E   E7130

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APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
FIFTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2017
Course Code: CE309
Course Name: WATER RESOURCES ENGINEERING (CE)

Max. Marks: 100   Duration: 3 Hours

PART A
Answer any two full questions, each carries 15 marks.   Marks

1 a) What are the various methods of computing average rainfall over a basin?   (7)
   b) The average annual rainfall depths recorded at 5 rain gauge stations are   (8)
       910,1070,1410,810 and 500mm respectively. If the average depth of rainfall over
       the basin is to be estimated within 10% error, determine the additional number of
       gauges needed.
2 a) State the uses and limitations of unit hydrograph.   (5)
   b) Ordinates of a 4hr unit hydrograph are given below. Derive the ordinates of a (10)
       12hr unit hydrograph.

Time (h)	0	4	8	12	16	20	24	28	32	36	40	44
Ordinates of 4hr UH (Cumec)	0	20	80	130	150	130	90	52	27	15	5	0

3 a) What are the factors that affect evaporation from a water body?   (5)
   b) What is Φ index?   (2)
   c) Explain the experimental method of determination of infiltration capacity using (8)
       double ring infiltrometer.

PART B
Answer any two full questions, each carries 15 marks.

4 a) Explain the various methods of surface irrigation.   (10)
   b) What are the objectives and classification of river training works?   (5)
5 a) What are the factors affecting duty?   (5)
   b) A water course has culturable command area of 2600 hectares out of which the   (10)
       intensities of irrigation for perennial sugar cane and rice crops are 20% and 40 %
       respectively .The duty for these crops at the head of the water course are 750
       hectares per cumec and 1800 hectares per cumec respectively. Find the discharge
       required at the head of water course if the peak demand is 120% of the average
       requirement.
6 a) Explain the stream flow measurement by area velocity method   (10)
   b) Define stage discharge curve.   (2)
   c) Define Flow and lift irrigation.   (3)

PART C
Answer any two full questions, each carries 20 marks.

7 a) The following information is available regarding the relationship between trap   (10)
efficiency and capacity inflow ratio for a river

Capacity in flow ratio	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
Trap efficiency	87	93	95	95.5	96	96.6	97	97.2	97.3	97.5

Find the probable life of the reservoir with an initial reservoir capacity of 30
million cubic meters if the annual flood inflow is 60 million cubic meters and the
average annual sediment inflow is 3600000KN. Assume a specific weight of
sediment equal to 12KN/m2. The useful life of the reservoir will terminate when
80% of initial capacity is filled with sediment

b) What is a flow duration curve?   (5)

c) What are the methods for the control of river sedimentation?   (5)

8 a) Derive an expression for the yield of an open well using Recuperation test.   (10)

b) With a neat sketch describe the vertical distribution of ground water.   (10)

9 a) Explain the method of calculating reservoir capacity for a specified yield from the   (10)
mass inflow curve.

b) The amounts of water flowing from a certain catchment area at the proposed dam   (10)
site are given in the following table. Determine the minimum capacity of the
reservoir if water is to be used to feed the turbines of the hydropower plant at a
uniform rate and no water is to be spilled over.

MONTH	INFLOW (x $10^3 m^3$)
JANUARY	2.83
FEBRUARY	4.25
MARCH	5.66
APRIL	18.40
MAY	22.64
JUNE	22.64
JULY	19.81
AUGUST	8.69
SEPTEMBER	7.10
OCTOBER	7.10
NOVEMBER	5.66
DECEMBER	5.66

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