

UNIT-V

S.No	Questions	BTL	CO	PO
Part–A (Short Answer Questions)				
1	What are the permissible limits for deflection?	L1	CO5	PO1
2	What is meant by composite construction is prestressed concrete?	L1	CO5	PO1
3	Explain the most common type of composite construction?	L2	CO5	PO1
4	What is meant by shear connectors?	L1	CO5	PO1
5	At what quantities do the crack width of a flexural crack depends on?	L1	CO5	PO1
6	How the composite action between the precast and cast in situ concrete is achieved?	L2	CO5	PO1
7	Explain the effect of differential shrinkage on a composite member.	L2	CO5	PO1
8	Write the assumption in analysis of ultimate stress in composite construction.	L1	CO5	PO1
9	Mention the factors affecting the deflection of the prestressed concrete beam?	L1	CO5	PO1
10	What are the advantages of composite constructions?	L1	CO5	PO1
11	Discuss about the importance of control of deflections.	L2	CO5	PO1
12	Define: Short term deflection and long-term deflection.	L1	CO5	PO1
Part–B (Long Answer Questions)				
1	Explain Mohr's theorem to determine the short-term deflections of uncracked members.	L2	CO5	PO1
2	Discuss effect of various tendon profiles on deflection and derive the equations for deflection.	L2	CO5	PO1
3	A precast pre tensioned beam of rectangular section has a breadth of 100mm and depth of 200mm. The beam with an effective span of 5m is prestressed by the tendons with their centroids coinciding with the bottom kern. The initial force in the tendons is 150kN. The loss of prestress is 15%. The top flange width is 400mm with the thickness of 40mm.If the composite beam supports a live load of 7kN/m ² calculate the resultant stresses developed if the section is unpropped. M40 and M20 concrete are used for pre tensioned and in-situ concrete.	L4	CO5	PO3
4	Design a composite slab for the bridge deck using a standard inverted T- section. The top flange is 300mm wide and 110mm thick. The bottom flange is 550mm wide and 250mm thick. The web thickness is 100mm and the overall depth of the inverted T. Section is 655mm. The bridge deck has to support a characteristic imposed load of 50kN/m ² , over an effective span of 12m. Grade 40 concrete is specified for the precast pretensioned T-with a compressive strength at transfer of 36 N/mm ² . Concrete of grade-30 is used for the in-situ part. Calculate the minimum prestress necessary and check for safety under serviceability limit state.	L6	CO5	PO3
5	Explain the advantages of using precast prestressed elements along with in-situ concrete.	L2	CO5	PO3
6	A prestressed beam with rectangular cross section with a width of 120mm and depth of 300mm is continuous over two spans	L4	CO5	PO3

	AB=BC=8m. The cable with zero eccentricity at the ends and an eccentricity of 50mm towards the top fibres of the beam over the central support carries an effective force of 500kN. Calculate the secondary moment developed at B and locate the position of the pressure line at section.			
7	A continuous beam ABC (AB=BC=10m) is prestressed by a parabolic cable carrying an effective force of 200kN. The cable profile is shown in Fig. The beam supports dead load and live load of 0.24kN/m and 2.36kN/m respectively. Calculate the resultant moments developed in the beam and locate the pressure line.	L4	CO5	PO3
8	Explain how long-term deflections are predicted in prestressed members.	L2	CO5	PO2
9	Write step by step design procedure for composite construction.	L1	CO5	PO2
10	A composite T-beam is made up of a pretension rib 100mm wide and 200mm deep, and a cast in situ slab 400mm wide and 40mm 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.	L4	CO5	PO3
11	Discuss in detail about the factors which influence flexural strength and shear strength of composite prestressed section.	L2	CO5	PO1
12	A prestressed concrete beam of rectangular section 120mm wide and 300mm deep, spans over 6m. the beam is prestressed by a straight cable carrying an effective force of 200kN at an eccentricity of 50mm. the modulus of elasticity of concrete is 38kN/m^2 . Compute the deflections at centre span for the following case: a) deflection under prestress and self-weight; b) Find the magnitude of udl live load which will nullify the deflection due to prestress and self-weight.	L3	CO5	PO3
13	A prestressed concrete beam having a cross sectional area of $3 \times 10^4 \text{ mm}^2$ is simply supported over a span of 10m. Its supports a uniformly distributed imposed load of 3kN/m, Half of which is not permanent. The tendons follow a trapezoidal profile with an eccentricity of 100mm with in the middle third of the span and vary linearly from the third span points to zero at the supports. The area of the tendons $A_p = 350\text{mm}^2$ having a effective prestress of 1290N/mm^2 immediately after transfer. Calculate the short term and long-term deflection.	L4	CO5	PO3
14	a) Explain the types of composite construction with neat sketch. b) Explain the precast prestressed concrete stresses at serviceability limit state.	L2	CO5	PO1

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