*R22 Regulation* *Subject code: 4E6BA*

# TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

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

## POWER SYSTEM PROTECTION

*(EEE)*

***Maximum Marks: 60*** Date: 16.06.2025 Duration: 3 hours

**Note:**
1. **This question paper contains two parts A and B.**
2. **Part A is compulsory which carries 10 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 (10X1M=10 Marks) | | Marks | CO | Bloom Tx |
|---|---|---|---|---|
| 1.a) | Draw basic components of a protection system? | 1M | 1 | L1 |
| b) | What is primary and backup protection? | 1M | 1 | L1 |
| c) | Distinguish between current setting and time setting? | 1M | 2 | L2 |
| d) | What is an impedance relay? | 1M | 2 | L1 |
| e) | What is wire pilot protection? | 1M | 2 | L1 |
| f) | How do you protect a bus bar? | 1M | 2 | L1 |
| g) | How microprocessor-based relays are different from electromechanical relays? | 1M | 3 | L1 |
| h) | List the limitations of Static relays? | 1M | 3 | L4 |
| i) | Define the term Fuse and explain its usage? | 1M | 4 | L1 |
| j) | Write different ratings of circuit breakers? | 1M | 4 | L2 |

**Part-B**

| Answer All the following questions. (5X10M=50Marks) | | Marks | CO | Bloom Tx |
|---|---|---|---|---|
| 2 | a) Explain clearly the primary and back up protection in power systems.<br>b) Mention the merits and demerits of static relays in power system protection. | 5M<br>5M | 1 | L2 |
| | OR | | | |
| 3 | a) With the help of block diagram explain the principle of operation of electromagnetic definite time over current relay.<br>b) Write the advantages and disadvantages of microprocessor based protective relays. | 5M<br>5M | 1 | L2 |
| 4 | a) What are the various overcurrent protective schemes? Discuss their merits, demerits and field of applications?<br>b) An earth-fault starting relay has a setting of 35%, and a current rating of 5 A. It is connected to a CT of ratio 500/5. Calculate pick-up current in primary for which the earth fault relay operates? | 5M<br>5M | 2 | L4 |
| | OR | | | |
| 5 | Discuss how a static MHO relay is realized. Explain its characteristic on the R-X diagram. | 10M | 2 | L6 |

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|---|---|---|---|---|
| 6 | What is carrier aided distance protection? What are its different types? Discuss the permissive under-reach transfer tripping scheme of protection? | 10M | 2 | L1 |
| | OR | | | |
| 7 | What type of protective device is used for the protection of an alternator against overheating of its (i) stator (ii) rotor? Discuss them in brief. | 10M | 2 | L1 |
| 8 | Explain the following types of Static Amplitude comparators:<br>a) Integrating comparators<br>b) Instantaneous comparator. | 5M<br>5M | 3 | L2 |
| | OR | | | |
| 9 | Explain the working of static IDMT over current relay with a neat block diagram. | 10M | 3 | L2 |
| 10 | What is an Arc Interruption? Explain the high resistance interruption method. | 10M | 4 | L1 |
| | OR | | | |
| 11 | a) Explain the working of SF6 Circuit breaker with a neat circuit diagram.<br>b) What is fuse? Explain it's characteristics? | 5M<br>5M | 4 | L2 |