Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering
End Sem Examination May-2024
CE3ET08 Prestressed Concrete

Programme: B.Tech. Branch/Specialisation: CE

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

Q.1 i. Maximum water-cement ratio for moderate exposure condition of the pre-stressed concrete is- **1**

(a) 0.45 (b) 0.50 (c) 0.55 (d) 0.65

ii. What is loss of stress in prestress? **1**

(a) Slow lowering of the induced compressive stress in a prestressed part

(b) Slow lowering of the induced compressive strain in a prestressed part

(c) Slow lowering of the induced compressive tension in a prestressed part

(d) Slow lowering of the friction in a prestressed part

iii. The resultant stresses in concrete at any section are obtained by the effect of _____. **1**

(a) Prestress and torsion stresses (b) Prestress and shear stresses

(c) Prestress and flexural stresses (d) Prestress and bending stresses

iv. The failure due to fracture of steel in tension in the beam is because of- **1**

(a) Least amount of prestressed concrete

(b) Least amount of reinforcement

(c) Excess amount of steel reinforcement

(d) Excess amount of prestressed concrete

v. The concrete members which are prestressed by providing the tensioned tendons are termed as _____. **1**

(a) Linear prestressed members

(b) Circular prestressed members

(c) Pre tensioning members

(d) Internally prestressed members

P.T.O.

vi. The grade of concrete used for construction of prestressed concrete structures is- **1**
(a) Design mix concrete
(b) Fully mix concrete
(c) Partially mix concrete
(d) Heavy mix concrete

vii. Due to presence of precompression, prestressed concrete is ideally suited for the design of members subjected to _____. **1**
(a) Prestressed tension (b) Principle stress
(c) Bonded stress (d) Axial tension

viii. Which of the following influence the deflections of prestressed concrete members? **1**
(a) Wall profile (b) Type of aggregates
(c) Type of cement (d) Cable profile

ix. Due to the effect of composite action sizes of precast prestressed units can be _____. **1**
(a) Serviced (b) Increased (c) Deducted (d) Reduced

x. Prestressed concrete has more or less replaced _____. **1**
(a) Prestressed concrete (b) Aluminium concrete
(c) Voids concrete (d) Reinforced concrete

Q.2 i. What is prestressed concrete? **2**
ii. What are the advantages and disadvantages of PSC over RCC? **3**
iii. Explain all type of prestressing losses. **5**
OR iv. Why do we need high strength concrete and steel for prestressed concrete structure? **5**

Q.3 i. Define the following- **2**
(a) Tendons
(b) Load balancing
ii. What are the effect of loading on the tensile stresses in tendons? Explain in detail. **8**
OR iii. What are the effect of tendon profile on deflections? Explain in detail. **8**

Q.4 i. What are end zone reinforcement? **3**
ii. Briefly outline the magnet's method of computing the horizontal and transverse stress in end blocks subjected to concentrated force from anchorage. **7**

OR iii. Discuss code recommendation for rectangular and I section of flexural members. **7**

Q.5 i. How will you improve shear resistance of a P.S.C. beam? **4**
ii. Explain the analysis of anchorage zone stresses in post tensioned members. How is the bursting tensile force calculated? **6**
OR iii. Write in detail about conventional elastic design for shear-transfer of prestress in pretensioned members-transmission length. **6**

Q.6 Attempt any two:
i. Write step by step method of design of end blocks by Guyon method. **5**
ii. What is partial prestressing? Explain in detail. **5**
iii. Explain Magnel method of design of end blocks. **5**

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Marking Scheme

CE3ET08 Prestressed Concrete

Q.1	i)	b) 0.50	**1**
	ii)	What is loss of stress in prestress? a) Slow lowering of the induced compressive stress in a prestressed part.	**1**
	iii)	The resultant stresses in concrete at any section are obtained by the effect of _____ c) Prestress and flexural stresses.	**1**
	iv)	The failure due to fracture of steel in tension in the beam is because of _____ b) Least amount of reinforcement.	**1**
	v)	The concrete members which are prestressed by providing the tensioned tendons are termed as _____ d) Internally prestressed members.	**1**
	vi)	The grade of concrete used for construction of prestressed concrete structures is? a) Design mix concrete	**1**
	vii)	Due to presence of precompression, prestressed concrete is ideally suited for the design of members subjected to _____ d) Axial tension	**1**
	viii)	Which of the following influence the deflections of prestressed concrete members? d) Cable profile	**1**
	ix)	Due to the effect of composite action sizes of precast prestressed units can be _____ d) Reduced	**1**
	x)	Prestressed concrete has more or less replaced _____ d) Reinforced concrete	**1**
Q.2	i.	Definition of Prestressed Concrete. Definition 2 Marks	**2**
	ii.	What are the Advantages and Disadvantages of PSC over RCC. Advantages - 1.5 Marks Disadvantages -1.5 Marks	**3**
	iii.	Explain all type of prestressing losses. Losses - 1 Mark for each type of loss.	**5**
OR	iv.	Why do we need high strength concrete and steel for prestressed concrete structure. Use of High Strength Concrete in PSC Structure. -2.5 Marks Use of High Strength Steel in PSC Structure. -2.5 Marks	**5**
Q.3	i.	Define (i) Tendons (ii) Load Balancing. (i) Tendons - 1Marks (ii) Load Balancing - 1Marks	**2**
	ii.	What are the effect of loading on the tensile stresses in tendons. Explain in detail. Each effect will carry equal marks upto eight to ten points and explanation with diagram and charts. – 1 Marks for each point.	**8**
OR	iii.	What are the effect of tendon profile on deflections. Explain in detail. Each effect will carry equal marks upto eight to ten points and explanation with diagram and charts. – 1 Marks for each point.	**8**
Q.4	i.	What are End Zone Reinforcement. Definition -1.5 Marks Diagram - 1.5 Marks	**3**
	ii.	Briefly outline the magnet's method of computing the horizontal and transverse stress in end blocks subjected to concentrated force from anchorage. Definition of Method – 2 Marks Diagram - 2 Marks Explanation - 3 Marks	**7**
OR	iii.	Discuss code recommendation for rectangular and I section of Flexural members. Code Name and detail – 2 Marks Recommendation for Rectangular Section – 2.5 Marks Recommendation for I Section – 2.5 Marks	**7**
Q.5	i.	How will you improve shear resistance of a P.S.C. beam? Diagram – 1 Marks Explanation – 3 Marks	**4**
	ii.	Explain the analysis of anchorage zone stresses in post tensioned members. How is the bursting tensile force calculated? Diagram – 2 Marks Explanation of Analysis – 2 Marks Bursting tensile force calculation formula – 2 Marks	**6**
OR	iii.	Write in detail about Conventional elastic design for shear-transfer of prestress in pretensioned members-transmission length. For each design steps - 1 Mark for each	**6**
Q.6		Attempt any two:	
	i.	Write step by step method of Design of end blocks by Guyon	**5**

method.
For each design steps - 1 Mark for each

ii. What is partial prestressing, Explain in detail. **5**
Definition – 2 Marks
Explanation – 3 Marks

iii. Explain Magnel method of design of end blocks. **5**
For each design steps - 1 Mark for each

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