Roll No. _____

END SEMESTER EXAMINATION
SEMESTER- V

COURSE CODE : CE507
COURSE TITLE : DESIGN & DETAILING OF STRUCTURE-I
SESSION : JULY-DEC'2021

DURATION : 3 (THREE)HRS
MAXIMUM MARKS : 75
PASS MARKS : 35 %

NOTE: *1. All the questions are compulsory*
2. Attempt any 5 (five) questions.
3. Mark for each question is shown against it.
4. Assume suitable logical data wherever necessary.

1.	**(a)**	A reinforced concrete beam having 250 mm width and 550mm effective depth has 4 nos of 16mm diameter bars as main tension reinforcement. Calculate the moment of resistance of the beam. Use M15 grade concrete and Fe415 grade steel.	**(8)**
	(b)	What do you mean by the terms balance section, under reinforced and over reinforced section? Why over reinforced section is not considered for design purpose.	**(5+2)**
2.		Design a slab for a room of size 4mX5m with discontinuous and simply supported edge on all the sides with corners prevented from lifting to support a live load of 4kn/m^2. Adopt M20 concrete and Fe415 steel.	**(15)**
3.	**(a)**	Design a simply supported concrete beam to suit the following data: a) Clear span= 4m b) Width of supports= 300mm c) Service load= 5kn/m d) M20 grade of concrete and Fe415 steel.	**(12)**
	(b)	What are the advantages of RCC.	**(3)**
4.	**(a)**	Enumerate the difference between working stress method and limit state method.	**(5)**
	(b)	A reinforcement concrete beam is 300mm wide and 500mm deep (effective) carries a superimposed load of 20 kN/m inclusive of self-weight over a clear span of 5m. Design suitable shear reinforcement if area of tensile steel is 1200mm^2. Use M20 concrete and mild steel bars.	**(10)**
5.	**(a)**	An RCC beam 250 X 500 mm effective carries a uniformly distributed load of 100 kN/m including its self weight, over a clear span of 6m. The beam is reinforced with 6 bars of 25 mm diameter on tension side. Calculate nominal shear stress and design shear strength of concrete.	**(8)**

	(b)	Why torsional reinforcement is provided in a slab? Write down the difference between one way slab and two way slabs.	**(2+5)**
6.	**(a)**	A simply supported slab of a corridor of a hospital building has a clear span 2.5 m and is supported on beams 230 mm width. Design the slab, if the beam is carrying a live load of 5kN/m. Use M20 concrete and HYSD Fe415 bars.	**(13)**
	(b)	What is development length of bars?	**(2)**
7.	**(a)**	What is shear reinforcement? Explain with suitable diagram the types of shear reinforcement.	**(1+5)**
	(b)	Explain different type loads acting on the structure.	**(6)**
	(c)	Define bond strength.	**(3)**
8.	**(a)**	find the depth of neutral axis and limiting depth of neutral axis of Rcc beam 300mm wide and 500mm effective is reinforced with 3 bars of 16mm using i. M20 concrete and plain mild steel bars(Fe250) ii. M20 concrete and Fe415 bars.	**(4+4)**
	(b)	Write down the difference between singly reinforced beam and doubly reinforced beam. Why doubly reinforced beam is provided in a beam.	**(7)**

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