Roll No. .....

24515

B.Tech. 7th Sem.
(Civil Engineering) Examination–
May, 2013

HYDROPOWER ENGG.

Paper CE-451-F

Time : 3 hours ***Max. 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 the examination.

Note : Attempt any **five** questions. **Question No. 1 is compulsory** and balance **one** question from each Section. All questions carry equal marks. Assume any missing data, if necessary.

1. (a) What should be the planning strategy in arriving at a proper generation-mix ? 4

(b) What are the inherent advantages of Water Power ? 4

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(c) What are the methods of load forecasting ? 4

(d) What is the purpose of draft tube in a turbine ? 4

(e) Distinguish between base load PP and Peak load PP. 4

SECTION - A

2. The load on a hydel plant varies from a minimum of 10000 kw to a maximum of 25000 kw. Two turbo-generators of capacities of 20000 kw each have been installed. Calculate : 20

(i) Total installed capacity of plant.

(ii) Plant factor.

(iii) Maximum demand.

(iv) Load factor.

(v) Utilization factor.

3. (a) Why is it necessary to predict future demand of load ? 10

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(b) Discuss the relative merits and demerits of Hydro-Power as compared to other power sources. 10

SECTION - B

4. What do you understand by run-of-river plants ? What are the parts and arrangements made of such plants ? Draw a neat sketch of such a plant. 20

5. (a) A 500 MW reversible Pump-Turbine has to work under a head of 400 m. Choose relevant specific speed and running speed of the Turbine. 15

(b) Elucidate the main problems of operation of Turbine in a Power House. 5

SECTION - C

6. (a) What do you understand by Water Hammer in pipeline ? Derive the expression for the Water Hammer pressure in case of a rigid pipe and in case of an elastic pipe. 12

(b) What are the function of Surge Tanks ? Explain with neat sketches. 8

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7. (a) What is meant by economical diameter of a Penstock ? How can it be found out ? 10

(b) How can the penstocks be strengthened to take care of the higher pressure ? 10

SECTION - D

8. Two Turbo Generators, each of 20,000 MW capacity have been installed in a Hydro Power station. The load varies from 15000 to 35000 kw in a set period. Calculate : 20

(i) Total Installed Capacity

(ii) Utilization factor

(iii) Load factor

(iv) Plant factor

9. (a) Derive a relation between LF, PF, UF. Distinguish between base PP load and Peak PP load. 10

(b) What are the broad categories of layout and parts of generation system of Power Plants. 10

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