

<b>7E7132</b>	Roll No. <u>60</u>	Total No of Pages: <b>3</b>
	<b>7E7132</b> <b>B. Tech. VII Sem. (Main/Back) Exam., Nov.-Dec. 2017</b> <b>Electrical Engineering</b> <b>7EE6.3A Economic Operation of Power Systems</b>	

Time: 3 Hours

Maximum Marks: 80  
Min. Passing Marks: 26

Instructions to Candidates:

Attempt any **five** questions, selecting **one** question from each unit. All questions carry **equal** marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.  
(Mentioned in form No. 205)

1. NIL

2. NIL

### UNIT-I

- Q.1 (a) What is depreciation reserve? Discuss the methods to calculate depreciation charges. [8]
- (b) Describe how the cost of unit energy generated by a generating unit is estimated. [8]

OR

- Q.1 (a) Explain the components which constitute the fixed and operating cost of power plant. [8]
- (b) Determine the generation cost per unit of energy from the following plant data-
- Installed capacity = 120 MW  
Capital cost of plant = ₹ 40,000 per kW  
Interest & depreciation = 15%  
Fuel consumption = 0.64 kg/kWh  
Peak load = 100 MW  
Load factor = 60%  
Salaries, wages, repairs & other operating costs per annum = ₹ 5,00,00,000 [8]

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UNIT-II

- Q.2 (a) How is the sequence of adding units in thermal power plant decided? [8]  
 (b) Discuss input – output curve, heat rate & incremental cost. [8]

OR

- Q.2 (a) Explain the “Economic Scheduling” Considering transmission losses. [8]  
 (b) Two generating units of thermal station have cost characteristics as under-  
 $C_1 = 561 + 7.92 P_1 + 0.001562 P_1^2$  ₹/hr  
 $C_2 = 310 + 7.85 P_2 + 0.00194 P_2^2$  ₹/hr  
 Obtain the cost characteristic of the composite unit for a total demand  $P_T$ . [8]

UNIT-III

- Q.3 (a) What are the advantages of pump storage plant as peak load plant in an interconnected system? [8]  
 (b) Explain plant requirements for base load and peak load operation. [8]

OR

- Q.3 (a) Explain the advantages of operating a hydro and thermal plant in coordination. [8]  
 (b) A two plant system is having a steam plant near load centre and a hydro plant at a remote location. The load is 700 MW for 14hrs a day and 500 MW for 10hrs a day. The characteristics of units are-

Loss coefficient,  $B_{22} = .0005$

$$C_1 = (24 + 0.02P_1) P_1 \text{ ₹/hr}$$

$$W_2 = (6 + .0025 P_2) P_2 \text{ m}^3/\text{sec.}$$

Find the generation schedule, daily water used by hydro plant and daily operating cost of thermal plant for  $Y_2 = 2.5$  ₹/hour/m<sup>3</sup>/ sec. [8]

**UNIT-IV**

- Q.4 (a) What is synchronizing power? How does it help in keeping the machines in step? [8]
- (b) Discuss the effect of change in excitation of one of the machines when two alternators are running in parallel. [8]

**OR**

- Q.4 (a) Describe briefly control of active and reactive power. [8]
- (b) Discuss the conditions necessary for parallel operation of alternators. [8]

**UNIT-V**

- Q.5 (a) Explain the different methods of minimum cost analysis and discuss about its applications, merits and demerits also. [8]
- (b) Explain the basic concepts of physical & financial efficiencies of electrical goods and services. [8]

**OR**

- Q.5 (a) Write short notes on the following- [10]
- (i) Linear & non – linear break even
- (ii) Break even and minimum cost analysis
- (b) Explain supply and demand relationship. [6]