

**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**  
(AUTONOMOUS)  
**B.Tech III Year II Semester Regular Examinations August-2023**

**POWER SYSTEM OPERATION AND CONTROL**

(Electrical & Electronics Engineering)

**Time: 3 Hours**

**Max. Marks: 60**

(Answer all Five Units 5 x 12 = 60 Marks)

**UNIT-I**

- 1 a Define objective function and briefly explain about an incremental fuel cost of thermal power station. **CO1 L2 6M**  
b Briefly explain about Input-output characteristics, Heat rate curve and Cost curve of thermal power station. **CO1 L2 6M**

OR

- 2 Derive the expression for general transmission loss formula in Optimal operation of Thermal Power Station. **CO1 L3 12M**

**UNIT-II**

- 3 a Briefly explain about short term problem in hydrothermal scheduling. **CO2 L2 6M**  
b Briefly explain about long term problem in hydrothermal scheduling. **CO2 L2 6M**

OR

- 4 A two-plant system having a steam plant near the load center and a hydroplant at a remote location is shown in Fig. The load is 500 MW for 16 hr a day and 350MW, for 8 hr a day.

The characteristics of the units are  $C_1 = 120 + 45 P_{GT} + 0.075 P_{GT}^2$ :

$W_2 = 0.6 P_{GH} + 0.00283 P_{GH}^2$  m<sup>3</sup>/s. Loss coefficient,  $B_{22} = 0.001 \text{ MW}^{-1}$

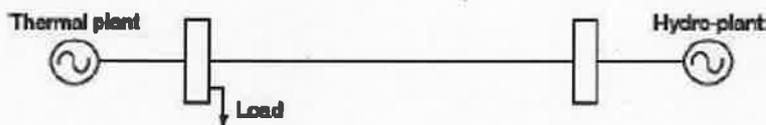


FIG. A typical two-plant hydro-thermal system

Find the generation schedule, daily water used by the hydro-plant, and daily operating cost of the thermal plant for  $\gamma_j = 85.5 \text{ Rs./m}^3\text{-hr}$ .

**UNIT-III**

- 5 Derive the mathematical modeling of speed governing system. **CO3 L3 12M**

OR

- 6 Two generating stations A and B have full load capacities of 200MW and 75MW respectively. The inter connector connecting the two stations has an induction motor /synchronous generator (plant (C) of full load capacity 25MW near station. A percentage changes of speed of A,B and C are 5 ,4 and 3 respectively. The loads on bus bars A and B are 75MW and 30MW respectively. Determine the load taken by the set C and indicate the direction of power flow

**UNIT-IV**

- 7 Draw the block diagram representation of a single area system and deduce the expression for the steady state response of the system. **CO4 L1 12M**

**OR**

- 8 Explain about of tie-line bias control with neat sketch **CO4 L2 12M**

**UNIT-V**

- 9 a Describe about the series compensation in transmission line. **CO5 L2 6M**

- b A short transmission line has an impedance of  $(2+j3)$  ohms interconnects two power stations, A and B both operating at 11 KV, equal in magnitude and phase. To transfer 25 MW at 0.8 p.f. lagging from A to B determine the voltage boost required at plant A. **CO5 L3 6M**

**OR**

- 10 a Explain the limitations of series compensation. **CO5 L2 6M**

- b What is surge impedance loading and also derive the necessary equations. **CO5 L1 6M**

**\*\*\* END \*\*\***