P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)
Sixth Semester, B.E. - Civil Engineering
Semester End Examination; May/June - 2018
Irrigation Engineering

Time: 3 hrs   *Max. Marks: 100*

*Note: Answer **FIVE** full questions, selecting **ONE** full question from each unit.*

UNIT - I

1a.	Write about the necessity of irrigation in India.	5
b.	Critically discuss the quality standards required for irrigation water with relevant specification.	5
c.	Base period, intensity of irrigation and duty of various crops under a canal system are given below. Find the reservoir capacity, if the canal losses are 20% and reservoir losses are 12%.	10

Crop	Base periods (days)	Duty at the field (hectares/cumec)	Area under the crop(hectares)
Wheat	120	1800	4800
Sugar cane	360	800	5600
Cotton	200	1400	2400
Rice	120	900	3200
Vegetables	120	700	1400

2a.	With neat diagram, explain the component parts of the sprinkler irrigation system and discuss the advantages and disadvantages.	10
b.	Find the time required to irrigate a border strip of length 203 m and width 10 m by a stream of discharge 0.043 cumec. Average depth of flow is expected to be 63.5 mm and average infiltration rate for the soil may be taken as 50 mm/ hour. Also determine the maximum length of the strip which can be irrigated in this case.	10

UNIT - II

3 a.	Explain the difference in procedure between Kennedy's and Lacey's method of alluvial canal design with reference to the relevant formula.	10
b.	Design an irrigation canal to carry a discharge of 14 cumec , Assume n = 0.0225 , m = 1 , side slope 2H:1V and B/D = 5.7	10
4 a.	What do you understand by a fall in canal with support of sketch? Why it is necessary? How do you select its location?	6
b.	With the support of sketch, explain the difference between cross regulator and head regulator of canal.	6
c.	Design the size and number of notches required for a canal drop with the following particulars: Full supply discharge = 4 cumecs Bed width = 6.0 m F.S depth = 1.5 m Half supply depth = 1.0 m assume any other data (assume three notches for 1st trail, repeat with minimum three trails)	8

UNIT - III

5 a. With neat sketch, explain the graphical method to estimate;

   i) Storage capacity of a reservoir   8

   ii) Yield of a reservoir, using mass inflow curve and demand curve.

b. Write a note on geological investigation required in site selection for the reservoir planning.   4

c. A proposed reservoir has capacity of 500 ha.m. The catchment area is 125 km^2, and the annual stream flow average 12 cm of runoff. If the annual sediment production is 0.03 ha.m/km^2, what is the probable life of the reservoir before its capacity is reduced by 10% of its initial capacity by sedimentation? The relationship between trap efficiency η (%) and capacity inflow ration C/I is as given below.   8

C/I	0.01	0.02	0.04	0.06	0.08	0.1	0.2	0.3	0.5	0.7
η (%)	43	60	74	80	84	87	93	95	96	97

6 a. Write a note on the hydrological investigation in reservoir planning.   5

b. Write a note on: i) Capacity inflow ratio   ii) Trap Efficiency.   5

c. The yield of water in Mm^3 from a catchment area during each successive month starting from January is given in the table below (Read in rows). Estimate reservoir capacity for full utilization of water.   10

1.4	2.1	2.8	8.4	11.9	11.9
7.7	2.8	2.52	2.24	1.96	1.68

UNIT - IV

7 a. What is jump height curve and trail water curve? Explain the various types of energy dissipaters in the spillways.   10

b. A masonry gravity dam 10 m high is trapezoidal in section with a top width of 1 m and bottom width of 8.25 m. The face exposed to water has a batter of 1:10. Test the stability of the dam for full water up to top. Find out the principle stresses at the toe and heel of the dam without considering seismic load. Assume unit weight of masonry as 22.4 kN/m^2 and permissible shear stress of joint = 1400 kN/m^2 10

8 a. Explain the seismic load in design a gravity dam in both dam empty and full condition with support of relevant sketch and formula.   10

b. What are stilling basins? Explain IS-type-II stilling basin.   10

UNIT - V

9 a. Explain: i) procedure of analytical method of stability analysis.   10

b. Explain the procedure of locating the phreatic line in the earth dam when there is a horizontal filter bed at toe.   10

10 a. Explain the various causes of failure in the earthen dam with the support of sketch.   9

b. Differentiate between the tanks in series and isolated tanks.   6

c. How the earthen dams are classified explain any one?   5

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