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

Paper ID : 100611 Roll No. | | | | | | | | | | |

**B.TECH.**

**Theory Examination (Semester-VI) 2015-16**

**DESIGN OF CONCRETE STRUCTURE-II**

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

**Section-A**

**Q.1. Attempt all parts. All parts carry equal marks. Write answer of each part in short. (2×10=20)**

(a) Why high strength concrete is needed for prestressing?

(b) What are moments in interior panel & exterior panel of a Flat Slab?

(c) What are the methods of analysis of flat slab?

(d) List the various types of tensioning devices used in prestressed concrete.

(e) What are the stability conditions should be checked for the retaining walls?

(f) Write down the function of counter forts in a retaining wall?

(g) Mention the important factors that must be considered while designing a RCC tank.

(h) What are conditions under which the walls of underground water tanks designed?

(i) Mention the reinforcement details that should be provided in a water tank.

(j) Compare the loss of prestress due to elastic shortening in pretensioned and post tensioned members.

## Section-B

**Q.2. Attempt any 5 questions from this section. (10×5=50)**

(a) Write a short note on flat slabs.

(b) Explain the advantages of prestressed concrete.

(c) A rectangular concrete 250mm wide and 600mm deep. is prestressed by means of four 14mm diameter high tensile bars located 200mm from the soffit of the beam. If the effective stress in the wires is 700N/mm$^2$, what is the maximum bending moment that can be applied to the section without causing tension at the soffit of the beam?

(d) Write down the steps involved in design of counter fort retaining wall.

(e) Write down the design procedure for circular water tank resting on ground with fixed base.

(f) A spherical cover dome is to be provided for a circular water tank with inner diameter of 6m. choose the rise for the dome as I m. Live load as the dome is 1kN/m$^2$. Design the cover dome and its supporting ring girder.

(g) Write down the procedure involved in design of strap footing.

(h) Explain different methods of post tensioning systems.

## Section-C

**Note: Attempt any 2 questions from this section.** (15×2=30)

Q3. (a) Design the interior panel of a slab with drops for an office floor to suit the following data :

Size of office floor = 20 m × 20 m

Size of panels = 5 m × 5 m

Loading class = 4 kN/m2

Materials: M20 grade concrete and Fe415 HYSD bars. Give a neat reinforcement detail drawing

(b) Design the required reinforcement in a column of diameter 350mm size with helical reinforcement of 8mm diameter and its subjected to a factored load of 1400kN.The column has an unsupported length of 3.5m and is braced against sideway. Use concrete grade is M20 and bar are Fe415 steel. Adopt limit state design method.

Q4. (a) Design a counter fort type retaining wall to suit the following data:

Height of the wall above grohnd level = 6m

Safe bearing capacity of soil site = 160kN/m$^2$

Angle of repose of soil, $\Phi = 30$

Spacing of counter forts = 3m c/c

Unit wt of soil = 16kN/m$^3$

Materials: M20 grade, Fe415 grade

Design vertical Stem.

(b) Design a cantilever retaining wall to retain earth embankment 4m high above G.L. The density of earth is 18kN/m$^3$ and its angle of repose is 30 degrees. The embankment is horizontal at its top. The safe bearing capacity of the oil may be taken as 200kN/m$^2$ and the co-efficient of friction between the soil and concrete is 0.5. Adopt M20 grade of concrete and Fe 415 HYSD bars.

Q5. (a) Design a circular Tank with flexible base for capacity 500000 liters the depth of water is to be 4m and free board = 200m. Use $M_{20}$ grade concrete and grade- I mild steel. Permissible direct tensile stress in concrete = 1.2 N/mm$^2$. Permissible stress in steel in direct tension

= 100N/mm². Sketch the details reinforcement in tank wall. Adopt IS code table for coefficient.

(b) A pretensioned beam 200 mm wide and 350 mm deep is prestressed with 12 wires of 7 at mm diameter, initially stressed to 1200 N/mm2. The centroid of the prestressing wires is located 100 mm above the soffit. Assuming the loss due to relaxation as 5%, calculate the total loss or prestress as per IS 1343-1 980.

Es = 210 KN/mm², Ec = 35 KN/mm²

Relaxation of steel stress = 5% of the initial stress

Shrinkage of concrete = 300 x 10-6

Creep coefficient = 1.6