Reg. No

AR 22

# Gandhi Institute of Engineering and Technology University, Odisha, Gunupur
## (GIET University)
B. Tech (Fifth Semester - Regular) Examinations, November – 2024
### 22BCVPC65001 – Reinforced Concrete Design
(Civil Engineering)

Time: 3 hrs                                                                                 Maximum: 70 Marks

**Answer ALL questions**
**(The figures in the right hand margin indicate marks)**

**PART – A**                                                                          **(2 x 5 = 10 Marks)**

| | | CO # | Blooms Level |
|---|---|---|---|
| Q.1. | Answer *ALL* questions | | |
| a. | Define limit state of collapse. | CO1 | K1 |
| b. | Differentiate between bending moment and torsion. | CO2 | K1 |
| c. | Explain slenderness ratio. | CO3 | K2 |
| d. | Differentiate between shallow and deep foundation. | CO4 | K1 |
| e. | Define M25 grade concrete. | CO1 | K1 |

**PART – B**                                                                          **(15 x 4 = 60 Marks)**

| | Answer *All* the questions | Marks | CO # | Blooms Level |
|---|---|---|---|---|
| 2. a. | Design a simply supported beam of size bxd 250mm x 400 mm for a bending moment of 175 kNm. Use M20 grade concrete and Fe 500 Steel. | 8 | CO1 | K3 |
| b. | Explain creep in concrete. List all advantages of RCC Structures | 7 | CO1 | K2 |
| | (OR) | | | |
| c. | Design a simply supported beam of clear span 6m The beam is subjected to a UDL of 30kN/m. Materials used are M20 grade and Fe500 steel. | 8 | CO1 | K3 |
| d. | Define M20 grade concrete and the values of cover block for beams and foundations. | 7 | CO1 | K1 |
| 3.a. | Design a simply supported beam of size bxd 225mm x 350 mm for a SF OF 150 kN. Use M20 grade concrete and Fe 500 Steel. The beam is reinforced with 3x12 +1x10mm bars as tensile reinforcement. | 8 | CO2 | K3 |
| b. | Check for deflection of a simply supported beam of clear span 5m. The size of the beam is 230 mm x 400 mm bxd. | 7 | CO2 | K3 |
| | (OR) | | | |
| c. | Design a simply supported beam of size bxd 230 mm x 350 mm for a UDL of 30KN/m. Use M20 grade concrete and Fe 500 Steel. The clear span of beam is 5 m. The beam is reinforced with 3x10mm bar at bottom . | 8 | CO2 | K3 |
| d. | Differentiate between axial force and shear force. Describe the effect of shear force in beams. | 7 | CO2 | K2 |
| 4.a. | Design a circular column to carry an axial load of 1000 KN .Use M20 grade concrete and Fe 500 steel .Assume any necessary data. | 8 | CO3 | K3 |
| b. | Design a one-way slab for 2 x 6 m room. Live load = $10kN/m^2$, Floor Finish $1kN/m^2$. USE M20 grade and Fe500 steel. | 7 | CO3 | K3 |
| | (OR) | | | |

| | | | | |
|---|---|---|---|---|
| c. | Compute the load carrying capacity of a rectangular column of size 300 x 500 mm and reinforced with 8x16 mm diameter bars. Material used are M20/Fe500 steel. | 8 | CO3 | K3 |
| d. | Design a roof slab for a room size of 4x6 m. Live load on slab is 10 kN/m$^2$ and floor finish is 1 kN/m$^2$. Use M20 grade concrete and Fe 500 steel. | 7 | CO3 | K3 |
| 5.a. | Design a foundation for a square column of size 300x300mm. The axial load on the column is 1000 kN. SBC of soil is 200kN/m$^2$. Use M20 concrete and Fe500 Steel. | 8 | CO4 | K3 |
| b. | Explain self-compacting concrete and light weight concrete. | 7 | CO4 | K1 |

(OR)

| | | | | |
|---|---|---|---|---|
| c. | Design a foundation for a circular column of size 400x400mm. The axial load on the column is 1500 kN. SBC of soil is 220 kN/m$^2$. Use M20 concrete and Fe500 Steel. | 8 | CO4 | K3 |
| d. | Describe shallow foundation and pile foundation. | 7 | CO4 | K1 |

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