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**B.Tech. 7th Semester (F) Scheme (Civil)**

**Examination, December-2018**

**HYDRO POWER ENGINEERING**

**Paper- CE-451-F**

*Time allowed : 3 hours]*

*[Maximum marks : 100*

*Note: Question No. 1 is compulsory and attempt one question from each of the four sections. All questions carry equal marks.*

1. (i) What do you mean by plant factor?  $10 \times 2 = 20$
- (ii) Write the principle types of power plants.
- (iii) Distinguish between Load factor and plant factor.
- (iv) Explain term pondage.
- (v) Define specific speed.
- (vi) For what purpose relief valve is provided?
- (vii) What is unit discharge?
- (viii) What is conventional source of energy?
- (ix) What are advantages of pumped storage plants?
- (x) Describe the types of turbines.

**Section-A**

2. (a) What do you mean by water power? Compare the thermal power with water power. 10
- (b) What is the necessity to determine future demand of load? Explain in detail. 10

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3. (a) The load on a hydal plant varies from a minimum of 10,000 kw to a maximum of 35,000 KW. Two turbo generators of capacities 22000 KW each have been installed. Calculate- 10
- (i) Total installed capacity of the plant
  - (ii) Plant factor
  - (iii) Maximum demand
  - (iv) Load factor
  - (v) Utilisation factor.
- (b) What is Load duration curve? Explain with sketch. Discuss its use. 10

**Section-B**

4. (a) What is a pumped storage plant? Explain the advantage of a pumped storage plant for short peak load duration. 10
- (b) What is difference between storage and pondage? 10
5. (a) For rigid and elastic pipe, derive the expression for water hammer pressure. 10
- (b) Explain the penstocks and their classification. Also describe the design criteria of penstock. 10

**Section-C**

6. (a) What do you mean by "Run off river plants"? Describe the general layout of run off river plants. 15

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- (b) Describe reversible turbines. 5
7. Describe Surge tank and its types. What are the functions of Surge shafts? 20

**Section-D**

8. (a) What are different types of turbines? Discuss the general criterion for the selection of turbine. 10
- (b) Explain the design theory of draft tube. 10
9. (a) Draw the neat sketch of a power house and describe the main feature of the sub structure and super structure. 20
- (b) Explain different types of power houses. Also describe the function of different components briefly.