*R20 Regulation* *Subject code:3P6BC*

# TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

## B.Tech VI Semester Supplementary Examinations, May 2025

## POWER SYSTEM OPERATION AND CONTROL

## *(EEE)*

***Maximum Marks: 70*** Date: 20.06.2025 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.**
**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) | | Marks | CO | BTL |
|---|---|---|---|---|
| 1 | What is an incremental fuel cost and what are its units? | 2M | 1 | L1 |
| 2 | Define the incremental efficiency. | 2M | 1 | L1 |
| 3 | What is penalty factor. | 2M | 2 | L1 |
| 4 | What is hydro thermal scheduling? | 2M | 2 | L1 |
| 5 | What are the basic components of an integral controller? | 2M | 3 | L1 |
| 6 | Write the formula f a synchronizing coefficient. | 2M | 3 | L1 |
| 7 | What are the different methods of voltage control? | 2M | 4 | L1 |
| 8 | What is state estimation? | 2M | 4 | L1 |
| 9 | What is EMS? What are the major functions of it? | 2M | 5 | L1 |
| 10 | Define WLSE . | 2M | 5 | L1 |

Part-B

| Answer All the following questions. (5X10M=50Marks) | | Marks | CO | BTL |
|---|---|---|---|---|
| 11 | Give algorithm for economic allocation of generation among generators of a thermal system neglecting transmission losses. Give steps for implementing this algorithm, and also derive necessary equations. | 10M | 1 | L2 |
| | OR | | | |
| 12 | Explain about loss coefficients ($B_{mn}$ coefficients). | 10M | 1 | L2 |
| 13 | Derive the transfer function and block diagram representation of IEEE Type-I model. | 10M | 2 | L2 |
| | OR | | | |
| 14 | Explain short term Hydro thermal scheduling problem. | 10M | 2 | L2 |
| 15 | Explain about load frequency control of single area control block diagram representation of an isolated power system. | 10M | 3 | L2 |
| | OR | | | |
| 16 | Derive the proportional plus integral control of single area and its block diagram representation. | 10M | 3 | L2 |

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|---|---|---|---|---|
| 17 | Explain series and shunt compensations.. | 10M | 4 | L2 |
| | OR | | | |
| 18 | Explain about load compensation and write its applications. | 10M | 4 | L2 |
| 19 | Explain about SCADA functions. | 10M | 5 | L2 |
| | OR | | | |
| 20 | Explain the different operating states of power system with state transition diagram. | 10M | 5 | L2 |