Dr Ragest Kyongv

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Roll No.

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National Institute of Technology, Hamirpur (HP)

End Semester Examination (May-2023) Name of the Examination: B.Tech. 8th Semester

Course Name

: Design of Hydro Power Station

Course Code

: EE-443

Time: 3 Hours

Maximum Marks: 50

Note:

- 1. All Questions are compulsory 2. Draw the relevant diagrams/figures
- 3. Assume data wherever required
- With the help of suitable sketches classify the hydro-electric power plant based on water flow regulation. (5)

Q1.

Explain the phenomenon of water hammer in the hydroelectric power station. State the procedure to overcome this problem. (5)

What is/are the criteria/s for selection of number of units and capacity of hydro power plant?

A power station supplies the load as tabulated below:

11			
Time (Hrs)	Load (MW)		
6 AM-8AM	1.2		
8 AM-9AM	2.0		
9 AM-12 Noon	3.0		
12 Noon-2 PM	1.50		
2 PM-6 PM	2.50		
6 PM-8 PM	1.80		
8 PM-9 PM	2.0		
9 PM-11 PM	1.0		
11 PM-5 AM	0.5		
5AM-6 AM	0.8		

a)

Q2.

(a)Plot the load curve and find out the load factor.

- (b)Determine the proper number and size of generating units to supply this load.
- (c) Find the reserve capacity of the plant and plant factor.
- (d) Find out the operating schedule of the generating units selected.

Compute the generation cost per kWh from the following data:

Installed capacity

=200 MW

Capital Cost

= Rs. 45000 per kW

Interest and depreciation

=12 %

b) Fuel Consumption

=0.6kg/kWh

Fuel Cost

= Rs. 1230 / 1000 kg

Other operating costs

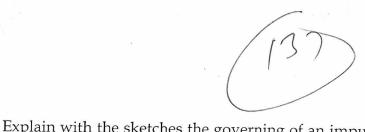
=30 % of fuel costs

Peak load

=170 MW

Load factor

=80%



Q3.	a) b)	detail the part played by floating fulcrum What is meant by cavitation? How it occurs in water turbines. How cavitation can be avoided.	(5)(5)
Q4.	a) b)	Explain the construction and various type of hydro generators with the help of suitable diagrams. What are the condition for parallel operation of alternators in hydro power plant? Explain the load sharing take place between two alternators operated in parallel.	(5) (5)
Q5.		Write Short note on I. Hydro Power Plant Stability II. Various switchyard equipment and their applications III. Generator protection against rotor faults	(10)