Water Resource Engineering (315314)

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** papers). Every question of both papers was grouped by topic and placed in its K-scheme unit. **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.

Paper pattern (same in both papers)

Q.	Attempt	Marks	Units seen in both papers
1	any 5 of 7	5 × 2 = 10	I, I, II, III, III, IV, V
2	any 3 of 4	3 × 4 = 12	three from Unit I + one from Unit II
3	any 3 of 4	3 × 4 = 12	one from Unit II + three from Unit III
4	any 3 of 5	3 × 4 = 12	three from Unit IV + two from Unit V
5	any 2 of 3	2 × 6 = 12	two numericals from Unit II + one from Unit III
6	any 2 of 3	2 × 6 = 12	one from Unit III + two from Unit V

Marks of questions set per unit (including options) were identical in both papers: Unit 1: 16, Unit 2: 22, Unit 3: 28, Unit 4: 14, Unit 5: 22 (total 102 option-marks).

Topics asked in both papers

#	Topic	Unit	Asked in
1	Classification of irrigation on the basis of purpose	1	S-26, W-25
2	Rainfall – definition; Symon's rain gauge (sketch / explanation)	1	S-26, W-25
3	Average rainfall over catchment – arithmetic mean / Thiessen polygon (numerical)	1	S-26, W-25
4	Runoff – definition and factors affecting runoff; define hydrology	1	S-26, W-25
5	Duty, delta, base period, crop period – definitions	2	S-26, W-25
6	Relation between duty, delta and base period (derivation)	2	S-26, W-25
7	Canal discharge / water requirement of crops from duty (numerical)	2	S-26, W-25
8	Fixing reservoir control levels (DSL/MDDL, FRL, HFL, TBL) – numerical	2	S-26, W-25
9	Earthen dam vs gravity dam (four points)	3	S-26, W-25
10	Spillway – functions / advantages	3	S-26, W-25
11	Types of spillway, suitability; ogee spillway sketch	3	S-26, W-25
12	Earthen dam – failures and preventive measures / maintenance	3	S-26, W-25
13	Bandhara irrigation – advantages, site requirements	4	S-26, W-25

14	Percolation tank – site selection / difference from irrigation tank	4	S-26, W-25
15	Drip and sprinkler irrigation – definition / comparison	4	S-26, W-25
16	Weir vs barrage	5	S-26, W-25
17	Diversion headworks – layout and functions of components	5	S-26, W-25
18	Canal lining – definition, materials, advantages and disadvantages	5	S-26, W-25
19	Cross drainage works – aqueduct, super passage etc. (definition / selection with sketch)	5	S-26, W-25

Unit I – Introduction to Irrigation and Hydrology

Question / topic	Marks	Asked in	Probability
Classification of irrigation on the basis of purpose • Enlist the classification of irrigation on the basis of purposes. *(W-25 Q.1a)* • Enlist any four classification of irrigation on the basis of purposes. *(S-26 Q.1b)*	2 M	S-26, W-25	**High**
Rainfall – definition; Symon's rain gauge (sketch / explanation) • Define rainfall and explain Symon's rain gauge station. *(W-25 Q.2a)* • Define rainfall. Draw a neat sketch of Symon's rain gauge. *(S-26 Q.2a)*	4 M	S-26, W-25	**High**
Average rainfall over catchment – arithmetic mean / Thiessen polygon (numerical) • Find mean rainfall by arithmetic mean method (stations A–D: 110, 103, 99, 89 mm). *(W-25 Q.2b)* • Thiessen polygon areas 360, 275, 420, 650 km² with 115, 128, 152, 135 cm – compute average rainfall. *(S-26 Q.2b)*	4 M	S-26, W-25	**High**
Runoff – definition and factors affecting runoff; define hydrology • Define runoff and state the factors affecting runoff. *(W-25 Q.2c)* • Define: i) Run-off ii) Hydrology. *(S-26 Q.1a)*	2 M, 4 M	S-26, W-25	**High**
Benefits / advantages of irrigation • State any four benefits of irrigation. *(W-25 Q.1b)*	2 M	W-25	**Medium**
Maximum flood discharge by empirical formulae (Inglis, Dicken's, Ryve's) • Estimate maximum flood discharge from 350 km² catchment, C = 15, using Inglis' and Dicken's formula. *(S-26 Q.2d)*	4 M	S-26	**Medium**
Hydrological cycle (with sketch) In syllabus, not asked yet — prepare for a surprise question.	—	Not yet	**Low**
Automatic (tipping bucket) rain gauge In syllabus, not asked yet — prepare for a surprise question.	—	Not yet	**Low**

