



End Semester Examination – Nov/Dec – 2016

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

Semester : **2016-17 ODD**
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 steel and mark the salient points.	CO1	4
	b.	Elaborate the design philosophies highlighting the advantages of different methods.	CO1	16
(OR)				
2.		Design a simply supported slab of 7.5 x 3.5 m supported on 230mm walls. Assume live load as 4 kN/m ² and floor finish of 1kN/m ² . Use M20 concrete and Fe415 steel.	CO2	20
3.	a.	Find τ_c value when the % of steel is 0.6 and grade of concrete is M20	CO2	2
	b.	Under what circumstances will you go for doubly reinforced sections?	CO3	2
	c.	A simply supported beam of size 350x700mm effective depth has to resist a factored moment of 450kNm and grade of concrete is M20. Design the reinforcement in the beam.	CO2	16
(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 $b_f = 750\text{mm}$, $d = 500\text{mm}$, $b_w = 250\text{mm}$, $A_{st} = 1160\text{mm}^2$. Use M20 concrete and Fe415 steel, when i) $D_f = 90\text{mm}$ ii) $D_f = 130\text{mm}$ iii) $D_f = 110\text{mm}$	CO3	20
(OR)				
6.	a.	Define slenderness ratio	CO1	1
	b.	What is the minimum % of steel to be used in column.	CO2	1
	c.	Why exterior columns are designed for uniaxial moment?	CO3	2
	d.	What is the minimum eccentricity for design of column?	CO2	2
	e.	Design a short square column of size 450mm with effective length of 3.0m capable of safely resisting a factored load of $P_u = 1200\text{kN}$. Use M20 concrete and Fe415 steel	CO2	14
7.	a.	Which column is subjected to biaxial bending?	CO3	1
	b.	What is the effective length of column effectively held in position and restrained against rotation at both ends?	CO2	1
	c.	Differentiate between short and long column	CO3	2
	d.	What is the condition for eccentricity to design the column as axially loaded column?	CO3	2

	e.	Design a circular column of size 400mm with effective length of 3.5m to resist a factored load of $P_u=1300\text{kN}$ and $M_u=125\text{kN.m}$. Use M20 concrete and Fe415 steel.	CO2	14
(OR)				
8.		An RC column 400 x 400mm in section carries an axial load of 750kN. Design the footing for the column using M20 concrete and Fe415 steel.	CO2	20
		<u>Compulsory:</u>		
9.		Design a dog-legged stair for a building in which the vertical distance between floors is 3.6m. the stair hall measures 2.5 m x 5 m. The live load may be taken as 3000N/m ² . Use M20 concrete and Fe415 steel.	CO2	20

ALL THE BEST