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OLE-24515

B. Tech. 7th Semester (Civil) Examination – April, 2021

HYDROPOWER ENGINEERING

Paper: CE-451-F

Time: Three Hours] [Maximum Marks: 100

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note: Attempt five questions in all, selecting one question from each Section. Question No. 1 is compulsory.All questions carry equal marks.

- **1.** Attempt the following questions : $4 \times 5 = 20$
 - (a) Define the terms load curve and load duration curve.
 - (b) Explain the advantages of hydropower over Thermal Power.

(c)	Explain the economical diameter of penstock.	
(d)	Write a short note on underground power houses.	
(e)	Differentiate between the term storage and pondage related to hydro power station.	
SECTION - A		
2. (a)	What do you mean by renewable resources ? Explain the different resources available. 10	
(b)	Why the future demand of load is necessary to	
	determine? 10	
3. (a)	Explain the following terms: 10	
	(i) Load factor	
	(ii) Capacity factor	
	(iii) Utilization factor	
	How are these related to each other?	
(b)	Explain the following terms: 10	
	(i) Firm power	
	(ii) Secondary power	
	(iii) Prediction of Loads in hydro power station	
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SECTION - B

- **4.** (a) Write a short note on pump storage plant. What are the advantages of a pump storage plant for short peak load duration?
 - (b) Describe the general layout of runoff river plant with the help of neat sketch.
- 5. (a) What are the different types of pump storage plant? Describe reversible turbines and Cavitation in turbine.
 - (b) Explain the basic features of hydropower plants,also explain efficiency of pump storage plant. 10

SECTION - C

- 6. What do you mean by water hammer effect? Write the expression for water hammer pressure for rigid and Elastic pipe.20
- 7. (a) Briefly explain the different types of values used in penstock arrangements.

(b) Describe the terms design criteria of penstock anchor blocks.

SECTION - D

- **8.** (a) What do you mean by cavitation? What is Cavitation factor and discuss its significance of water turbines?
 - (b) Define the term specific speed of a water turbine. What information does it give and how it is made used in practice? Indicate how the form of a reaction turbine depends upon specific speed? 10
- 9. (a) Sketch of typical power house and describe the functions of all components briefly.10
 - (b) Write a short note on ventilation in power house.

10