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Reg. No……
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DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/ MANAGEMENT/COMMERCIAL PRACTICE, NOVEMBER – 2025

PRECAST AND PRESTRESSED CONCRETE

[Maximum Marks: **75**] [Time: **3** Hours]

PART-A

I. Answer '*all*' the following questions in one word or one sentence. Each question carries '*one*' mark.

(9 x 1 = 9 Marks)

		Module Outcome	Cognitive level
1.	Define precast concrete.	M1.01	R
2.	Minimum and Maximum length of transmission poles as per BIS.	M1.02	R
3.	Beams and columns are ..... precast elements.	M2.01	R
4.	Which IS code gives the materials, plan and specifications for prefabrication.	M2.02	R
5.	Define creep.	M2.04	R
6.	Method of pre stressing in which corroded tendons can be replaced.	M3.01	R
7.	In pre tensioned members immediate losses occur due to----------	M3.03	R
8.	The value of maximum strain in concrete at the extreme compression fibre in bending is---------	M4.01	R
9.	The minimum 28 day compressive strength of pre tensioned concrete cubes of 15 cm size, prescribed in the Indian standard code IS: 1343-1980, is.....	M4.04	R

PART-B

II. Answer any '*eight*' questions from the following. Each question carries *'three'* marks.

(8 x 3 = 24 Marks)

		Module Outcome	Cognitive level
1.	Explain the applications of precast concrete.	M1.01	U
2.	Explain the specifications as per IS of any 3 precast structural building Components from the following list. a) Flooring and Roofing Scheme b) Beams c) Columns d) Lintel	M2.01	U
3.	List the classifications of precast walls based on structural functions and based on construction.	M2.02	R
4.	Explain types of site prefabrications.	M2.03	U
5.	List the applications of pre stressed concrete.	M2.05	R
6.	Compare internal pre stressing and external pre stressing.	M3.01	U
7.	Explain post tensioning.	M3.01	U
8.	Explain principle of prestressing and stress transfer from tendon to concrete in pre tensioning & post tensioning.	M3.03	U
9.	List immediate and time dependent loss in post tensioned members.	M3.04	R
10.	List the basic assumptions in analysis of pre-stressed concrete beams.	M4.01	R

PART-C

Answer '*all*' questions from the following. Each question carries *'seven'* marks.

(6 x 7 = 42 Marks)

		Module Outcome	Cognitive level
III.	List the Disadvantages of precast concrete members.	M1.01	R
	OR		
IV.	Describe any two Non-structural Precast elements as per IS from the following list. 1) Paver blocks 2) Fencing Poles 3) Transmission Poles	M1.02	U
V.	Discuss the Construction methodology of precast concrete box culvert.	M1.03	U
	OR		
VI.	Describe sampling procedure and testing of individual components of Precast structures as per BIS standards.	M1.04	U
VII.	Explain requirements of structural joints of prefabricated structures as per IS.	M2.01	U
	OR		
VIII.	Explain the design considerations of structural joints in prefabricated structures as per IS.	M2.04	U
IX.	Calculate the loss of stress in the tendons due to shrinkage of concrete and creep in a post tensioned beam if the age of concrete at transfer is 7 days. Take Es = 2.10×10^5 N/mm^2, creep co-efficient for 7 days is 2.2, Stress in concrete at the level of tendon caused due to prestress and sustained loads is 12.65N/mm^2. Characteristic compressive strength of concrete is 50N/mm^2.	M3.03	A
	OR		
X.	A pre tensioned concrete beam of area of cross section $4x\ 10^5$mm^2, pre stressed by high tensile wires of area of cross section 2100 mm^2, located at eccentricity of 500 mm from the center of cross section. If the wires are tensioned to a stress of 1360N/mm^2, calculate the percentage loss of stress due to elastic deformation. Assuming modulus of elasticity of concrete and steel as 27.386 kN/mm^2 and 210kN/mm^2 respectively and maximum moment due to self weight is 480 KN-m., Moment of inertia of the section is $7.733x10^{10}$ mm^4.	M3.03	A
XI.	A simply supported prestressed concrete beam of rectangular cross section 350mm x 550mm is loaded with a uniformly distributed load of 250kN/m over a span of 6m. It is subjected to a pre stressing force of 2000kN and tendons are in concentric. Sketch the distribution of stress at mid span and support.	M4.03	A
	OR		
XII.	Draw the stress distribution of plain concrete rectangular beam with eccentric prestress carries a UDL of 'w' N/unit length.	M4.03	A
XIII.	Explain the properties of concrete and steel used in Pre stressed concrete.	M4.01	U
	OR		
XIV.	Explain steps involved in Design of simply supported rectangular beam section.	M4.04	U

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