[Total No. of Questions - 9] [Total No. of Printed Pages - 3] (2125)

15419

M. Tech 3rd Semester Examination

Water Power Engineering

WRE-118

Time : 3 Hours **Max. Marks : 100**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/continuation sheet will be issued.

Note : Attempt five questions in all, selecting one question from each section A, B, C & D. Section E is compulsory.

SECTION - A

1. Average monthly flow rates of a river corresponding to a dry year are given below:

MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Flow in m^3/sec	110	90	70	50	30	25	65	220	300	190	115	110

Estimate the minimum storage capacity required for power generation with a uniform discharge of 85 m^3/sec. (20)

2. (a) Discuss the various sources of energy with their relative advantages and disadvantages. (10)

(b) How the power potential of a stretch of a river is estimated? (10)

SECTION - B

3. Describe in detail various component parts and their functions in a diversion canal development. Discuss with the help of sketches the different arrangements with respect to the conveyance systems needed for various topographical conditions. (20)

[P.T.O.]

4. Explain the terms Load factor, Plant factor and Utilization factor. The load on a power plant uniformly varies from 10,000 kW to a maximum of 35,000 kW. Two generators of 22,000 kW each are installed. Calculate plant capacity, load factor and utilization factor. (20)

SECTION - C

5. Describe the different types of intake structures with the help of sketches clearly indicating component parts and explain their functions. (20)

6. Explain the different type of surge tanks along with their working. How does the surge tanks provide protection against water hammer pressure, in a penstock. (20)

SECTION - D

7. Discuss various criteria for selection of turbines. Describe working of Pelton Turbine and its parts. (20)

8. What do you understand by performance of turbines? Explain performances of reaction and impact turbines. (20)

SECTION - E

9. (a) If the discharge available is 20 m^3/sec and utilizable head is 25 meters the theoretical power available in kW will be

(i) 4900 (ii) 500,000

(iii) 500 (iv) 490

(b) Pondage is required for

(i) Pumped storage plants (ii) Storage plants

(iii) Runoff river plants (iv) None of the above

(c) In a power grid using hydro power and thermal power the thermal power plant would be operated at

(i) Peak loads (ii) Base loads

(iii) Intermediate loads (iv) Anywhere in the load curve

(d) When the Specific speed is between 10 to 30 and the head is 300m and above, which type of turbine is suitable

(i) Francis turbine (ii) Kaplan turbine

(iii) Pelton turbine (iv) Propeller turbine

(e) If the pressure wave travels at 1000m/sec. and length of penstock is 2500m, the critical time of pipe will be

(i) 2.5 sec. (ii) 5.0 sec.

(iii) 0.5 sec. (iv) None of these.

(4×5=20)