R18 Regulation *Subject code:2P7BA*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VII Semester Supplementary Examinations, December 2024

POWER SYSTEM OPERATION AND CONTROL
(EEE)

Maximum Marks: 70 Date:10.01.2025 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)		CO	Bloom Tx
1	What is an incremental fuel cost and what are its units?	1	L1
2	Define the incremental efficiency	1	L1
3	What is spinning reserve?	2	L1
4	What is the thermal constraint minimum up-time?	2	L1
5	What are the basic components of an integral controller	3	L1
6	The Area of frequency response characteristic 'β' is:	3	L1
7	What are the different methods of voltage control?	4	L1
8	What are the disadvantages of tap-changing transformers?	4	L1
9	What is EMS? What are the major functions of it?	5	L1
10	Define SCADA system?	5	L1
	Part-B		
Answer All the following questions. (5X10M=50Marks)		CO	Bloom Tx
11	Obtain the condition for optimum operation of a power system with 'n' plants. [10M]	1	L2
	OR		
12	A constant load of 400 MW is supplied by two 210-MW generators 1 and 2, for which the fuel cost characteristics are given as below: [10M] $C = 0.05\ P_{G1}^2 + 20\ P_{G1} + 30.0$ Rs./hr $C = 0.06\ P^2_{G2} + 15\ P_{G2} + 40.0$ Rs./hr The real-power generations of units P_{G1} and P_{G2} are in MW. Determine: (i) the most economical load sharing between the generators. (ii) The saving in Rs./day thereby obtained compared to the equal load sharing between two generators	1	L2
13	Derive the condition for optimality of short-term hydro-thermal scheduling problem. [10M]	2	L2

	OR		
14	A two-plant system having a steam plant near the load center and a hydro-plant at a remote location is shown in Fig. The load is 500 MW for 16 hr a day and 350–MW, for 8 hr a day. The characteristics of the units are $C_1 = 120 + 45\,P_{GT} + 0.075\,P^2_{GT}$ $w_2 = 0.6\,P_{GH} + 0.00283\,P_{2GH}\ \mathrm{m^3/s}$ Loss coefficient, $B_{22} = 0.001\ \mathrm{MW^{-1}}$ Find the generation schedule, daily water used by the hydro-plant, and daily operating cost of the thermal plant for γ_1 = 85.5 Rs./m^3 -hr. [10M]	2	L2
15	Develop the block diagram of the LFC of a single-area system. [10M]	3	L2
	OR		
16	Explain the necessities of keeping frequency constant in single and two area systems. [10M]	3	L2
17	Explain the voltage regulation with and without compensators. [10M]	4	L2
	OR		
18	Describe 'off-load' and 'on-load' tap-changing transformers. [10M]	4	L2
19	Explain about power system security. [10M]	5	L2
	OR		
20	Briefly discuss the various functions of energy control centre. [10M]	5	L2