Isohyetal method of average rainfall In syllabus, not asked yet — prepare for a surprise question.	—	Not yet	**Low**
Ill effects of excess irrigation / necessity of irrigation In syllabus, not asked yet — prepare for a surprise question.	—	Not yet	**Low**
Evaporation – definition and factors In syllabus, not asked yet — prepare for a surprise question.	—	Not yet	**Low**

Unit II – Crop Water Requirement and Reservoir Planning

Question / topic	Marks	Asked in	Probability
Duty, delta, base period, crop period – definitions • Define base period and crop period. *(W-25 Q.1c)* • Define: i) Delta ii) Crop period. *(S-26 Q.1c)*	2 M	S-26, W-25	**High**
Relation between duty, delta and base period (derivation) • Derive relation between duty, delta and base period. *(W-25 Q.2d)* • Derive the relation between duty, delta and base period. *(S-26 Q.5b)*	4 M, 6 M	S-26, W-25	**High**
Canal discharge / water requirement of crops from duty (numerical) • Find the design discharge of a canal (transit losses 18 %, time factor 0.7, capacity factor 0.8, five crops). *(W-25 Q.5a)* • Find the discharge and volume of water required for wheat and rice (duty, base period, area given). *(S-26 Q.3a)*	4 M, 6 M	S-26, W-25	**High**
Fixing reservoir control levels (DSL/MDDL, FRL, HFL, TBL) – numerical • Fix the FRL, TDL and HFL from data (Francis formula for waste weir). *(W-25 Q.5b)* • Fix control levels of a medium size reservoir (tank losses 20 %, carry-over 10 %, dead storage 10 %). *(S-26 Q.5a)*	6 M	S-26, W-25	**High**
Surveys for an irrigation project and data to be collected • Explain the engineering surveys for an irrigation project. Enlist the data to be collected. *(W-25 Q.3a)*	4 M	W-25	**Medium**
Silting of reservoir – definition, factors (and control) • Define silting of reservoir and state any three factors affecting silting of reservoir. *(S-26 Q.2c)*	4 M	S-26	**Medium**
Cropping seasons (Kharif, Rabi, Hot weather), CCA, GCA, intensity of irrigation In syllabus, not asked yet — prepare for a surprise question.	—	Not yet	**Low**
Factors affecting duty / methods of improving duty In syllabus, not asked yet — prepare for a surprise question.	—	Not yet	**Low**
Methods of irrigation – surface (flooding, border, basin, furrow), subsurface, overhead In syllabus, not asked yet — prepare for a surprise question.	—	Not yet	**Low**

IKS – Rahat (Persian wheel) water lifting system In syllabus, not asked yet — prepare for a surprise question.	—	Not yet	**Low**

Unit III – Dams and Spillways

Question / topic	Marks	Asked in	Probability
Earthen dam vs gravity dam (four points) • Differentiate between earthen dam and gravity dam on any four points. *(W-25 Q.3b)* • Differentiate between earthen dam and gravity dam on any four points. *(S-26 Q.3b)*	4 M	S-26, W-25	**High**
Spillway – functions / advantages • State any four advantages of spillway in dams. *(W-25 Q.1d)* • Enlist any four functions of spillway. *(S-26 Q.3c)*	2 M, 4 M	S-26, W-25	**High**
Types of spillway, suitability; ogee spillway sketch • Enlist the types of spillway and suggest suitability according to site condition. *(W-25 Q.6a)* • Draw a neat sketch of ogee spillway. *(S-26 Q.1e)*	2 M, 6 M	S-26, W-25	**High**
Earthen dam – failures and preventive measures / maintenance • Suggest suitable routine measures to maintain earthen dam. *(W-25 Q.5c)* • Explain the failures of earthen dams with their preventive measures. *(S-26 Q.5c)*	6 M	S-26, W-25	**High**
Forces acting on gravity dam (list / explain with sketch) • Enlist the forces acting on gravity dam. *(W-25 Q.1e)* • Explain with sketch the various forces acting on gravity dam. *(W-25 Q.3c)*	2 M, 4 M	W-25	**Medium**
Earthen dam – components (labelled section), cut-off trench, rock toe • Draw labelled sketch of earthen dam; functions of cut-off trench and rock toe. *(W-25 Q.3d)*	4 M	W-25	**Medium**
Galleries in gravity dam – purpose • Enlist any two purposes of galleries in gravity dam. *(S-26 Q.1d)*	2 M	S-26	**Medium**
Energy dissipation below spillway • Explain energy dissipation. *(S-26 Q.3d)*	4 M	S-26	**Medium**
Spillway gates – types; Vishweshwarayya (automatic) gate • Enlist various types of gates in dams; explain Vishweshwarayya gate with neat sketch. *(S-26 Q.6a)*	6 M	S-26	**Medium**
Types of dams / gravity dam joints, drainage, elementary profile In syllabus, not asked yet — prepare for a surprise question.	—	Not yet	**Low**

