

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E Sem-III Regular Examination January 2011

Subject code: 732103

Subject Name: Economics and Management of Thermal Systems

Date: 10 /01 /2011

Time: 02.30 pm – 05.00 pm

Instructions:

Total Marks: 70

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Why non conventional sources are considered as future major power resources to face power crisis in the world? Which of them are more prominent? **07**
- (b) Explain role of fuels in the power plant economics? **07**

- Q.2** (a) What different load curves are considered in designing a power plant? What is the effect of its nature on the working of power plant? **07**
- (b) Define the plant use factor and plant capacity factor and state their uses in the design operation of power plant. **07**

OR

- (b) Following data for a thermal power plant of 500 MW capacity. Capacity factor : 0.45, Annual load factor : 0.6, Cost of fuel used per year : Rs. 1000×10^6 , Capital cost of the plant Rs. 10000×10^6 , annual interest and depreciation : 15% , Calculate (i) Minimum reserve capacity of the station (ii) the cost per kW- hour generated ? **07**

- Q.3** (a) What do you understand by peak load plant? What is the basic requirement of a peak load plant? **07**
- (b) Discuss the advantages and disadvantages of pump storage plant as peak load plant. **07**

OR

- Q.3** (a) Draw neat diagram showing all the components of compressed air storage plant which is used as peak load plant and explain its all mode of operation. **07**
- (b) What are the different arrangements of the components of thermal power plant when used as peak load plant? List out specific features of each. **07**

- Q.4** (a) What is meant by power plant economics? What are the fixed and operating cost? **07**
- (b) Explain different tariff method for electrical energy. **07**

OR

- Q.4** (a) Explain about selection of generating equipments. **07**
- (b) A new industry requires a maximum demand of 800 kW at 30 % load factor the following two power suppliers are available (a) Public supply charges Rs. 500 per kW of maximum load and 40 paisa per kWh. The capital cost is Rs. 8×10^5 and interest and depreciation charge on capital are 10%. (b) A private oil engine station requires Rs. 3×10^6 capital. Interest and depreciation charge on capital are 12%, the maintenance and labour charges are 10 paisa per kWh energy generated. The fuel consumption is 0.35 kg per kWh and cost of fuel is 80 paisa per kg. Find which supply will be more economical. **07**

- Q.5** (a) What are the advantages of combined operation of power plant in electric power system? **07**
- (b) Discuss basic factors for combined hydro and thermal power station. **07**

OR

- Q.5** (a) Explain the method of determining the distribution of the given load among the two plants for most economic generation. **07**
- (b) The estimated cost of two power station I and II running parallel are Rs. $(2500 \text{ kW} + 0.550 \text{ kWh})$ and $(\text{Rs. } 2400 \text{ kW} + 0.6 \text{ kWh})$ respectively and supply to a system whose maximum load is 100 MW and minimum load is 10MW during the year. The load varies as a straight line. Find for minimum cost of generation (i) Installed capacity of each station (ii) The annual load, capacity and capacity use factor of each station (iii) the average cost of production per kWh for entire system. Assume reserve capacity of II is 20 % **07**
