R22 Regulation *Subject code:* 4E6BA

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VI Semester Regular/Supplementary Examinations, April 2026

POWER SYSTEM PROTECTION

(EEE)

Maximum Marks: 60 Date:13.04.2026 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)	What are the requirements of protective relays?	1M	1	1
b)	Explain Errors in C.T and PT?	1M	1	2
c)	A relay is connected to a 400/5A CT and set at 150%. With a primary fault of 2400A, calculate the plug setting multiplier?	1M	3	3
d)	List out the applications of distance relays?	1M	3	1
e)	Explain the difference between Modified Differential Protection & Differential Protection for Alternators	1M	2	2
f)	Explain the incipient faults?	1M	2	2
g)	What are the essential components of static relays?	1M	4	1
h)	What is meant by multi input comparators?	1M	4	1
i)	Differentiate between Re striking voltage and Recovery voltage?	1M	4	3
j)	What are the different types of fuses?	1M	4	1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	Bloom Tx
2	a) Define protective relaying and explain its necessity in power systems.	5M	1	2
	b) Explain the concept of primary and backup protection with suitable examples.	5M	1	2
	OR			
3	a) Explain the principle of operation of attracted armature type of relays?	5M	1	2
	b) What is a static relay? Explain the advantages of static relays over Electromagnetic relays?	5M	1	2
4	a) What is an over current relay? Explain time-current characteristics of over-current relays.	5M	3	2
	b) Design and explain a time graded over-current protection scheme for parallel feeder network.	5M	3	4

	OR			
5	a) Explain the operational characteristics of an Impedance relay? b) Explain the effect of arc resistance on the performance of distance relays?	5M 5M	2 2	2 4
6	a) Explain the working principle of wire pilot protection. b) Design and Explain principle of Mertz-Price protection of generator against Stator winding faults?	5M 5M	2 2	2 6
	OR			
7	a) Explain frame leakage protection scheme for bus-bars? b) A 3-phase transformer having line-voltage ratio of 0·4 kV/11kV is connected in star-delta and protective transformers on the 400 V side have a current ratio of 500/5. What must be the ratio of the protective transformers on the 11 kV side?	5M 5M	2 2	2 3
8	a) What is a static relay? Explain the merits and demerits of static relays? b) Explain the operation of Static directional relay?	5M 5M	2 2	2 2
	OR			
9	a) Explain Duality between Amplitude Comparator and Phase Comparator? b) What is microprocessor-based relays? Explain its advantages?	5M 5M	2 2	2 2
10	a) Explain different arc interruption theories in detail? b) Explain the operation of sf_6 gas circuit breaker with help of neat sketch?	5M 5M	4 4	2 2
	OR			
11	a) Explain the operation of minimum oil circuit breaker with a neat sketch? b) Explain the characteristics of fuses?	5M 5M	4 4	2 2