Types of earthen dam (homogeneous, zoned, diaphragm); seepage control In syllabus, not asked yet — prepare for a surprise question.	—	Not yet	Low

Unit IV – Minor and Micro Irrigation

Question / topic	Marks	Asked in	Probability
Bandhara irrigation – advantages, site requirements • State any two advantages of Bandhara irrigation. *(W-25 Q.1f)* • State any four requirements for an ideal site for bandhara. *(S-26 Q.4c)*	2 M, 4 M	S-26, W-25	High
Percolation tank – site selection / difference from irrigation tank • Explain how percolation tank differs from irrigation tank. *(W-25 Q.4c)* • State the site selection criteria for percolation tank. *(S-26 Q.4a)*	4 M	S-26, W-25	High
Drip and sprinkler irrigation – definition / comparison • Differentiate between sprinkler irrigation and drip irrigation. *(W-25 Q.4b)* • Define drip irrigation. *(S-26 Q.1f)*	2 M, 4 M	S-26, W-25	High
Lift irrigation scheme – layout and components • Draw a layout of lift irrigation scheme; explain its function with component parts. *(W-25 Q.4a)*	4 M	W-25	Medium
Well irrigation – advantages and disadvantages • State the advantages and disadvantages of well irrigation system. *(S-26 Q.4b)*	4 M	S-26	Medium
Drip / sprinkler – components and layout sketch In syllabus, not asked yet — prepare for a surprise question.	—	Not yet	Low
Types of wells (open well, tube well) In syllabus, not asked yet — prepare for a surprise question.	—	Not yet	Low

Unit V – Diversion Headwork and Canals

Question / topic	Marks	Asked in	Probability
Weir vs barrage • Differentiate between weir and barrage. *(W-25 Q.4e)* • Compare weir with barrage w.r.t. cost, afflux, maintenance, sketch. *(S-26 Q.4d)*	4 M	S-26, W-25	High
Diversion headworks – layout and functions of components • Draw layout of diversion headwork; functions of head regulator, divide wall, fish ladder, scouring sluices. *(W-25 Q.6b)*	4 M, 6 M	S-26, W-25	High

• Draw a layout of diversion head works with component parts. *(S-26 Q.4e)*			
Canal lining – definition, materials, advantages and disadvantages • Define canal lining and state material used for canal lining. *(W-25 Q.1g)* • State three advantages and disadvantages of canal lining. *(S-26 Q.6b)*	2 M, 6 M	S-26, W-25	**High**
Cross drainage works – aqueduct, super passage etc. (definition / selection with sketch) • Suggest suitable CD work and draw sketch for three bed-level situations. *(W-25 Q.6c)* • Define: i) Aqueduct ii) Super passage. *(S-26 Q.1g)*	2 M, 6 M	S-26, W-25	**High**
Classification of canals as per alignment • Explain the classification of canal as per alignment. *(W-25 Q.4d)*	4 M	W-25	**Medium**
Canal regulators – head regulator, escape, fall • Explain with neat sketch head regulator, escape and fall. *(S-26 Q.6c)*	6 M	S-26	**Medium**
K.T. weir – components and construction In syllabus, not asked yet — prepare for a surprise question.	—	Not yet	**Low**
Canal cross-sections – in cutting, embankment, partial cutting & filling In syllabus, not asked yet — prepare for a surprise question.	—	Not yet	**Low**
Cross regulator and canal outlets In syllabus, not asked yet — prepare for a surprise question.	—	Not yet	**Low**

Exam tips from the two papers

- Both papers had a **reservoir control-levels numerical** (6 M) and a **duty/discharge numerical** — practise fixing DSL, FRL, HFL, TBL by interpolation from the capacity table, and season-wise canal discharge with transit losses / time factor.
- Average rainfall (arithmetic mean / Thiessen) and Inglis / Dicken flood formula are short 4 M numericals — learn the formulas.
- Earthen dam vs gravity dam (4 M) and weir vs barrage (4 M) came in **both** papers in almost the same words.
- Sketches expected: Symon's rain gauge, gravity dam forces, earthen dam section, ogee spillway, diversion headworks layout, lift irrigation layout, CD works, canal regulators.
- As per the syllabus, runoff is asked without numericals.

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