

Water Resource Engineering (315314)

MSBTE Diploma · K-Scheme · Model Question Paper — Set C

Time: 3 Hours
Max. Marks: 70
Instructions:

1. All questions are compulsory.
2. Answer each next main question on a new page.
3. Illustrate your answers with neat sketches wherever necessary.
4. Figures to the right indicate full marks.
5. Assume suitable data, if necessary.
6. Mobile phone, pager and any other electronic communication devices are not permissible in the examination hall.

Q.1 Attempt any FIVE of the following:
10

- a) State the classification of irrigation projects based on purpose (any four).
- b) Define runoff. State any two factors affecting it.
- c) Define: i) Base period ii) Delta.
- d) Name any four types of spillways.
- e) Define the terms heel and toe of a gravity dam.
- f) Define bandhara. State any two advantages of bandhara irrigation.
- g) Define: i) Level crossing ii) Siphon aqueduct.

Q.2 Attempt any THREE of the following:
12

- a) Explain with a neat sketch how rainfall is measured using Symon's rain gauge.
- b) The Thiessen polygon areas and rainfall at four stations of a catchment are given below. Find the average rainfall by (i) arithmetic mean method and (ii) Thiessen polygon method.

Station	A	B	C	D
Polygon area (km ²)	320	313	258	260
Rainfall (mm)	82	104	121	96

- c) Explain the hydrological cycle with a neat sketch.
- d) Explain border strip, check basin and furrow methods of surface irrigation with sketches.

Q.3 Attempt any THREE of the following:
12

- a) Explain the engineering surveys required for an irrigation project and enlist the data to be collected.
- b) Give any four points of difference between earthen dam and gravity dam.
- c) Draw a neat labelled sketch of an ogee spillway and explain its parts.
- d) Explain the modes (causes) of failure of a gravity dam.

Q.4 Attempt any THREE of the following:

12

- Explain how a percolation tank differs from an irrigation tank.
- Draw the layout of a sprinkler irrigation system. State its components and suitability.
- Explain open well and tube well with neat sketches.
- Differentiate between weir and barrage (any four points).
- State the necessity of canal lining and name any four lining materials.

Q.5 Attempt any TWO of the following:

12

- Fix the F.R.L., H.F.L. and top of bund level of a reservoir from the following data: D.S.L. (outlet sill level) = 320.00 m; effective storage required for crops = 13 Mm³; evaporation and other tank losses = 18 % of effective storage; maximum flood discharge = 420 m³/s; length of waste weir = 90 m ($Q = 1.84 L H^{3/2}$); free board = 1.5 m.

Contour R.L. (m)	318	320	322	324	326	328	330
Capacity (Mm ³)	1.2	2.4	4.6	7.9	12.3	17.8	24.6

- The gross command area of a canal is 15,000 ha, of which 80 % is culturable. The intensity of irrigation and duty for the crops are given below. Find the discharge required at the head of the canal if transit losses are 20 % of the head discharge and the time factor is 0.8.

Crop	Season	Intensity of irrigation	Duty at field (ha/cumec)
Sugarcane	Perennial	10 %	730
Rice	Kharif	35 %	850
Wheat	Rabi	45 %	1750
Groundnut	Hot weather	8 %	900

- Explain the causes of seepage failure of an earthen dam and the measures to control seepage, with a neat sketch.

Q.6 Attempt any TWO of the following:

12

- Explain with a neat sketch the various forces acting on a gravity dam.
- Draw a neat layout of diversion headworks and explain the functions of: i) Head regulator ii) Divide wall iii) Fish ladder iv) Under-sluices.
- Explain the classification of canals according to alignment. Draw a typical cross-section of a canal in partial cutting and partial filling.

Note: This is a **model question paper 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