



17502

14115

3 Hours/100 Marks

Seat No.

--	--	--	--	--	--	--	--	--	--

- 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) **Use** of Non-programmable Electronic Pocket Calculator is **permissible**.

MARKS

1. A) Attempt **any three** :

(3×4=12)

- Classify irrigation scheme on the basis of purpose and administration.
- Define Irrigation, Hydrology, Rainfall intensity and Runoff.
- Calculate MFD for a catchment having area 1200 km². Use Ingli's formula and Dicken's formula. Take Dicken constant C = 28.
- Draw the neat sketches of Symon's rain gauge and tipping bucket type rain gauge.

B) Attempt **any one** :

(1×6=6)

- Compute the average rainfall by Thiessen's polygon method and arithmetic average method for a C. A. at dam site.

Rain gauge st. Rainfall in mm	1400	1500	1100	1200	1300
C. A. in sq. km.	20	30	24	26	25

Also calculate maximum yield in Mm³ by using Ingli's formula.

- Fix control levels DSL, FRL, HFL and TBL from given data.
 - Effective storage required for crops – 3800 Ha.m.
 - Carry over allowance – 15% of effective storage.
 - Tank losses – 10% of effective storage.

P.T.O.



iv) Dead storage – 10% Gross storage.

Contour

RL (m)	81	84	87	105	108	111	114
Storage Mm³	3.50	5.0	6.00	45.0	50.0	61	68

Assume flood lift as 1.5 m and free board as 2.0 m.

2. Attempt **any four** : **(4×4=16)**

- List the data collected in engineering survey and hydrological survey for an irrigation project.
- What is silting of reservoir ? What are the factors affecting rate of silting ?
- Explain hydraulic failures and seepage failures of earthen dam.
- What is seepage ? Explain any three methods to control seepage through embankment.
- Draw a typical cross section of earthen dam suitable at a site where clayey soil and murum are available and pervious strata available of moderate depth.
- Enlist the forces acting on gravity dam. Show them with a neat sketch.

3. Attempt **any four** : **(4×4=16)**

- Differentiate between theoretical and practical profile of gravity dam.
- Explain working of tainter gate with the help of neat sketch.
- What are various types of galleries in gravity dam ? State the function of each type with neat sketch.
- State any four essential requirements of site for construction of bandhara.
- Draw a layout of diversion head works and name important components.

4. A) Attempt **any three** : **(3×4=12)**

- Explain need and construction of percolation tank with help of neat cross section.
- Explain importance of drip irrigation. Also draw layout and show component parts.
- State two advantages and two disadvantages of Barrage.



MARKS

d) Write function of following :

- i) Divide wall
- ii) Fish ladder
- iii) Scouring sluices
- iv) Head regulator.

B) Attempt **any one** : **(1×6=6)**

- a) Describe sprinkler irrigation system with the help of neat layout and also mention situation on w.r.t. crop, soil, topography, maintenance and operation.
- b) Design an economical trapezoidal section of a canal for carrying discharge $5.0 \text{ m}^3/\text{s}$, bed slope 1 : 1000, $N = 0.013$, and side slope I V : 2 H.

5. Answer **any two** : **(2×8=16)**

a) Calculate the storage required in Ha. m for irrigating following crops. Consider reservoir loss as 12% and canal losses 15%.

Sr. No.	Crop	Base period days	Duty of field Ha/cumec	Area under crop Ha.
1	Wheat	150	2,000	12000
2	Rice	120	900	4500
3	Sugarcane	320	700	4200
4	Cotton	210	1600	8000
5	Vegetable	120	600	2400

- b) Explain any eight selection criteria for suitable type of class.
- c) Draw neat sketch of canal network show the location and mention situation favouring following structures.
 - i) Head regulator
 - ii) Cross regulator
 - iii) Escape
 - iv) Outlets.

**MARKS**6. Attempt **any four** :**(4×4=16)**

- a) Compare between aqueduct and super passage.
 - b) What is meant by pick up weir ? Explain the situation where, it is proposed.
 - c) Differentiate between weir and barrage.
 - d) Compare between contour canal and ridge canal.
 - e) What are causes and remedial measures of water logging ?
-