyze the deck slab of a T-beam girder bridge to suit the following data: Clear roadway = 7.5m. Effective span of T-beam = 16m. M20 grade of concrete and Fe 415 HYSD bars	CO2	20
5.	a.	Design a corbel to carry a factored load of 500kN at a distance of 200mm from the face of a 300 x 300 mm column. Assume the grade of 30 concrete is used for construction.	CO3	16
	b.	Discuss the load transfer mechanism of corbel with neat sketch	CO	4
(OR)				
6.	a.	A beam 3500mm deep and 250mm wide continuous over three spans with a clear span of 5400mm and the width of the support is 600mm, carries a uniformly distributed service load of 160kN/m. Design the beam using M 20 and Fe 415 steel	CO3	16
	b.	Recall the application of deep beams with neat sketch		4

7.	a.	A reinforced concrete grid floor is to be designed to cover a floor area of size 12m x 15m. The spacing of ribs in mutually perpendicular direction being 1.5m c/c. Live load to be considered is 1.5kN/m <sup>2</sup> . Materials to be used are M20 concrete and Fe-415 steel. Analyze the grid floor for moments and shears using IS method and design suitable reinforcements.	CO2	<b>18</b>
	b.	List the types of Grid floor with neat sketch	CO1	<b>2</b>
<b>(OR)</b>				
8.	a.	A RC grid floor is to be designed to cover a floor area of 13 m x 17 m. The spacing of ribs in mutually perpendicular direction is 1.5 m c/c. Live load on floor is 2.5kN/m <sup>2</sup> . Adopt M30 and Fe 415. Assume the ends are simply supported. Analyze the grid floor by Rankine Grashoff Method and design suitable reinforcement in the grid floor.	CO2	<b>15</b>
	b.	Explain the concept of grid floor and comment on its types and uses.	CO1	<b>5</b>
9.	a.	Design a spherical shell for a circular room of 8m diameter with 200mm thick wall. Assume the incidental live load and finishes on the dome as 750N/m <sup>2</sup> and 215N/m <sup>2</sup> . The dome carries a lantern load of 10kN on a crown point. Use M20 concrete and Fe-415 steel.	CO2	<b>20</b>

ALL THE BEST

### Course Outcome:

Students at the end of the course will be able to:

CO1: Elaborate the design concepts of complex structural elements.

CO 2: Analyze and design the structural elements as per standards.

CO3: Prepare detailing in appropriate professional formats