QP Code: SN23BTECH199 | Reg. No | | | | | | | | | | | AY 23

Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
(GIET University)

B. Tech (Fifth Semester - Regular) Examinations, November 2025

23BCVPC35001 – Design of Concrete Structures

(CIVIL)

Time: 3 hrs | Maximum: 60 Marks

Answer ALL questions
(IS:456 code will be allowed in the exam hall)
(The figures in the right hand margin indicate marks)

PART – A **(2 x 5 = 10 Marks)**

Q.1. Answer ***ALL*** questions

		CO #	Blooms Level
a.	Define limit state.	CO1	K2
b.	Explain characteristic load of materials.	CO2	K2
c.	Differentiate between nominal mix and design mix.	CO3	K2
d.	Differentiate between one way slab and two way slab.	CO4	K2
e.	Write five disadvantages of concrete.	CO5	K2

PART – B **(10 x 5 = 50 Marks)**

Answer ***ALL*** the questions

		Marks	CO #	Blooms Level
2. a.	A simply supported beam of size 250×400 mm effective depth is subjected to a BM of 150 kNm. Design the beam for flexure. (Use M20 grade concrete and Fe 500 steel)	5	CO1	K3
b.	Draw a stress strain curve for Fe 500 steel. Write all the assumptions of limit state of collapse.	5	CO1	K3
	(OR)			
c.	A simply supported beam of size 250×400 mm overall depth is subjected to a BM of 100 kNm. Design the beam for flexure. (Use M20 grade concrete and Fe 415 steel)	5	CO1	K3
d.	A simply supported beam of span 5m of size 250 x 400 overall depth. Check for deflection as per codal provision.	5	CO1	K3
3.a.	A simply supported beam of size 250×425 mm effective depth is subjected to a SF of 100 kN. Design the beam for shear. (Ast=4x12mm) (Use M20 grade concrete and Fe 500 steel)	5	CO2	K3
b.	Determine the $x_{u,max}/d$ value for Fe 415 steel. Describe various type of steel used in RCC work.	5	CO2	K3
	(OR)			
c.	Design a circular column to carry an axial load of 1000 kN. (Use M20 grade concrete and Fe 500 steel)	5	CO2	K3
d.	Determine the moment carrying capacity of a beam of size 250 x 450 mm effective depth reinforced with 4 x 20 mm as in bottom and 2 x 20 mm at top. (Use M20 grade concrete and Fe 500 steel)	5	CO2	K3
4.a.	Design a slab for a room size of 4m x 6m, supported on all four sides. Live load = 5 kN/m^2	5	CO3	K3

	Floor finish = 1 kN/m^2 (Use M20 grade concrete and Fe 500 steel)			
b.	Describe the various type of admixtures.	5	CO3	K3
	(OR)			
c.	Design a square foundation for a column of 300 x 300 mm subjected to an axial load of 1000kN. SBC of soil 200 kN/m^2. (Use M20 grade concrete and Fe 500 steel) Assume any other necessary data.	5	CO3	K3
d.	Draw: i. stress diagram for single rectangular reinforced rectangular beam. ii. stress strain diagram for mild steel.	5	CO3	K3
5.a.	Determine the load carrying capacity of a square column of size 450 x 450 mm reinforced with 8 x 16 φ as compression steel. (Use M20 grade concrete and Fe 500 steel)	5	CO4	K3
b.	Determine the depth of neutral axis for a beam of size 250x 450 mm reinforced with 4x 12 at bottom and 3x 12 at top. (Use M20 grade concrete and Fe 500 steel)	5	CO4	K3
	(OR)			
c.	Design a dog-legged stair case for the following data: Height of ceiling=3.25 m Thickness of slab=150 mm Live load =5 kN/m^2 Assume any other necessary data. (Use M20 grade concrete and Fe 500 steel)	5	CO4	K3
d.	Write short notes on: i. Fibre reinforced concrete ii. Sulphur resistant concrete	5	CO4	K3
6.a.	Design a rectangular column to carry an axial load 1500kN. (Use M20 grade concrete and Fe 500 steel)	5	CO5	K3
b.	Write short notes on design mix concrete.	5	CO5	K3
	(OR)			
c.	A 5m long simply supported beam of size 300 x 600mm over all depth subjected to a SF of 100 kN. Design the beam for shear and deflection. (Ast= 4 x 20 mm)	5	CO5	K3
d.	Describe high strength concrete and self-compacting concrete.	5	CO5	K3

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