



R18 Regulation

Subject code:2P7BA

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VII Semester Supplementary Examinations, November 2023

POWER SYSTEM OPERATING AND CONTROL

(EEE)

Maximum Marks: 70

Date:11.12.2023 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	What is an incremental fuel cost and what are its units?		L1
2	Define the incremental efficiency.		L1
3	What is minimum down-time?		L1
4	What is spinning reserve?		L1
5	What is the Unit of R?		L1
6	What is the need of a fly-ball speed governor?		L1
7	Define the need of compensation		L1
8	Define the voltage regulation		L1
9	What are the components in SCADA?		L1
10	Define SCADA system?		L1

Part-B

Answer All the following questions.		(5X10M=50Marks)	
11	Obtain the condition for optimum operation of a power system with 'n' plants. [10]		L3
OR			
12	Three power plants of a total capacity of 500 MW are scheduled for operation to supply a total system load of 350 MW. Find the optimum load scheduling if the plants have the following incremental cost characteristics and the generator constraints: [10] $\frac{dC_1}{dP_{G_1}} = 40 + 0.25P_{G_1}, \quad 30 \leq P_{G_1} \leq 150$ $\frac{dC_2}{dP_{G_2}} = 50 + 0.30P_{G_2}, \quad 40 \leq P_{G_2} \leq 125$ $\frac{dC_3}{dP_{G_3}} = 20 + 0.20P_{G_3}, \quad 50 \leq P_{G_3} \leq 225$		L3
13	Using the DP method, how do you find the most economical combination of the units to meet a particular load demand? [10]		L3
OR			
14	Explain the different constraints considered in solving a Unit Commitment problem. [10]		L2

15	Explain clearly about proportional plus integral LFC with a block diagram. [10]	L2
	OR	
16	A single-area system has the following data: Speed regulation, $R = 4$ Hz/p.u. MW Damping coefficient, $B = 0.1$ p.u. MW/Hz Power system time constant, $T = 10$ s Power system gain, $K = 75$ Hz/p.u. MW. When a 2% load change occurs under uncontrolled case, determine the AFRC and the static frequency error. What is the value of the steady-state frequency error if the governor is blocked? [10]	L3
17	Explain the voltage regulation with and without compensators. [10]	L2
	OR	
18	Describe 'off-load' and 'on-load' tap-changing transformers. [10]	L4
19	Briefly discuss the various functions of energy control centre. [10]	L2
	OR	
20	What is EMS? What are its major functions in power system operation and control? [10]	L2