TE - sem-VI - 016 - civil - TRPC

7/6/16

Q.P. Code : 576701

(Old Course)

(3 Hours) **[Total Marks : 100**

N.B.: (1) Question **No.1** is **compulsory**.
(2) Attempt **any Four** out of remaining **Six** questions.
(3) **Figures** to the **right** indicate **full marks**.
(4) Assume suitable **data** if **needed** but **justify the same**.
(5) **Use** of **IS 456** is **not permitted**.

1. (a) Explain, why high strength concrete and steel is required in prestressed concrete. **5**
   (b) Explain the terms transmission length and end block. **5**
   (c) What do you understand by (1) Balanced section, under reinforced section and over reinforced section. **5**
   (d) A short column 300mm X 300mm is reinforced with 4 bars of 20mm diameter. Determine the safe working load on the column. Use M20 Fe415. **5**

2. (a) Design a singly reinforced rect. beam to resist a Bending moment of 200 KNM the width of beam is to be kept 230mm. **8**
   (b) A reinforced concrete beam is simply supported over a span of 5m and it carries udl of 24kN/m including its own weight if the size of the beam is restricted to 300mm X 450mm (effective) det. the area of tension and compression steel if required Use M20/Fe415. **12**

3. (a) Design a simply supported one way slab for an effective span of 2.6m it carries a superimposed load of 2.5kN/m^2 including floor finish. Use M20/ Fe415. Draw sketch showing reinforcement details. **8**
   (b) Design a two way slab for a room having clear dimensions of 4m X 5m take live load as 2kN/m^2 and floor finish 1kN/m^2. Use M20/Fe415 take $\alpha_x = 0.087$, $\alpha_y = 0.057$. **12**

TURN OVER

4. (a) Design the shear reinforcement for a simply supported beam 230mm X 450mm effective depth. carrying UDL of 40kN/m including self weight. The span of beam is 4m it is provided with 6 bars of 16mm diameter at bottom and 2 anchor bars of 10mm diameter at top. Use M20/Fe415. **10**

Pt%	0.25	0.5	0.75	1.0	1.25	1.5
Tc(N/mm^2)	0.22	0.30	0.33	0.39	0.45	0.47

(b) A T-beam section has width of flange = 1000mm depth of flange 120mm, web size 300mm depth and thickness of web 150mm. Determine the moment of resistance of the section. Use M20/Fe415. **10**

5. (a) Explain briefly different types of footing often used for various soil conditions. **5**

(b) Design footing for R.C. column 300mm X 450mm carrying an axial load of 2000kN. The bearing capacity of soil is $200kN/m^2$. Use M20/Fe415. **15**

6. (a) A prestressed beam having size 230mm X 450mm deep is prestressed by 12 wires each of 7mm diameter. initially stressed to $1000N/mm^2$ with their centrods located at 100mm form the soffit. Det. the final % age loss of stress due to elastic deformation, creep, shrinkage and relaxation using the following data. **12**

Relaxation of steel stress 5%,
Creep coefficient (φ) = 1.6,
Residual shrinkage strain = 3×10^{-4},
$E_s = 210kN/mm^2$, $E_c = 34kN/mm^2$.

(b) A prestressed concrete beam having span 8m of size 230mm X 450mm, it is axially presented by a cable carrying an effective force of 200kN the beams support a total UDL of 20kN/m compare the magnitude of the principle tension developed in the beam with and without the axial prestress. **8**

7. (a) A prestressed concrete beam supports a live load of 5kN/m over a simply supported span of 8m. The beam has an I - Section with an overall depth of 400mm. The thickness of the fiange and web are 60mm and 80mm respectively. The width of flange is 200mm. The beam is to be prestressed by an effective prestressing force of 250kN at the suitable eccentricity such that the resultant stress at the soffit of the beam at the centre of span is zero. **20**

(i) Find the eccentricity required for the force.

(ii) If the tendon is eccentric what should be the magnitude of prestressing force for the resultant stress to be zero at the bottom fibre of the central span section.
