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GIET UNIVERSITY, GUNUPUR – 765022

Ph.D. (First Semester) Examinations, January – 2024

23SPPECV1011 – Design of Advanced Concrete Structures (CIVIL)

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 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.	10
b. Advantage and disadvantages of moment redistribution	4
2.a. A beam of width 450 mm, depth 700 mm cover of reinforcement 40 mm is reinforced with 3 rods of 40 mm diameter. Determine the crack width when the section is subjected to a BM of 490 Kn m at a point on the side of the beam 250 mm below the neutral axis	10
b. Factors affecting Crack width in beams	4
3.a. Design a three span 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.	10
b. Briefly explain the classifications of shear wall.	4
4.a. A simply supported deep beam 200 mm wide x 1800 mm overall depth and 2750 mm clear span is simply supported on 250 mm wide supports on either sides. It carries a characteristic UDL of 260KN/m inclusive of its self-weight. Design and details the beam. The materials are M20 Grade concrete and HYSD reinforced of grade Fe415.	10
b. Explain the Analysis procedure for ribbed Slabs.	4
5.a. Design a simply supported deep beam to the following data: Clear span = 4.20 m Bearing at each end = 450 mm Overall depth = 3500 mm Width of beam = 250 mm Supper imposed load = 250 kN/m Use M20 concrete and Fe415 steel.	10

- b. Explain shear effect in two-way slab with beams 4
- 6.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. 10
- b. Explain the strengthening of column areas for moment transfer. 4
- 7.a. A simply supported one way ribbed slab of 6m span is to be used for 5 kN/m^2 live load design the slab using M25 grade concrete and Fe 415 HYSD bars. 10
- Ribs are spaced at 450mm c/c
- The thickness of topping as 50 mm
- Width of rib as 120mm
- Over all depth is 250 mm
- b. Explain the effect of opening in flat slab 4
- 8.a. Estimate the reinforcement of a shear wall of length 4.16 m and thickness 250 mm is subjected to the following forces $f_{ck}=25 \text{ N/mm}^2$, $f_y= 500 \text{ N/mm}^2$ 10
- | Sl no | Loading | Axial load (kN) | Shear force (kN) | Bending moment (kNm) |
|-------|--------------|-----------------|------------------|----------------------|
| 1 | DL+LL | 1950 | 600 | 20 |
| 2 | Seismic load | 250 | 4800 | 70 |
- b. Explain ACI guidelines for shear calculations. 4

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