COLLEGE OF ENGINEERING, PUNE

(An Autonomous Institute of Government of Maharashtra.)
SHIVAJI NAGAR, PUNE - 411 005

END Semester Examination

(CE(DE)-14005) Water Resources Planning and Management

Course: B.Tech Branch: Civil Engineering

Semester: Sem VII

Year: 2014-2015 Max.Marks:60

Duration: 3 Hours Time:- 2.00 pm to 5.00pm Date. 30 NOV 2014

Instructions: MIS No. | | | | | | | | | |

1. Figures to the right indicate the full marks.
2. Mobile phones and programmable calculators are strictly prohibited.
3. Writing anything on question paper is not allowed.
4. Exchange/Sharing of anything like stationery, calculator is not allowed.
5. Assume suitable data if necessary.
6. Write your MIS Number on Question Paper

Q.1 a) Carry out reservoir operation of an irrigation reservoir from the following data given in Table using standard operating policy (SOP). **08**

Month	River flow (Ha.m)	Precipitation (Ha.m)	Evaporation Losses (Ha.m)	Irrigation Demand (Ha.m)
1	140	30	160	490
2	1560	120	110	440
3	1880	160	120	410
4	1230	220	140	320
5	480	120	220	530
6	60	0	120	660
7	0	0	100	740
8	0	0	80	680
9	0	0	60	640
10	0	0	110	590
11	0	0	160	680
12	0	0	220	760

The live storage capacity of reservoir is 5860 Ha.m and initial live storage is 500 Ha.m.

b) From Table-2 given below, calculate the 75% dependable annual flow. Also calculate the annual firm yield of the river. **02**

Table 2 - River flow in m^3/s

Year	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962
River Flow	87.33	91.83	114.9	100.3	87.25	90.83	79.83	102.6	97.42	86.82	95.33	100.7

Q.2 a) Find out the reservoir capacity from the following data in Table 3 at Chandoli dam site for obtaining a dependable demand of $200Mm^3$ /month. **06**

Table 3 - River flows at Chandoli dam site

Month	J	J	A	S	O	N	D	J	F	M	A	M
River Flow (Mcum)	160	562	743	697	340	63	25	18	15	5	4	6

b) Briefly discuss the steps involved in planning an irrigation reservoir. **04**

Q.3 a)) The flow duration curve data at a run-of-river hydro plant site are given below: **06**
Qfirm = 10.0 cumecs, Q_{50} = 25 cumecs, head available = 20m, plant capacity =5 MW, efficiency = 0.85, maximum turbine discharge has an exceedence of 26%. Calculate firm energy, secondary energy, dump energy, peak energy and total energy. Take weekly period.

b) The weekly load curve data is given below: **04**
Peak load = 450 MW, Average load = 300 MW

% energy of system	% peak of system
10	30
30	50

At a hydroplant site, a firm flow of 210 cumecs with a constant head of 45m is available. Overall efficiency of plant = 0.80, calculate the hydroplant capacity, if the plant is placed (i) at the base of the load and (ii) at the peak of the load.

Q.4 a) In a lift irrigation project a choice is to be made between two pumps, with details given below. Which of these two pumps is economically superior at an interest rate of 8 percent? Use Present worth method and benefit-cost ratio method for comparing alternatives. **07**

Pump	Capital cost Rs	Annual Cost Rs	Annual Benefit Rs	Life Yr	Salvage value Rs
A	40000	6000	15000	10	6000
B	60000	5000	16000	15	8000

b) Calculate annual cost of a project given **03**
Initial capital cost = Rs. 30 million
Annual interest rate = 10 %
Annual discount rate of sinking fund =8%
Annual O&M cost = Rs. 0.09 million
Life of the project = 25years

Q.5 a) There are two crops to be grown on 200 hectare area (CCA).The other data is as given below: **06**

Crop	Gross return from crop (Rs. /tonne)	Crop Yield (tonnes/ha)	Cost (Rs. /ha)	Gross irrigation requirement (m)
1	4500	2.2	2500	0.7
2	3500	3.1	2000	0.4

Also
(i) total water available for irrigation diversion from a reservoir is 120 ha.m
(ii) crop 2 should occupy at least 60 hectare, and
(iii) Area of crop 1 should not exceed 85 hectare.
iv) Irrigable command area is 180 Ha.
Formulate and solve an LP model to maximize area under the crops.

b) State various methods of sediment distribution of a reservoir and explain any one in detail. **04**

Q.6 a) Write short notes on any **two** of the following: **08**
i) Inter-state river water disputes in India
ii) Techniques used in water resources systems analysis
iii) Inter basin river water transfers in India

b) Discuss various environmental consequences of water resources projects. **02**

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