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



Ph.D. (First Semester-Summer) Examinations, December – 2025
23SPPECV1022 – Design Of Advanced Concrete Structures
(Civil Engineering)

Time: 3 hrs

Maximum: 70 Marks

The figures in the right hand margin indicate marks.

Answer ANY FIVE Questions.	(14 x 5 = 70 Marks)	Marks
1.a. A beam AB of 4 m span and fixed at the ends, carries an UDL of 30 KN/m at collapse. Draw maximum bending moment diagram as per IS code recommendations for redistribution of moments.		7
b. Explain the mechanisms and types of cracking in reinforced concrete beams. Discuss the causes and effects of each type of crack.		7
2.a. A simply supported T-beam span of 5m is subjected to a moment of 85 KN/m at mid span. The section of beam is as shown in figure. Calculate the crack width at corner A, directly under tension reinforcement B & the center tension face C. the materials are M20 grade concrete and Fe415 steel.		7
b. With neat diagrams, illustrate moment redistribution in a fixed beam and a two-span continuous beam. Discuss advantages and disadvantages.		7
3.a. Design a 3span continuous deep beam carrying a characteristic load of 210KN/m inclusive of its self-weight for the beam, clear span is 4.5 m width of support 250 mm. thickness of the beam 230 mm and Overall depth of 2.7 m. the materials are M20 Grade concrete and and HYSD reinforced of grade Fe415.		7
b. Explain the structural behaviour of deep beams and how it differs from ordinary beams.		7
4.a. Simply supported beam of 250 mm wide and 1500 mm overall depth & 2300 mm clear span is simply supported on 200 mm wide support on either side it carries UDL of 200KN/m inclusive of its self-weight. Design the beam using M20 concrete and Fe415 Grade.		7
b. Describe the design procedure of deep beams according to IS 456. Explain each step in detail.		7
5.a. A simply supported one way ribbed slab of 5 m span is to be used for 3 KN/m ³ live load. Design the slab using M20 grade concrete and HYSD bars of grade Fe 415.		7
b. Explain the concept of ribbed or voided slabs. Discuss their advantages and typical applications.		7
6.a. With suitable sketches, explain the load transfer mechanism in ribbed slabs.		7
b. R.C. Grid floor is to be designed to cover a floor area of 12 m X 8 m. The spacing of ribs in mutually perpendicular directions is 1.5 m centre to centre. Live load on the floor is 2KN/m. Analyse the grid floor by IS 456 methods and enumerate the suitable reinforcements.		7
7.a. A flat plate 7 × 6 m panel on 500 × 500 mm column has a slab thickness of 180 mm, designed for a load of 9.3 kN/m ² Check for the safety of slab in shear and also determine the necessary stirrups for reinforcing the slab. Adopt M25 and Fe 415.		7

- b. Explain the concept of grid floors and their structural behaviour. Discuss advantages and limitations. 7
- 8.a. A plain braced concrete wall of dimensions 10 m high, 6m long and 200 mm thick is restrained against rotation at its base and unrestrained at the ends. If it has to carry a factored total gravity load of 250 KN and a factored horizontal load of 10 KN at top. Check the safety of the wall. Assume M25 concrete and Fe 415 steel. 7
- b. Classify shear walls and explain different types used in buildings. 7

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