

Precast and Prestressed Concrete Structures (315317)

MSBTE Diploma · K-Scheme · Civil Engineering (CE), Semester 5 · Important Questions

How this list was made: Based on MSBTE papers **W-2025** and **S-2026** available on msbte.ac.in (these are the only two K-scheme papers of this course so far, so “High” simply means it was asked in **both** of them). Every question of both papers was grouped by topic; units and unit marks are from the K-scheme curriculum specification table (I – 14, II – 16, III – 12, IV – 10, V – 18 marks). **High** = asked in both papers, **Medium** = asked in one paper, **Low** = in the K-scheme syllabus but not asked yet. Practice guidance only — not a prediction of the exam.

Most repeated topics

#	Topic	Unit	Times asked
1	Cable profiles in simply supported rectangular beam – concentric, eccentric straight, parabolic	5	4 (S-26, W-25)
2	Structural precast elements – fencing/transmission poles, paver blocks, manhole covers, precast mesh, door & window frames	1	3 (S-26, W-25)
3	Loss of prestress – meaning, reasons / types; creep and elastic deformation losses	5	3 (S-26, W-25)
4	Precast concrete – definition, necessity / importance	1	2 (S-26, W-25)
5	Types of concrete for precast work (PCC, RCC, PSC, SCC, ferro-cement, AAC, foam concrete)	1	2 (S-26, W-25)
6	Non-structural precast elements – bridge panels, tunnel / canal lining, piles, box culvert	1	2 (S-26, W-25)
7	Module and modular co-ordination	2	2 (S-26, W-25)
8	Storage, transportation and erection of precast / prefabricated elements	2	2 (S-26, W-25)
9	Principle / definition of prestressed concrete	3	2 (S-26, W-25)
10	Pre-tensioning vs post-tensioning; merits and demerits	4	2 (S-26, W-25)
11	Hoyer (long line) system of pre-tensioning	4	2 (S-26, W-25)
12	Freyssinet system of post-tensioning	4	2 (S-26, W-25)
13	Gifford-Udall system of post-tensioning	4	2 (S-26, W-25)
14	IS recommendations for % losses in pre-tensioning and post-tensioning	5	2 (S-26, W-25)
15	Basic assumptions in analysis of prestressed concrete beams	5	2 (S-26, W-25)

Unit I – Precast Concrete and its Elements (14 M)

Question / topic	Marks	Asked in	Probability
Structural precast elements – fencing/transmission poles, paver blocks, manhole covers, precast mesh, door & window frames • Discuss structural precast elements: fencing poles, paver block,	2 M, 4 M	S-26, W-25	High

manhole covers, precast mesh. (W-25 Q.2b) • Enlist four structural pre-cast elements. (S-26 Q.1a) • Draw the typical cross-section of pre-cast door and window frames showing reinforcement. (S-26 Q.2b)			
Precast concrete – definition, necessity / importance • Define Precast concrete. (W-25 Q.1a) • State the necessity / importance of pre-cast concrete. (S-26 Q.2a)	2 M, 4 M	S-26, W-25	High
Types of concrete for precast work (PCC, RCC, PSC, SCC, ferro-cement, AAC, foam concrete) • Define Autoclaved Aerated Concrete (AAC). (W-25 Q.1b) • Enlist the various types of concrete. (Any four) (S-26 Q.1b)	2 M	S-26, W-25	High
Non-structural precast elements – bridge panels, tunnel / canal lining, piles, box culvert • State and explain the various elements used for non-structural precast concrete. (W-25 Q.2c) • Describe key features of pre-cast concrete box culvert. (S-26 Q.2c)	4 M	S-26, W-25	High
Advantages and disadvantages of precast concrete • Describe advantages and disadvantages of precast concrete. (W-25 Q.2a)	4 M	W-25	Medium
Materials required for precast concrete structures • State different materials required for precast concrete structures. (W-25 Q.2d)	4 M	W-25	Medium
Testing / quality checks of precast components • What are the important tests to check quality of pre-cast systems? Explain any one of them in detail. (S-26 Q.2d)	4 M	S-26	Medium
Precast building components – slab panels, beams, columns, footings, lintels, chajjas, staircase In syllabus, not asked yet — prepare for a surprise question.	—	Not yet	Low
Casting tolerances and fabrication systems for precast elements In syllabus, not asked yet — prepare for a surprise question.	—	Not yet	Low

Unit II – Prefabricated Buildings (16 M)

Question / topic	Marks	Asked in	Probability
Module and modular co-ordination • Define module and modular co-ordination. (W-25 Q.1d) • Define modules and modular co-ordination. (S-26 Q.1c)	2 M	S-26, W-25	High
Storage, transportation and erection of precast / prefabricated elements • Demonstrate the procedure of the storage, transportation and erection for given precast element. (W-25 Q.5a)	4 M, 6 M	S-26, W-25	High

