**PVP 14**

Code: CE6T1

**III B.Tech - II Semester – Regular/Supplementary Examinations**
**March 2020**

# DESIGN AND DRAWING OF CONCRETE STRUCTURES – II
## (CIVIL ENGINEERING)

**Note: Use of IS 456-2000 & IS: 1343 - 1980 and IS 1893 (Part-1) - 2002 are permitted**

Duration: 3 hours Max. Marks: 70

PART – A

Answer *all* the questions. All questions carry equal marks

11x 2 = 22 M

1.

a) What is the main advantage of combined footing?
b) What are the stability requirements for retaining wall?
c) What factors govern the spacing of counterforts?
d) What is meant by panel of flat slab?
e) State capital or column head.
f) Identify the importance of ductility in RC structures.
g) What is the need for the use of high strength concrete and high tensile steel in prestressed concrete?
h) Explain the losses of prestress.
i) Calculate the loss due to anchorage slip.
j) Outline Pressure Line.

k) Show the expression for minimum prestressing force and maximum eccentricity.

## PART – B

Answer any *THREE* questions. All questions carry equal marks.

3 x 16 = 48 M

2. Design the stem for a counterfort retaining wall, if the height of wall above the ground level is 5.5 m, SBC= 180 kN/$m^2$, angle of internal friction is $30^0$ and unit weight of backfill is 18 kN/$m^3$. Keep spacing of counterforts as 3.1 m. The coefficient of friction between soil and concrete is 0.5. Use M20 grade concrete and Fe 415 steel. 16 M

3. A flat slab floor system consisting of 6 panels in each direction supports dead and live load of 7 kN/$m^2$ and 6 kN/$m^2$ respectively. The supporting columns are of 500 mm x 500 mm with storey height of 3.0 m. Design an interior panel of size 6 m x 6 m using IS 456 for the direct design method, when no column head or drop is provided. Use M25 concrete and Fe 415 steel. 16 M

4. a) Compare the advantages of pretensioned concrete over post tensioned concrete. 6 M

b) Explain the factors affecting ductility. 5 M

c) Describe the importance of ductility in earthquake resistant design. 5 M

5. A pretensioned beam 200 mm x 300 mm is prestressed by 10 wires each of 7 mm diameter, initially stressed to 1200 MPa with their centroids located 100 mm from the soffit. Identify the final percentage loss of stress due to elastic deformation, creep, shrinkage and relaxation. Assume relaxation of steel stress = 60 MPa. $E_s$ = 210 GPa, $E_c$ = 36.9 GPa, creep co-efficient = 1.6 and residual shrinkage strain = $3 \times 10^{-4}$ . 16 M

6. A rectangular concrete beam 100mm wide & 250mm deep spanning over 8m is prestressed by a straight cable carrying a effective prestressing force of 250kN located at an eccentricity of 40mm. The beam supports a live load of 1.2 kN/m.
   i) Calculate the resultant stress distribution for the centre of the span cross section of the beam assuming the density of concrete as 24 $kN/m^2$.
   ii) Find the magnitude of prestressing force with an eccentricity of 40mm which can balance the stresses due to dead load & live load at the soffit of the centre span section.

   16 M