(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2454 Roll No. | | | | | | | | | | |

B.Tech.

(SEM. VI) EVEN THEORY EXAMINATION 2012-13

DESIGN OF CONCRETE STRUCTURES–2

Time : 3 Hours *Total Marks : 100*

Note :– Attempt **all** questions. Wherever required use reference sketches and draw reinforecment details. Assume any missing data if required. Use of IS code 456 is allowed.

1. Attempt any **two** parts of the following : **(2×10=20)**

   (a) An exterior panel of size 3.2 m × 5.6 m has two adjacent edges discontinuous. It is supported over 300 mm × 450 mm column of length 3.2 m. It is carrying live load 3 kN/m^2 and floor finish 1 kN/m^2. Set the dimensions of column head and drop and determine design moments in longitudinal direction.

   (b) An interior panel of size 4.5 m × 4.5 m supported over column of 400 mm diameter. It is carrying a live load 4 kN/m^2 and floor finish 1.2 kN/m^2. Design panel with drop.

   (c) (i) Describe the deflection behavious of flat slab.

   (ii) Show details of reinforcement in flat slab.

2. Attempt any **two** parts of the following : **(2×10=20)**

(a) A 230 mm thick 3 m high brick wall above ground is carrying live load of 180 kN/m. Design foundation wall. Take safe bearing capacity of soil as 160 kN/m² at 1.2 m below ground.

(b) A column 300 × 450 mm supports an axial load 1500 kN. Design isolated sloping footing for the column if safe bearing capacity of the soil is 220 kN/m². Also sketch the reinforcement details.

(c) Explain the conditions when combined footing is provided.

Two columns A and B of size 300 × 300 mm and 300 × 400 mm are carrying loads of 800 kN and 1200 kN respectively. The columns are spaced centre to centre by 1.2 m. If safe bearing capacity of the soil is 100 kN/m². Set the dimensions of combined footing.

3. Attempt any **two** parts of the following : **(2×10=20)**

(a) Determine bending moment produced by class-A loading in a culvert of clear span 5 m. Width of road way is 7.5 m. Assume other data suitably if required.

(b) Check the stability of cantilever retaining wall shown in fig.1. Friction coefficient between soil and concrete in 0.5.

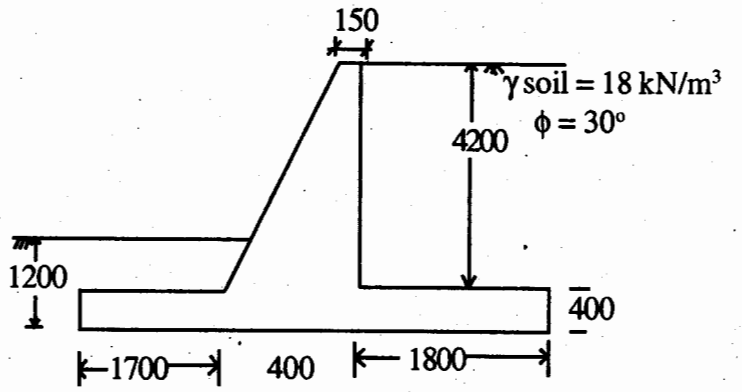

Fig.1

(c) (i) Describe class A A loading for design of highway bridges.

(ii) Show reinforcement of cantilever retaining wall.

4. Attempt any **two** parts of the following : **(2×10=20)**

(a) Fix the dimensions of an intz tank for 150 kL capacity and design vertical wall for it. Use M-30 conerete and Fe 415 steel.

(b) Design a circular tank resting on ground with a fixed base. The diameter of tank is 6 m and height 3.6 m. Use M-30 concrete and Fe-415 steel and show details of reinforcement also.

(c) (i) Explain the method of design of rectangular tanks which are inside the ground.

(ii) Describe elements of staging of over head tanks and their functions.

5. Attempt any **two** parts of the following : **(2×10=20)**

(a) A prestressed beam of square section 300 mm × 300 mm contains 30 pretensioned wires of 3 mm diameter uniformly distributed over the section. Wires are tensioned initially with a total force of 350 kN. The other data are as follows :

$E_s = 2 \times 10^5$ N/mm^2 , $E_c = 3 \times 10^4$ N/mm^2

Shortening due to creep = 30×10^{-6} mm per N/mm^2 of stress

Total shrinkage = 200×10^{-6} per unit length

Relaxation of steel stress = 4% of initial stress.

Determine percentage loss of stress in steel.

(b) Explain method of determining stress at any section of a prestressed beam when it is prestressed eccentrically with parabolic tendon. Explain with the help of figures.

(c) Explain the following :

(i) Fressinet method of prestressing

(ii) Loss of stress due to friction.