in Drip Irrigation method. What are the advantages and disadvantages of Drip Irrigation?   10

h. Define 'Duty' and 'Delta' and derive their relationship. What are the factors on which duty depends?   10

OR

8. a. Name any two methods used for estimating consumptive use of water for a particular crop at a particular place. Explain in details.   10

b. Explain with neat sketch the layout of a modern canal system, carrying water from a barrage. Discuss as to how the duty of water increase as we move downstream from the head of the main canal towards the head of the water course.   10

9. a. What is meant by 'canal lining', and what are its advantages? Enumerate the different types of canal linings and discuss the design & construction features of concrete linings.   10

b. Design a regime channel for a discharge of 50 cumecs and silt factor 1.1, using Lacey's theory.   10

OR

10. a. What is meant by "falls" and where are they located? Discuss briefly the components of various types of falls with neat sketches. Also discuss the suitability of each type.   10

b. Explain the following :   10

    i)   Well loss

    ii) Specific capacity of well

    iii) Interference among wells

    iv) Measuring the yield of underground water sources.

Roll No ....

CE - 602
B.E. VI Semester
Examination, June 2013
Water Resources and Irrigation Engineering

Time : Three Hours

Maximum Marks : 100   *Minimum Pass Marks : 35*

Note: Attempt five questions. All questions carry equal marks. There is internal choice within each question. Answer should be precise and to the point only. Assume suitable data if necessary and state them clearly.

1. a) Explain the different types of precipitation with examples. Can we use Radar as an aid in the measurements of rainfall? How?

b) The mass curve of precipitation resoluted from the storm, gave the following values:

Hour min.	Accumulated depth at the end of pads in mm	
22.0	0.0	Beginning of storm
22.05	10.2	
22.10	20.8	
22.15	33.0	
22.20	47.2	
22.25	55.8	
22.30	64.0	

22.35	71.6
22.40	78.8
22.45	85.4
22.50	91.4 End of storm

From the above storm, draw maximum intensity duration curve.

10

OR

2. a) Mention the basic assumptions in the theory of unit hydrograph. Explain step by step the method of construction of unit hydrograph from a storm of unit duration. 10

b) The infiltration capacities of an area at different intervals of time are indicated below. Find an equation for the infiltration capacity in the exponential form. 10

Time in hrs.	Infiltration capacity in cm/hr
0	10.4
0.25	5.6
0.50	3.2
0.75	2.1
1.0	1.5
1.25	1.2
1.50	1.1
1.75	1.0
2.0	1.0

3. a. Enumerate the various methods which can be used for estimating design flood discharge from a certain catchment, and discuss one of these methods in details.
10

CE-602

b. A 30 cm well penetrating a confined againster is pumped at a rate of a 1200 lpm. The drawdown at an observation well at a radial distance of 30m is as follows:

Time from start (min)	Draw down (m)
1.0	0.2
2.5	0.5
5	0.8
10	1.2
20	1.8
50	2.5
100	3.0
200	3.7
500	4.4
1000	5.0

Calculate the againster parameters S and T. 10

OR

4. a) What is meant by artificial recharge of ground water? Describe the different methods which are used for this purpose. 10

b) Route the following flood through a river for which $K=20h$ and $X=0.25$. At the start of the inflow flood, outflow discharge is 40 m/s.

Time (h)	Inflow (m³/s)
0	40
12	65
24	165
36	250
48	240
60	205

PTO

72	170
84	130
96	115
108	85
120	70
132	60
144	54

Plot the inflow and outflow hydrographs and determine attenuation and peak lag. 10

5. a) Differentiate between total cost and the joint cost of a multipurpose project. Explain the important methods which can be used for dividing the joint cost, giving suitable example. 10

b) Canal water is to be supplied from an irrigation project to three distinct regions. The available annual water supply is 300 units of water. Table shows the net annual irrigation benefits in monetary units which would accrued to the three regions. Determine the annual water delivery to be made to each of the regions so as to maximise the annual profits. Also determine the maximum annual profit. 10

Annual water supplied (units of water)	Net annual irrigation benefits to regions (monetary units)		
	I	II	III
0	0	0	0
100	300	100	400
200	600	300	500
300	800	900	600

OR

6. a) Explain the concept of system illustrating with examples from water resources engineering system. 10

b) The data pertaining to a flood control project, likely to provide full safety against floods up to 50 yr. Frequency are as follows: 10

Cost of the project	= Rs. 6 lakhs
Salvage value	= Rs. Nil
Cost of project to be recovered	= Rs. 6 lakhs
Period of recovery	= 50 years
Interest rate	= 6.5% per annum
Maintenance charges	= 2% of capital cost

i) Work out the annual cost of the project.

ii) Also determine the annual benefits from the frequency damage data given in table.

iii) Finally work out the B.C. ratio of the project and comment on its viability from Indian planning point of view.

Flood frequency in yrs.	Annual Damages in rupees
0	0
5	25,000
10	40,000
15	45,000
30	61,000
40	71,000
70	75,000