

FACULTY OF ENGINEERING
B.E. 3/4 (Civil) II – Semester (Main) Examination, June 2014

Subject: Structural Engineering Design and Detailing – I (RCC)

Time: 3 Hours

Max.Marks: 75

- Note: 1) Answer all questions from Part A. Answer any three questions from Part B.**
2) Use of (excerpts from) the relevant codes and charts is permitted.
3) Use suitable data wherever necessary.

PART – A (25 Marks)

- | | | |
|----|--|---|
| 1 | Under what circumstances a combined footing is necessary? | 2 |
| 2 | When is a 'key' needed in a retaining wall and what is the suitable location for it? | 2 |
| 3 | Differentiate between a circular tank with rigid base and that with a flexible base. | 2 |
| 4 | Sketch the details of class-A (wheeled) loading. | 2 |
| 5 | Sketch the various components of an Intze tank. | 2 |
| 6 | Explain in detail the various types of combined footings adopted in practice. | 3 |
| 7 | Differentiate between a cantilever and counter fort retaining wall, in terms of their suitability and structural action of their components. | 3 |
| 8 | Explain the principles of designing the staging for an overhead tank. | 3 |
| 9 | Give a detailed note on standard vehicular loadings for bridges. | 3 |
| 10 | Write a note on pigoaud's curves for bridges. | 3 |

PART – B (50 Marks)

UNIT – I

- | | | |
|----|--|----|
| 11 | Design a trapezoidal footing for two columns 'A' and 'B', both of 300 mm x 300 mm size, spaced at 4 m c/c and carrying axial factored loads of 900 kN and 1200 kN respectively. The maximum overhang allowed from the face of either of the column is 0.45 m. Assume a safe bearing capacity of 200 kN/m ² for the underlying soil. Adopt M-20 and Fe-415. Sketch the details of reinforcement. | 15 |
|----|--|----|

OR

- | | | |
|----|--|----|
| 12 | Design the stem and counterfort of a counterfort retaining wall for a leveled back fill of 5 m above the ground level. Unit weight of the back fill is 18 kN/m ³ . Angle of repose is 30° and safe bearing capacity of soil is 200 kN/m ² . Adopt M-20 and Fe-415. Sketch the reinforcement details. | 15 |
|----|--|----|

UNIT – II

- | | | |
|----|--|----|
| 13 | Compare the designs of a circular tank with flexible base and that with a rigid base for a capacity of one lakh litres. Adopt M-25 and Fe-415. Tank rests on ground. | 15 |
|----|--|----|

OR

- | | | |
|----|---|----|
| 14 | Compare the designs of a square and rectangular tank (L/B greater than 2) for a capacity of 2 lakh litres. Tank rests on ground. Adopt M-20 and Fe-415. | 15 |
|----|---|----|

UNIT – III

15 Design a solid slab bridge for a clear span of 6 m. Supports on either side are of 450 mm width. Consider class-AA (tracked) loading. Width of carriage way may be taken as 7.5 m. Necessary data may be suitably assumed. Adopt M-25 and Fe-415. Sketch the reinforcement details.

20

OR

16 Design an interior panel of a T-beam bridge with an effective size of 2.5 m x 4.0 m. Consider at least 3 possible cases of class-A (wheeled) loading. Adopt M-25 and Fe-415. Thickness of slab may be taken as 250 mm and the average thickness of wearing coat as 75 mm. Sketch the reinforcement details in the slab. Use Pigeaud's Curves.

20

Estelio