PRESTRESSED CONCRETE STRUCTURES MID ASSIGNMENT QUESTIONS

Prestressed Concrete Structures Important Assignment Questions

1. A prestressed concrete beam (span = 10m) of rectangular section, 120 mm wide and 300 mm deep, is axially prestressed by a cable carrying an effective force of 180 kN. The beam supports a total uniformly distributed load of 5kN/m which includes the self-weight of the member. Compare the magnitude of the principal tension developed in the beam with and without the axial prestress
2. What is the transmission length? List the various factors influencing transmission length.
3. A composite T-beam is made up of a pre-tensioned rib 100 mm wide and 200 mm deep, and a cast *in situ* slab 400 mm wide and 40 mm thick having a modulus of elasticity of $28kN/mm^2$. If the differential shrinkage is 100×10^{-6} units, Determine the shrinkage stresses developed in the precast and cast *in situ* units
4. A concrete beam having a rectangular section,150mm wide and 300 mm deep, is prestressed by a parabolic cable having an eccentricity of 100mm at the center of the span, reducing to zero at the supports. The span of the beam is 8m. The beam supports a live load of 2Kn/m. Determine the effective force in the cable to balance the dead load and live loads on the beam. Estimate the principal stresses at the support section.
5. List the various factors influencing the deflections of prestressed concrete members.
6. A composite bridge deck slab is made up of a pre-tensioned rectangular beam having a width of 300 mm and a depth of 600 mm. The cast-in-situ slab is 500 mm wide by 150mm thick. The ultimate shear force at the support section is 392KN.
   (a)Estimate the horizontal shear stress at the junction of precast and in situ slabs
   (b)Neglecting the shear resistance between the surfaces, design suitable vertical reinforcements to resist the shear force at the support section using Fe-415 HYSD bars.
7. The end block of a prestressed concrete beam, rectangular in section, is 100 mm wide and 200 mm deep. The prestressing force of 100KN is transmitted to concrete by a distribution plate,100 mm wide and 50 mm deep, concentrically located at the ends. Calculate the position and magnitude of the maximum tensile stress on the horizontal section through the center and edge of the anchor plate. Compute the bursting tension on these horizontal planes.