

17502

11819

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.

Marks

- 1. a) Attempt any THREE of the following:** **12**
- (i) State the methods of determining average annual rainfall. Explain any one method.
 - (ii) State the effect of type of catchment on maximum flood discharge.
 - (iii) Explain Thiessen's Polygon method of calculating average rainfall with neat sketch.
 - (iv) Enlist methods of assessment of irrigation water and explain any one.

P.T.O.

b) Attempt any ONE of the following:

6

- (i) The base period intensity of irrigation and duty of various crops under a canal are given in the table below. Find the reservoir capacity if the canal has 20% losses and reservoir has 12% losses.

| Sr. No. | Name of crop | Duty at field (ha/cumec) | Base period (days) | Area under crops (ha) |
|---------|--------------|--------------------------|--------------------|-----------------------|
| 1. | Wheat | 1800 | 120 | 4000 |
| 2. | Rice | 800 | 120 | 3200 |
| 3. | Sugarcane | 700 | 360 | 4500 |
| 4. | Cotton | 1500 | 120 | 2400 |
| 5. | Vegetable | 600 | 120 | 1600 |

- (ii) Fix FRL of dam from the following data.

DSL = 110.00m

Tank Losses = 1500 M³

Effective Live Storage = 8000 M³

| Contour RL (M) | 110 | 112 | 114 | 116 | 118 | 120 |
|-------------------------|------|------|------|------|------|-------|
| Capacity M ³ | 1000 | 3000 | 5000 | 6000 | 9000 | 12000 |

2. Attempt any FOUR of the following:

16

- What are the advantages and disadvantages of Bandhara irrigation.
- Explain the following terms with respect to Drip irrigation method, Head mains, Laterals, Drip nozzles.
- Differentiate between earthen and gravity dam with respect to foundation, seepage, construction and maintenance.
- Draw a neat sketch of cross section of zoned type earthen dam and show all components of it.
- Differentiate between elementary profile and practical profile of gravity dam.
- State the meaning of cut-off. Why is it necessary? Give construction details of cut-off.

3. Attempt any FOUR of the following:**16**

- a) What is spillway? State the purpose of emergency spillway. Draw a neat labelled sketch of ogee spillway.
- b) Give the function of following components of earthen dam.
 - (i) Cut off trench
 - (ii) Pitching
 - (iii) Rock toe drainage arrangement
- c) Draw a labelled sketch of vertical sliding gate, state where it is suitable.
- d) Draw a layout of Bandhara irrigation scheme showing different components.
- e) What is percolation tank? Why it is necessary? What are important points considered for selection site for percolation tank.
- f) Define Hydrology and explain hydrological cycle.

4. a) Attempt any THREE of the following:**12**

- (i) Discuss sprinkler irrigation system with respect to merits demerits, sketch and trouble shooting of it.
- (ii) What is Kolhapur type weir? Draw a neat sketch of it.
- (iii) Write any eight component parts of diversion head work.
- (iv) What is function of pick up weir? Under what situation it is constructed.

b) Attempt any ONE of the following:**6**

- (i) State the main components of drip irrigation and describe the function of each.
- (ii) Design the section of an unlined channel from the following data.

$$Q = 50 \text{ m}^3/\text{sec}, V = 1.0 \text{ m/sec}$$

$$\frac{B}{D} = 6, N = 0.0225$$

$$\text{side slope} = 2:1$$

5. Attempt any TWO of the following:**16**

- a) Mention various investigation surveys required for reservoir planning and explain engineering survey in detail.
- b) Explain type of failure in earthen dam and its remedial measures.
- c) Draw cross section of canal in partial cutting and filling and name components.

6. Attempt any FOUR of the following:**16**

- a) State functions of silt ejector and draw its sketch.
 - b) Draw the labelled layout of diversion head work and mention function of each part of it.
 - c) Calculate balancing depth for a section of canal having the following data.
 $b = 10\text{m}$, $\text{FSD} = 1.5\text{m}$, $\text{Bank width} = 2\text{m}$,
side slope 1:1 in cutting and 1.5:1 in filling.
Free board = 0.5m.
 - d) Define lining, enlist different types of lining. Explain.
 - e) Classify various types of cross drainage work. Mention difference between aqueduct and siphon aqueduct.
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