

UNIT-II

S. No.	Questions	BTL	CO	PO
Part-A(Short Answer Questions)				
1	Mention the losses that can occur in prestressed concrete?	L1	CO2	PO1
2	Name the effects due to which friction loss occur?	L1	CO2	PO1
3	What is meant by loss due to elastic shortening?	L1	CO2	PO1
4	What is meant by shrinkage of concrete?	L1	CO2	PO1
5	What is meant by Relaxation of steel?	L1	CO2	PO1
6	What is the expression of loss of stress due to friction?	L1	CO2	PO1
7	Mention the importance of shrinkage in composite construction?	L1	CO2	PO1
8	How the loss due to anchorage slip in prestressed concrete calculated?	L2	CO2	PO2
9	What are the systems of pre-tensioning and post-tensioning in prestressed concrete?	L1	CO2	PO1
10	What do you mean by creep?	L1	CO2	PO1
11	What is the expression of loss due to creep in prestressed concrete?	L1	CO2	PO1
Part-B (Long Answer Questions)				
1	Describe briefly Freyssinet system of post tensioning.	L1	CO2	PO1
2	Explain in detail the pre-tensioning and post-tensioning systems with neat diagrams.	L1	CO2	PO1
3	A pretensioned concrete beam, 100mm wide and 300mm deep, is prestressed by straight wires carrying an initial force of 225kN at an eccentricity of 55mm. The modulus of elasticity of steel and concrete are 210 and 35kN/mm ² respectively. Estimate the percentage loss of stress in steel due to elastic deformation of concrete if area of steel wires is 188mm ² .	L2	CO2	PO2
4	A post-tensioned concrete beam, 100mm wide and 300mm deep, is prestressed by 3 cables, each with a cross sectional area of 50mm ² and with an initial stress of 1200N/mm ² . All the three cables are straight and located 100mm from the soffit of the beam. if the modular ratio is 6, calculate the loss of stress in the three cables due to elastic deformation of concrete for only the following cases: - Simultaneous tensioning and anchoring of all three cables; - Successive tensioning of the three cables.	L3	CO2	PO3
5	A straight pre tensioned prestressed concrete member 12 m long with a cross section of 400 mm wide and 500 mm deep is concentrically post tensioned by four tendons of 250 mm ² each. The tendons are stressed one after another to the stress of 1000 N/mm ² . The eccentricity of prestressing force is 100 mm at the centre of the span. Compute the loss of prestress due to elastic shortening of concrete. How can the loss be counteracted?	L3	CO2	PO2
6	A post-tensioned beam with a cable of 4 wires = 600mm ² is tensioned with 1 wire at a time. The cable with zero eccentricity at the ends and 100 mm at the centre and is on a parabolic curve. The span of the beam is 10m. The cross-section is 200mm wide and 550mm deep. The wires are to be stressed from one end so that immediately after anchoring, the initial prestress of 940 N/mm ² would be obtained. Compute the final design stress in steel after all the loss, Coefficient of friction is 0.6, Coefficient for wave effect is 0.003, deformation and slip of anchorage	L3	CO2	PO3

	is 1.25mm, $E_s=210\text{kN/mm}^2$, $E_c=28\text{kN/mm}^2$, Shrinkage of concrete is 0.0002 and relaxation of stress in steel is 3% of initial stress.			
7	A cylindrical concrete tank, 40m external diameter, is to be prestressed circumferentially by means of a high-strength steel wire ($E_s=210\text{kN/mm}^2$) jacked at 4 points, 90 degrees apart. If the minimum stress in the wires immediately after tensioning is to be 600N/mm^2 and the coefficient of friction is 0.5, calculate a) The maximum stress to be applied to the wires at the jack; b) The expected extension at the jack.	L3	CO2	PO3
8	A concrete beam of rectangular cross section, 200 mm wide and 400 mm deep prestressed 8 wires of 8 mm diameter located at an eccentricity of 50 mm, the initial stress in the wires being 1300 N/mm^2 . Estimate the loss of stress in steel due to creep of concrete using the ultimate creep strain method and the creep coefficient method. Use the following data $E_s=210\text{KN/mm}^2$, $E_c=35\text{KN/mm}^2$, $A=3\times 10^4\text{ mm}^2$, Ultimate creep stain = $41 \times 10^{-6}\text{ mm/mm per N/mm}^2$. Creep coefficient = 1.6.	L2	CO2	PO2

Blooms Taxonomy Level (BT) (L1–Remembering; L2–Understanding; L3–Applying; L4– Analyzing; L5–Evaluating; L6–Creating)