

**SECTION – D**

7. What is draft tube ? What are the functions of draft tube ? Explain different types with figures and draft tube theory. 20
8. (a) What are the main considerations for deciding between a surface power house and an underground option ? 12
- (b) State any *four* power plant equipments and their functions. 08

Roll No. ....

**24515**

**B. Tech. 7th Semester (Civil Engg.)**

**Examination – December, 2016**

**HYDROPOWER ENGG.**

**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 total at least *one* question from each Section. All questions carry equal marks.

**SECTION – A**

1. (a) What are different sources of energy ? Differentiate between renewable and non-renewable energy sources with their advantages and disadvantages. 12

- (b) Explain various guidelines of planning for hydropower development in detail. 08
2. (a) Calculate the active power and reactive power for AC system where a 2200 kVA transformer supplies power at a power factor of 0.78. How much reactive power will be required for the same apparent power if the power factor is increased to 0.98 ? How much additional real power in the latter case could be supplied ? 10
- (b) How are load factor, capacity factor and utilization factor interrelated ? What is significance of diversity factor ? 10

### SECTION - B

3. (a) What are different methods of classifying hydro-electric power plants ? 12
- (b) Define valley dam power plants. 08
4. (a) Explain the basic features of a pumped storage plants and enumerate its advantages. 8

- (b) What do you mean by one, two, three and four unit arrangements in PS project ? How do you compare the advantages of two and three unit arrangements ? 12

### SECTION - C

5. (a) How can the penstocks be strengthened to take care of higher pressures ? How can the thickness of the penstocks be calculated for a particular design pressure ? 10
- (b) Write short notes on : 5 + 5
- (i) Governing of turbines
- (ii) Water hammer in turbines
6. (a) What is the function of anchor blocks ? What are the forces which should be taken into account in their stability analysis ? 10
- (b) What is the significance of surge tank and state its advantages ? 10