<ul style="list-style-type: none"> Explain the procedure of the storage, transportation and erection of pre-fabricated building element. (S-26 Q.3a) 			
Structural joints – requirements and design considerations <ul style="list-style-type: none"> State any two requirements of structural joints. (W-25 Q.1c) Discuss the requirements of structural joints of the given prefabricated elements. (W-25 Q.3b) 	2 M, 4 M	W-25	Medium
Prefabricated building construction – concept and process <ul style="list-style-type: none"> Explain the term "Prefabricated Building Construction" along with the process. (W-25 Q.3a) 	4 M	W-25	Medium
Equipment for prefabricated building construction <ul style="list-style-type: none"> List the various equipments required for the construction of prefabricated buildings with applications of each (minimum 6 points). (W-25 Q.5b) 	6 M	W-25	Medium
Mixed and composite construction <ul style="list-style-type: none"> Differentiate between mixed and composite construction. (Any four points) (S-26 Q.3b) 	4 M	S-26	Medium
Load-bearing and non-load-bearing precast wall panels <ul style="list-style-type: none"> Write the functions, applications, advantages and disadvantages of load-bearing and non-load-bearing pre-cast wall panels. (S-26 Q.5a) 	6 M	S-26	Medium
Number of precast slab panels for a room (modular sizes, IS 15916) – numerical <ul style="list-style-type: none"> Calculate the number of pre-cast slab panels using specifications for components as per IS 15916–2010 for the room of size 3m × 4m. (S-26 Q.4a) 	4 M	S-26	Medium
Classification of prefab systems, modular grid, environmental impact In syllabus, not asked yet — prepare for a surprise question.	—	Not yet	Low

Unit III – Fundamentals of Pre-stressed Concrete (12 M)

Question / topic	Marks	Asked in	Probability
Principle / definition of prestressed concrete <ul style="list-style-type: none"> State the basic principle of prestressed concrete. (W-25 Q.1e) Define pre-stressed concrete and state types of pre-stressing steel. (S-26 Q.1d) 	2 M	S-26, W-25	High
Types of prestressing steel – wire, strand/cable, tendon/bar and where each is used <ul style="list-style-type: none"> Define pre-stressed concrete and state types of pre-stressing steel. (S-26 Q.1d) State the situation in which wire, cable and tendon are used with justification. (S-26 Q.3d) 	2 M, 4 M, 6 M	S-26	Medium

<ul style="list-style-type: none"> What type of pre-stressing steel is used in pre-stressed concrete? Describe any two in detail. (S-26 Q.6a) 			
Advantages / disadvantages of PSC; PSC vs RCC <ul style="list-style-type: none"> State the advantages and disadvantages of pre-stressed concrete with respect to other construction material. (S-26 Q.1e) Differentiate between pre-stressed concrete and reinforced concrete. (S-26 Q.3c) 	2 M, 4 M	S-26	Medium
Applications of prestressed concrete <ul style="list-style-type: none"> State any four applications of prestressed concrete. (W-25 Q.3d) 	4 M	W-25	Medium
Need of high strength materials for PSC <ul style="list-style-type: none"> Justify the need of high strength materials for prestressed concrete. (W-25 Q.5c) 	6 M	W-25	Medium
Loading stages of a prestressed member <ul style="list-style-type: none"> Describe the process of applying pre-stressing force at different loading stages. (S-26 Q.4b) 	4 M	S-26	Medium
Basic terminology (tendon, anchorage, transfer, bonded / unbonded, effective prestress) In syllabus, not asked yet — prepare for a surprise question.	—	Not yet	Low

Unit IV – Methods and Systems of Pre-stressing (10 M)

Question / topic	Marks	Asked in	Probability
Pre-tensioning vs post-tensioning; merits and demerits <ul style="list-style-type: none"> Differentiate between pre-tensioning and post-tensioning process used in civil construction. (W-25 Q.3c) State the merits and demerits of post tensioning. (S-26 Q.4e) 	4 M	S-26, W-25	High
Hoyer (long line) system of pre-tensioning <ul style="list-style-type: none"> Explain Hoyer system of pre-tensioning with labelled sketch. (W-25 Q.4a) Describe Hoyer system of pre-tensioning with diagram. (S-26 Q.5b) 	4 M, 6 M	S-26, W-25	High
Freyssinet system of post-tensioning <ul style="list-style-type: none"> Explain the Freyssinet system of prestressing with respect to process and application with sketches. (W-25 Q.6a) State with justification the situations in which Freyssinet, Magnel Blaton and Gifford Udall systems are applied. (S-26 Q.5c) 	6 M	S-26, W-25	High
Gifford-Udall system of post-tensioning <ul style="list-style-type: none"> Discuss the merits and demerits of Gifford Udall system. (W-25 Q.4b) State with justification the situations in which Freyssinet, Magnel Blaton and Gifford Udall systems are applied. (S-26 Q.5c) 	4 M, 6 M	S-26, W-25	High
Magnel-Blaton system of post-tensioning <ul style="list-style-type: none"> State with justification the situations in which Freyssinet, Magnel Blaton and Gifford Udall systems are applied. (S-26 Q.5c) 	6 M	S-26	Medium

