



17502

21415

3 Hours/100 Marks

Seat No.

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- 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.**
(7) **Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.**
(8) **Use of Steam tables, logarithmic, Mollier's chart is permitted.**
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MARKS

1. A) Attempt **any three** : **(3×4=12)**
- a) State any four advantages and four ill effects of irrigation.
 - b) Explain with neat label sketch Symon's rain gauge.
 - c) Calculate the maximum flood discharge for a catchment area 1500 km² using Dicken's formula. Assume Dicken's coefficient as 28.
 - d) State the meaning of :
 - i) GCA
 - ii) Delta
 - iii) Duty
 - iv) Crop period.
- B) Attempt **any one** : **(1×6=6)**
- a) A tank has a catchment area of 120 km² out of which 20 km² is independent. The average annual rainfall of the catchment is 80 cm. The runoff of average bad year is 20% of the rainfall for an average bad year. The runoff from the intercepted catchment available for this tank is 20% of actual runoff. Calculate the assured yield.

P.T.O.



b) Fix the FRL, FFL and HFL from the following data :

- 1) DSL = 110.00 m
- 2) Effective losses = 8000 m³
- 3) Tank losses = 1500 m³
- 4) Maximum flood discharge = 400 m³/sec
- 5) Length of waste weir = 100 m
- 6) Francis formula $Q = 1.8 LH^{3/2}$
- 7) Free Board = 1.5 m.

Contour RL →	110	112	114	116	118	120
Capacity in m³	1000	3000	5000	6000	9000	12000

2. Attempt **any four** :

(4×4=16)

- a) State the various cropping pattern seasons and crops in Maharashtra.
- b) Enlist any eight criteria for selection of site for a dam.
- c) Differentiate between earthen and gravity dam with respect to foundation, seepage, construction and maintenance.
- d) Write the functions of following components of earthen dam.
 - i) Turfing
 - ii) Berms
 - iii) Heating
 - iv) Rock toe.
- e) Draw a neat sketch of cross section of zoned type earthen dam and show all components of it.
- f) Differentiate between elementary profile and practical profile of gravity dam.

3. Attempt **any four** :

(4×4=16)

- a) State and explain the different conditions of stability of a gravity dam.
- b) State importance of spillway in earthen dam and explain construction and working of ogee spillway with sketch.
- c) Draw a labeled sketch of vertical sliding gate. State where it is suitable ?
- d) State advantages and disadvantages of Bandhara irrigation scheme.
- e) State the main features of lift irrigation scheme.



MARKS

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

(3×4=12)

- a) Describe construction of percolation tank.
- b) Compare between drip irrigation and sprinkler irrigation on any four points.
- c) Write any eight component parts of diversion headwork.
- d) State different types of weir. Draw labeled sketch of any one type of weir.

B) Attempt **any one** :

(1×6=6)

- a) State the needs of sprinkler irrigation scheme. Draw layout of sprinkler irrigation scheme and show various components of it.
- b) Calculate the balancing depth for a section of a canal having the following data :
b = 10 m, FSD = 1.5, Bank width = 2 m, Side slope 1 : 1 in cutting, 1.5 : 1 in filling free board 0.5 m.

5. Attempt **any two** :

(2×8=16)

- a) Following table gives the necessary data about the crops, their duty and the area under each crop commanded by a canal taking off from storage reservoir. Find the reservoir capacity if the canal losses are 20% and reservoir losses are 12%.

Crop	Base period (days)	Area under the crop (Ha)	Duty at the field (Ha/cumec)
Wheat	120	4800	1800
Sugar cane	360	5600	800
Cotton	200	2400	1400
Vegetables	120	1400	700
Rice	120	3000	800

- b) Explain the type of failure in earthen dam and its remedial measures.
- c) Suggest the suitable type of CD work and draw sketch of it under each of the following situations.
 - i) Canal bed level and Nala bed level are same.
 - ii) Canal bed level is above HFL of Nala.
 - iii) Nala bed level is above FSL of Canal.
 - iv) HFL of Nala is between FSL of Canal and bed level of Canal.

**MARKS****(4×4=16)**

6. Attempt **any four** :

- a) Differentiate between weir and barrage w.r.t. :
 - i) Cost
 - ii) Silting
 - iii) Flood control
 - iv) Area of submergence.
 - b) State four types of weir. Draw a sketch of any one and describe its purpose.
 - c) Draw the cross section of canal in partial cutting and partial embankment.
 - d) What do you mean by canal lining ? State two purposes, advantages, disadvantages of canal lining.
 - e) Differentiate between head regulator and cross regulator on any four points.
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