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- (b) What are the advantages and disadvantages of underground power house ? Explain in detail. 10
9. (a) What are the different types of houses ? Describe the layout of powerhouse. 10
- (b) Derive a relation between LF, PF, and UF. Differentiate between base pp load and peak pp load. 10

Roll No.

24515

B. Tech 7th Sem. (Civil Engineering)

Examination – June, 2016

HYDROPOWER ENGG.

Paper : CE-451-F

Time : Three Hours]

[Maximum Marks : 100

Before answering the question, 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 : Question Number 1 is *compulsory*. Attempt *one* question from each Section. All questions carry equal marks. Attempt *five* questions in all. Assume missing data, if any, suitably.

1. (a) What do you mean by firm power and secondary power ?
- (b) Describe basic features of hydropower plants.
- (c) Explain the purposes of draft tube in the turbines.
- (d) What are the inherent advantages of water power ?
- (e) Briefly describe the role of hydro-power in power system. $5 \times 4 = 20$

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SECTION - A

2. (a) What do you mean by load on hydro-power stations ? Explain the load duration curve with the help of graph. Also mention its significance. 10
- (b) The load on a hydel plant varies from 8000 KW to a maximum of 36000KW. The two turbo generators are installed, each having the capacity of 20000 KW. Calculate the following : 10
- (i) Load factor
 - (ii) Capacity factor
 - (iii) Utilization factor
 - (iv) Plant factor
 - (v) Maximum demand
3. (a) Describe the merits and demerits of Hydro-power w.r.t. other sources of power. 10
- (b) Explain the load duration curve with diagram. What are the uses of load duration curve ? 10

SECTION - B

4. (a) The runoff river hydropower plant has inflow of 30 cumecs and it works on head of 50 m with a provision for pondage to meet daily demand with load factor of 75%. Determine the power generation capacity of plant at 85% overall efficiency. What amount of pondage is needed if

the plant operates at the peak station for six hours ? 10

- (b) What do you mean by "run of river plants" ? Describe the general layout of run of river plants. 10
5. (a) What are the different types of pump storage plants ? Describe reversible turbines and cavitations in turbines. 10
- (b) Differentiate between thermal power and hydropower. Explain the methods for prediction of loads. 10

SECTION - C

6. Describe the following : 20
- (i) Anchor blocks
 - (ii) Types of valves
 - (iii) Water hammer
 - (iv) Classification of penstocks
7. (a) Describe surge shafts and its types. Briefly explain the design of surge shaft. 10
- (b) What do you mean by penstock ? Describe the design criteria of penstocks. 10

SECTION - D

8. (a) What are the different types of turbines ? Describe the general criterion for the selection of turbine. 10