Question Paper

Exam Date & Time: 31-May-2018 (09:30 AM - 12:30 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

INTERNATIONAL CENTRE FOR APPLIED SCIENCES
IV SEMESTER B.S. DEGREE MAKE - UP EXAMINATION - MAY / JUNE 2018
DATE: 31 MAY 2018
TIME: 9.30AM TO 12.30 PM
Basic Concrete Design [CE 243]

Marks: 100 **Duration: 180 mins.**

Answer ANY FIVE full Questions.
Additional data if required may be assumed suitably and indicated.
Reference to IS-456 : 2000 and SP - 16 is permitted.
Solve questions 1 and 2 by working stress method and remaining questions by Limit state Method

1)		Explain Modular ratio with an example.	(5)
	A)		
	B)	Differentiate between working stress method and limit state method.	(5)
	C)	An RCC beam 250mm wide X 520mm effective depth is reinforced with 2nos of 25mm diameter bars in tension. Find out the depth of neutral axis and state whether the beam is under reinforced or over reinforced. The materials used are M35 grade concrete and HYSD reinforcement of grade Fe415.	(10)
2)		Explain Transformed Area method with the help of relevant diagrams	(10)
	A)		
	B)	A rectangular beam of size 230mm width X 425mm effective depth is reinforced with 2 bars of 20mm diameter in compression and 3 bars of 25mm diameter in tension. Find out the moment of resistance of the section. The materials are M20 grade concrete and HYSD reinforcement of grade Fe 415. Assume effective cover of compressive reinforcement as 40mm.	(10)
3)		A singly reinforced rectangular beam of width 230mm & 465mm effective depth is reinforced with 3 bars of 20mm	(10)
	A)		

diameter. Find out the factored moment of resistance of section. The materials are M20 grade concrete and Fe415 HYSD steel reinforcement. Also find out the moment of resistance if it is reinforced with 4 bars of 20mm diameter bars of Fe415 HYSD steel reinforcement.

B) Find the factored moment of resistance for the 'T'- beam section having width of flange 1600mm, Depth of web 500mm, depth of flange 100mm,width of web as 550mm and the section is reinforced with 6 no of bars of 25mm diameter. The materials are M20 grade concrete and Fe415 HYSD steel reinforcement. Assume effective cover as 40mm. (10)

4) Explain: (10)

A) i) Why is the over -reinforced design not preferred in LSM.

ii) What are the primary functions of the stirrups in flexural members

B) A beam of section having 230mm width X 490mm effective depth is reinforced with 3 no of 25mm dia bars as tension reinforcement. The section is subjected to a factored shear of 33kN. M20 grade concrete and Fe415 HYSD bars are used for longitudinal reinforcement. Check the shear stress and find the spacing of 6mm dia Mild steel stirrups. (10)

5) Design a two way slab for a office building floor of size 3.6m X 4.4m with discontinuous and simply supported edges on all the sides with corners not prevented from lifting and supporting a service live load of 3.6kN/sqm.Adopt M20 grade concrete and Fe415 HYSD bars. Take, Floor finish= 1kN/sqm, Clear cover =20mm (20)

6) Explain Limit state of collapse: Flexure and Limit state of collapse: Shear (10)

A)

B) Design a circular short column of 3m length unsupported & both ends hinged to carry an factored axial load of 1100kN. Provide Circular lateral ties.Use M20 grade concrete and Fe 415 grade HYSD steel reinforcement (10)

7) Calculate deflection due to creep for simply supported beam considering permanent load on beam of 25kN/m. The beam has a cross-section of 230mm width and 600mm overall depth and is reinforced with 4 bars of 16mm dia at tension side and 2bars of 12mm dia at compression side. The beam has an effective span of 6.5m. The material is M25 grade concrete and Fe 415 steel. Assume effective (20)

cover as 40mm.

8) Explain the design rules for torsion indicating appropriate formulas and checks to be considered based on shear and equivalent moment. (20)

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