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B.TECH.

THEORY EXAMINATION (SEM–VI) 2016-17

DESIGN OF CONCRETE STRUCTURES II

Time : 3 Hours ***Max. Marks : 100***

Note : *Be precise in your answer. In case of numerical problem assume data wherever not provided.*

SECTION – A

1. Explain the following: **10 x 2 = 20**

(a) List the principles in design of strap footing.

(b) What are the advantages offered by flat plates over conventional two way slabs with supporting beams?

(c) List a few factors that affect the punching shear strength of flat slabs.

(d) What are the situations in which combined footings are preferred over isolated footings?

(e) Draw a typical reinforcement detail of combined rectangular and trapezoidal footings.

(f) Write short notes on segmental retaining walls.

(g) What are the two theories for calculating earth pressure on retaining wall?

(h) Define column head and drop.

(i) What is the need of prestressing?

(j) State the difference in load carrying mechanism in flexure under working condition between RCC and PSC.

SECTION – B

2. Attempt any five of the following questions: **5 x 10 = 50**

(a) Design a combined footing for two columns carrying axial loads of 500 kN and 800 kN. Both columns are 30 cm in diameter and are spaced at 3m centre to centre. Columns are reinforced with 18 mm bars and consist of M25 Grade. The bearing capacity of the soil is 80 kN/m^2.Use M30 & Fe415 grade steel.

(b) A slab is supported on 600 mm diameter circular columns spaced 8 m x 6 m apart in both directions. The column head has a diameter of 120 cm. The live load on the flat slab is 5 kN/m^2. Determine the moments in the flat slab along its 8m span.

(c) Discuss the following in detail.

(i) Merits and demerits of prestressed concrete.

(ii) Losses in prestress.

(d) Design a rectangular tank of 250 KL capacity in a space of 15m x 5m area .It is a covered tank and placed 1m below the Ground level.

(e) Design a footing of 250 mm the masonry wall which supports a load of 150 kN /m and moment of 15 kN m at service state. Consider,

Unit wt of soil = 20 kN /m^3

Angle of repose = 30°, Allowable bearing capacity of soil = 150 kN /m^2.Use M20 and Fe415.

(f) Explain the Various methods of prestressing with neat sketches.

(g) Design the interior panel of a Flat slab with drops for an office floor to suit the following data:

Size of office floor = 25 x 25 m

Size of panels = 5 m x 5 m

Loading class = 4 kN /m^2.M20 and Fe415.

(h) Explain the general features and design principles of counterfort retaining wall.

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SECTION – C

Attempt any two of the following questions: **2 x 15 = 30**

3. Design a T-shaped cantilever retaining wall for retaining 5 m high earth above the ground level. Consider the weight of soil = 15 kN /m^3.Angle of repose of soil = 30°, Coefficient of friction at base = 0.5, Allowable bearing pressure of soil = 150 kN /m^2. Grade M20 for concrete and Fe415 for steel.

4. Design a circular tank with fixed base for capacity of 500000 litres .The depth of water is to be 5m.Free board = 300 mm. Use M20 grade concrete and Fe415 HYSD bars. Permissible direct tensile stress in concrete = 1.2 N/mm^2 .Permissible stress in steel in direct tension = 100 N/mm^2 Sketch the details of reinforcement in tank walls.

5. Design a strap footing for two columns spaced at 6 m c/c face of one of the column of section 400 mm x 400 mm and subjected to a load of 1000 kN at service coincides with the property line and other column is of section 500 mm x 500 mm and subjected to a load of 1500kN at service state.

Consider, Unit weight of soil = 15 kN /m^3
Angle of repose = 30
Allowable bearing capacity of soil = 150 kN /m^2
Grade M20 and Fe415.

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