Internal and external prestressing In syllabus, not asked yet — prepare for a surprise question.	—	Not yet	Low
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Unit V – Losses of Pre-stress and Analysis of Pre-stressed Rectangular Beam Section (18 M)

Question / topic	Marks	Asked in	Probability
Cable profiles in simply supported rectangular beam – concentric, eccentric straight, parabolic <ul style="list-style-type: none"> Draw the cable profile of simply supported rectangular beam section – concentric, eccentric straight and parabolic. (W-25 Q.6c) Sketch the profiles for eccentric straight and parabolic cables. (S-26 Q.1f) Explain in brief cable profile in simply supported rectangular beam section. (S-26 Q.4d) Describe with neat sketches straight tendon and parabolic tendon profiles in simply supported rectangular beam section. (S-26 Q.6b) 	2 M, 4 M, 6 M	S-26, W-25	High
Loss of prestress – meaning, reasons / types; creep and elastic deformation losses <ul style="list-style-type: none"> State the meaning of loss of pre-stress. (W-25 Q.1f) Identify the reasons for loss of pre-stress in the given element. (W-25 Q.4c) Describe loss due to creep of concrete and loss due to elastic deformation of concrete. (S-26 Q.6c) 	2 M, 4 M, 6 M	S-26, W-25	High
IS recommendations for % losses in pre-tensioning and post-tensioning <ul style="list-style-type: none"> Elaborate the IS specification and recommendations for various % losses in case of pre-tensioning and post-tensioning. (W-25 Q.6b) State the IS recommendations for % losses in case of pre and post-tensioning. (S-26 Q.4c) 	4 M, 6 M	S-26, W-25	High
Basic assumptions in analysis of prestressed concrete beams <ul style="list-style-type: none"> State any two basic assumptions in analysis of prestressed concrete beam. (W-25 Q.1g) Explain any four assumptions in analysis of pre-stressed concrete beams. (S-26 Q.1g) 	2 M	S-26, W-25	High
Effect of cable profile on maximum stresses at midspan and support <ul style="list-style-type: none"> Explain the effect of cable profile on maximum stresses at midspan and at support. (W-25 Q.4d) 	4 M	W-25	Medium
Suitable cable profile for a given loading (e.g. central point load) <ul style="list-style-type: none"> A concrete beam supports concentrated load at center on the simply supported span. Suggest a suitable profile. (W-25 Q.4e) 	4 M	W-25	Medium

Losses during tensioning – friction (length effect / wobble, curvature) and anchorage slip In syllabus, not asked yet — prepare for a surprise question.	—	Not yet	Low
Loss due to shrinkage of concrete and relaxation (creep) of steel In syllabus, not asked yet — prepare for a surprise question.	—	Not yet	Low

Exam tips from the two papers

- **Cable profiles** (concentric, eccentric straight, parabolic) were asked **4 times** (2, 4 and 6 marks) – practise neat beam sketches with the c.g.c. line and eccentricity marked.
- **Hoyer, Freyssinet and Gifford-Udall systems** came in both papers – learn one clear labelled sketch of each, plus where each is used.
- **IS 1343 % losses table**, meaning/reasons of loss of prestress and **assumptions in analysis** were repeated – write the table from memory.
- Unit I/II: precast elements (poles, pavers, manhole covers, frames, box culvert), modular co-ordination, storage–transport–erection were asked in both papers.
- The only numerical so far was the **number of precast slab panels for a room** (S-26). The curriculum treats the effect of cable profile on stresses as theory; our model papers include a few simple stress / loss numericals for understanding and CO5 (evaluate losses) – revise theory first.

Note: This is a **important-question list prepared by Ananda Technologies** only for practice and exam preparation, based on the pattern of previous MSBTE question papers and the K-scheme syllabus. It is **not an official MSBTE paper**, and it does **not** mean that these questions will come in the exam. Answers follow standard textbook points; marks shown are indicative. Free for students — anandatechnologies.in