Reg. No:

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY   PUTTUR
(AUTONOMOUS)
B.Tech IV Year I Semester Regular & Supplementary Examinations Feb-2021
POWER SYSTEM OPERATION AND CONTROL
(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 60

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

UNIT-I

1 a Explain about penalty factor.   4M

   b A power plant has 3 units with the following characteristics, $F1=0.05P1^2 + 21.5P1 + 800$ Rs/hr , $F2=0.10P2^2+27.0P2+500$Rs/hr, $F3=0.07P3^2+16.0P3+900$Rs/hr. Pmax=120MW and Pmin=39MW. Find the optimum scheduling and the total cost per hour for a total load of 200MW   8M

OR

2 a Explain about optimum generation allocation with line loss neglected.   10M

   b Define objective function.   2M

UNIT-II

3 a With neat figure explain the classification of hydro power plant.   8M

   b What is the necessity of connecting two different plants on same load   4M

OR

4 a Briefly explain about short term problem in hydrothermal scheduling.   8M

   b Explain about conventional plants in detail   4M

UNIT-III

5 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.   12M

OR

6 a Explain about first order turbine model.   7M

   b Sketch the schematic diagram of speed governor system.   5M

UNIT-IV

7   a   Discuss in detail the importance of load frequency control   6M

    b   Derive the expression for dynamic response of isolated power system under uncontrolled   6M
case

OR

8   a   Explain the multi control area systems.   6M

    b   Two generating units having the capacities 600 and 900MW operating at a 50Hz supply.   6M
The system load increases by 150MW when both the generating units are operating at
about half of their capacity which results in the frequency falling by 0.5Hz. If the
generating units are to share the increased load in proportion to their ratings. What should
be the individual speed regulations? What should the regulation to be expressed in PU Hz/
PU MW.

UNIT-V

9   a   List the types of reactive power compensation. Briefly describe about load   6M
power compensation with necessary equations.

    b   What is surge impedance loading and also derive the necessary equations   6M

OR

10   a   Distinguish shunt and series compensations.   6M

    b   (i)What are the sources of reactive power? How it is controlled?   6M

       (ii) What are the effects capacitors in series compensation circuit?

       (iii) Mention the purpose of series compensation.

       (iv) Write about synchronous condenser.

       (v) Define the voltage regulation.

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