Code No. : 5038/M

FACULTY OF ENGINEERING
B.E. 3/4 (Civil) II Semester (Main) Examination, May/June 2012
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 relevant I.S codes and charts are **permitted**.*
*3) Assume **suitable** data **wherever** necessary.*

PART – A **(25 Marks)**

1. Why is it necessary to combine the footings ? **2**
2. What are one way and two way shears in footings ? **2**
3. When is a key provided for the base slab of a retaining wall ? **2**
4. Give the expressions for coefficient of active earth pressure on the stem of a retaining wall for sloped filling. **2**
5. What are the different classes of loads (IRC) available for the design of road bridges. **2**
6. Explain the stability requirements of a retaining wall. **3**
7. Explain the 'effective width method'. **3**
8. What are the design forces that act on the middle ring beam of an intze tank ? **3**
9. Explain the principles of design of staging. **3**
10. What is the minimum thickness and reinforcement required for the bottom slob of a rectangular tank resting on ground ? **3**

PART – B (50 Marks)

UNIT – I

11. A cantilever retaining wall is to retain an earthen embankment 4 m above ground level. Its foundation is 1.20 m below ground level. SBC of soil is 200 kN/m^2. Unit weight of earth is 17 kN/m^3.

Angle of repose is 30°.

Check the stability and design the stem.

Sketch neatly reinforcement details in section and elevation.

Coefficient of friction is 0.55. 15

OR

12. Design a combined footing connecting two columns A and B, 4 m centre to centre carrying an ultimate axial load of 1000 kN and 1400 kN respectively. The boundary line of the property is 400 mm from the outer face of the column A.

Column A is 300 mm × 300 mm

Column B is 450 mm × 450 mm.

The SBC of soil is 145 kN/m^2.

Use M 20 grade concrete and Fe 415 grade steel.

Sketch the reinforcement details. 15

UNIT – II

13. Design a circular tank having a flexible base joint for a capacity of 60,000 litres of water. The height of the tank including free board of 0.20 m is 4 m. Use M 20 grade concrete and Fe 415 grade steel. Sketch neatly the reinforcement details. The tank is resting on the ground. 15

OR

14. Design a rectangular tank 5 m × 4 m to retain water to a height of 3.20 m including a free board of 0.20 m. The tank is resting on the ground. Use M 20 grade concrete and Fe 415 grade steel. Sketch the reinforcement details. 15

UNIT – III

15. Design a R.C. deck slab bridge to suit the following data :

Width of carriage way	=	7.50 m
Clear span	=	5.0 m
Width of kerb	=	600 mm
Width of bearing	=	400 mm

Materials used : M 20 grade concrete and Fe 415 grade steel.

Type of loading IRC class AA wheeled vehicle. **20**

OR

16. a) Outline the procedure for the use of Pigeaud's curve to obtain design moments of bridge decks.

b) Analyse a two way slab panel of a T – beam bridge for the following data to arrive at the moments (D.L and L.L) using Pigeaud's method.

Panel dimensions = 2.5 m × 3 m.

Live load = IRC class AA Tracked.

Average thickness of wearing coat = 80 mm

Thickness of slab = 200 mm. **20**