Water Resources Engineering - I
(New) (1220)

P. Pages : 3

Time : Three Hours   **Max. Marks : 100**

Instructions to Candidates :
1. Do not write anything on question paper except Seat No.
2. Answer sheet should be written with blue ink only. Graph or diagram should be drawn with the same pen being used for writing paper or black HB pencil.
3. Students should note, no supplement will be provided.
4. Solve **any two** bits from each unit.
5. Assume suitable data if necessary.
6. Use of non programmable calculator is allowed.
7. Figures to the right indicates full marks.

UNIT – I

1. a) i) How will you determine missing precipitation data.   **5**

   ii) A Catchment has six rain gauge stations. In a year the annual rainfall recorded by the gauges are as follows :   **5**
   Station   A   B   C   D   E   F
   Rainfall (cm) 82.6   102.9   180.3   110.3   98.8   136.7
   for a 10% error in the estimation of the mean rainfall calculate optimum number of stations.

   b) i) Explain methods of estimating of mean rainfall.   **6**

   ii) Write a short note on Hydrologic cycle.   **4**

   c) Test the consistency of 22 years of data of annual precipitation measured at station A. Rainfall data for station A as well as average annual rainfall measured at group of eight neighbouring stations located in meteorologically homogeneous region are given below.   **10**

Year	1946	47	48	49	50	51	52	53	54	55	56
Station A	177	144	178	162	194	168	196	144	160	196	141
Group 8 Station	143	132	146	147	161	155	152	117	128	193	156
Year	57	58	59	60	61	62	63	64	65	66	67
Station A	158	145	132	95	148	142	140	130	137	130	163
Group 8 Station	164	155	143	115	135	163	135	143	130	146	161

In what year is a change in regime indicated.

UNIT – II

2. a) What are different techniques of stream flow measurements explain in detail. **10**

b) Ordinates of 4.h unit hydrograph are given below calculate the ordinate of 2 – h unit hydrograph for the same catchment. **10**

Time (h)	0	4	8	12	16	20	24	28	32	36	40	44
Ordinate of 4-h UH m^3/sec	0	20	80	130	150	130	90	52	27	15	5	0

c) Write short note on

   i) Synthetic unit hydrograph. **5**

   ii) Components of hydrograph. **5**

UNIT – III

3. a) i) A tube well of 30cm diameter penetrates fully in an artesian aquifer. The strainer length is 15m. Calculate the yield from the well under a drawdown of 3m. The aquifer consist of sand of effective size 0.2 mm having coefficient of permeability 50m/day. Radius of drawdown is 150m. **5**

   ii) How will you select suitable site for tubewell. **5**

b) i) During recuperation test the water in an open well was depressed by pumping by 2.5m and is recuperated 1.8m in 80 minutes. Find (a) yield from the well of 4m diameter under a depression head of 3m. (b) The diameter of well to yield 8 litres/sec under a depression head of 2m. **6**

   ii) Explain with fig. shallow well and deep well. **4**

c) Explain causes, effects and remidial measures of water logging. **10**

UNIT – IV

4. a) Explain various methods of controlling reservoir sedimentation. **10**

b) Explain in detail with layout drip irrigation. **10**

c) Define trap efficiency what are different factors affecting trap efficiency. **10**

UNIT – V

5. a) i)   What is role of soil moisture in growth of crops explain with fig   **6**

     ii)   What are advantages and disadvantages of irrigation.   **4**

  b) i)   Find the field capacity of a soil for the following data :   **6**
Root zone depth = 2m   Existing water content = 5%
Dry density of soil = $15KN/m^3$ water applied to the soil = $500m^3$
water loss due to evaporation and deep percolation = 10%
Area of plot = 1000 sq.m.

     ii)   Define outlet factor, Time factor.   **4**

  c)   The base period, intensity of irrigation and duty of various crops   **10**
under a canal system are given in the table below. Find the reservoir
capacity if canal losses are 20% and reservoir losses are 12%.

Crop	Base period days	Duty hectares/cumes	Area under crop hectares
Wheat	120	1800	4800
Sugar cane	360	800	5600
Cotton	200	1400	2400
Rice	120	900	3200
Vegetables	120	700	1400

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