R18 Regulation *Subject code:2P7BA*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

B.TechVII Semester Supplementary Examinations, July 2022

POWER SYSTEM OPERATION AND CONTROL

(ELECTRICAL AND ELECTRONICS ENGINEERING)

Maximum Marks: 70 Date:02.07.2022 Duration: 3 hours

Note: **1.This question paper contains two parts A and B.**
2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks **(10x2M=20 Marks)**

1 Define incremental fuel cost and production cost.
2 Draw heat curve and explain its significance.
3 Compare short term and long term hydro-thermal scheduling.
4 What are Fundamental Characteristics of an Excitation system?
5 What is meant by a control area and control area error?
6 What is the need of integral controller in LFC system?
7 What is the need of reactive power compensation in transmission systems?
8 Write the advantages and disadvantages of compensation in transmission system.
9 What is the need of computer control of power systems?
10 Define state estimation?

Part-B

Answer All the following questions. **(10MX 5=50Marks)**

11 A. Derive the equation for optimal load sharing among n units in a power system by neglecting transmission losses. [5M]

B. A power system consists of two 200MW units whose input cost data are represented by the equations: $C_1 = 0.03P_1^2 + 21P_1 + 750$ Rs/hour, $C_2 = 0.5P_2^2 + 18P_2 + 980$ Rs/hour. If the total received power $P_R = 350$ MW, determine the load division between the units for the most economic operation. [5M]

OR

12 A. Derive general transmission line loss formula and state assumptions made in calculating B- coefficients. [5M]

B. Draw the flow chart for obtaining optimal scheduling of generating units by neglecting the transmission losses. [5M]

13 A. Derive the coordination equation for the optimal scheduling of hydrothermal interconnected power plants? [5M]

B. Explain First order Turbine model? [5M]

OR

14 A. Explain Mathematical Modeling of Speed Governing System? [5M]

B. Explain types of hydrothermal scheduling problems? [5M]

15 A. Explain proportional plus integral load frequency control of a single area system with a neat block diagram. [5M]

B. Explain why it is necessary to maintain the frequency of the system constant.[5M]

OR

16 A. Discuss the importance of combined load frequency control and economic dispatch control with a neat block diagram. [5M]

B. Two generators of rating 125MW and 250MW are operated with a droop characteristics of 4% and 5% respectively from no load to full load. Find the load sharing by each generator if a load of 300MW is connected across the parallel combination of those generators. [5M]

17 A. Briefly explain the different methods of reactive power injection in the power System. [5M]

B. What is importance of load compensation? What are the Specifications of load compensation equipment? [5M]

OR

18 A. Compare series, shunt compensations with their advantages and disadvantages. [5M]

B. What is load compensation? Discuss its objectives in power system. [5M]

19 A. Explain the concept of energy control center and give its functions. [5M]

B. Why is SCADA necessary? How is it done? [5M]

OR

20 A. Explain about EMS? [5M]

B. Explain state transition diagram showing various state transitions and control strategies. [5M]