

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

**Karunya UNIVERSITY**

(Karunya Institute of Technology &amp; Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

**End Semester Examination – Nov/Dec – 2016**

**Code : 14CE2009**  
**Sub. Name : Reinforced Concrete Structures**

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

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

Q. No.	Sub Div.	Questions	Course Outcome	Marks
1.	a.	Draw the stress strain curve for concrete and mark the salient points.	CO1	4
	b.	Discuss the various failure theories with neat sketches	CO1	16
(OR)				
2.		Design a simply supported slab of 5 x 3.5 m supported on 230mm walls. Assume live load as 3 kN/m <sup>2</sup> and floor finish of 1kN/m <sup>2</sup> . Use M20 concrete and Fe415 steel.	CO2	20
3.		A simply supported beam of size 300x500mm effective depth has to resist a factored moment of 180 kNm and a factored shear of 200kN. Use M20 concrete and Fe415 is M20.Design the reinforcement and the stirrups in the beam.	CO2	20
(OR)				
4.		Design a beam of span 4m supported on walls 230mm thick. The load on the beam is 15kN/m. Use M20 concrete and Fe415 steel.	CO2	20
5		Find the moment of resistance of T-beam and suggest the economical section, having the following data b <sub>f</sub> = 700mm, d= 600mm, b <sub>w</sub> = 240mm, D <sub>f</sub> = 90mm. Use M20 concrete and Fe415 steel, when i) Ast= 2454 mm <sup>2</sup> ii) Ast = 1200mm <sup>2</sup>	CO3	20
(OR)				
6.	a.	Which column is subjected to uniaxial bending?	CO3	1
	b.	As per IS code what is the maximum % of steel to be used in column?	CO2	1
	c.	What is the condition for a column to be safe in biaxial bending?	CO3	2
	d.	Differntiate short and long column.	CO3	2
	e.	Design a circular column of size 400mm diameter with effective length of 3.2m capable of safely resisting a factored load of Pu=1000kN. Use M20 concrete and Fe415 steel	CO2	14
7.	a.	What is the effective length of column effectively held in position at both ends and restrained against rotation at one end?	CO2	1
	b.	How much increasase in strength does a column have when it is provided with helical reinforcement?	CO2	1
	c.	As per codal provisions how is the minimum eccentricity of the column calculated.	CO2	2
	d.	List the various limit states in the design of RC elements	CO3	2
	e.	Design a square column of size 400mm with effective length of 3.5m to resist a factored load of Pu=1300kN and an eccentricity of 80mm. Use M20 concrete and Fe415 steel.	CO2	14
(OR)				

8.		An RC column 400 x 400mm in section carries an axial load of 1000kN. Design the footing for the column using M20 concrete and Fe415 steel.	CO2	<b>20</b>
		<b><u>Compulsory:</u></b>		
9.		Design the stem of a cantilever retaining wall to retain earth embankment 3 m high above the ground level. The unit weight of earth is $18\text{kN/m}^3$ and its angle of repose is $30^\circ$ . the embankment is horizontal at its top. The safe bearing capacity of soil may be taken as $100\text{kN/m}^2$ and the coefficient of friction between soil and concrete as 0.5. Use M20 concrete and Fe415 steel.	CO2	<b>20</b>

ALL THE BEST