

B. Tech. 7th Semester (Civil Engineering) XI

Examination December-2013

HYDROPOWER ENGG.

Paper-CE-451-F

Time allowed : 3 hours]

[Maximum marks : 100

Note : Attempt five questions in all. Q.No. 1 is compulsory.

Attempt one question from each section. Each question carries equal marks (20 marks).

1. (a) Compare hydro & thermal power plants.
- (b) Where are pumped storage tanks used?
- (c) What are functions of a draft tube?
- (d) How cavitation can be avoided/checked?
- (e) Differentiate between firm & secondary power.
- (f) On what factors selection of turbines depend?
- (g) What is divided fall development?
- (h) What forces should be kept in mind while designing penstock?
- (i) What is unit discharge?
- (j) Name the principle types of power plants.

2x10=20

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[P.T.O.]

**Section-A**

2. (a) What are the advantages & disadvantages of the hydropower plant? 10
- (b) Enumerate various sources of energy. 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) What is Load curve ? Explain with sketch? Discuss its use? 10

**Section-B**

4. (a) Classify hydropower stations. Describe all of them in brief with sketches where necessary. 10
- (b) With the help of neat sketch discuss general layout of run-of-river. 10
5. (a) What are pumped storage plants? 10
- (b) Differentiate between storage & pondage. Support your answer with a neat sketch. 10

**Section-C**

6. (a) What are various types of penstocks? Explain each. 10
- (b) What is surge shaft ? Discuss its design criteria. 10

7. Write short note on :

- (i) Anchor blocks
- (ii) Water hammer
- (iii) Types of valves
- (iv) Classification of surge shaft

4x5=20

**Section-D**

8. (a) What is meant by cavitation? What is Thoma's cavitation factor & discuss its significance for water turbines. 10
- (b) What do you mean by specific speed of a water turbine? What information does it give and how it is made use in practice? Indicate how the form of a reaction turbine depends upon specific speed. 10
9. (a) Draw a neat sketch of a powerhouse and describe the main features of sub structure and super structure. 10
- (b) Describe the advantages and disadvantages of underground powerhouses. 10