



III B.Tech II Sem Regular End Examination, June 2022

Power System Protection
(Electrical and Electronics Engineering)

Time: 3 Hours.

Max. Marks: 70

Note: 1. Question paper consists: Part-A and Part-B.

2. In Part – A, answer all questions which carries 20 marks.

3. In Part – B, answer any one question from each unit.

Each question carries 10 marks and may have a, b as sub questions.

PART- A**(10*2 Marks = 20 Marks)**

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|---|----|-----|-----|
| 1. a) What is protective relay? | 2M | C01 | BL1 |
| b) Compare electromagnetic with static relay . | 2M | C01 | BL1 |
| c) Define the term "feeder". | 2M | C02 | BL1 |
| d) Discuss the effect of power surges (power swings) on the performance of distance relays. | 2M | C02 | BL1 |
| e) Explain frame leakage protection with a neat diagram. | 2M | C03 | BL1 |
| f) What is magnetic inrush current? | 2M | C03 | BL1 |
| g) Draw the block diagram for static relay. | 2M | C04 | BL1 |
| h) Describe about amplitude comparator. | 2M | C04 | BL1 |
| i) List out the major components of circuit breaker. | 2M | C05 | BL1 |
| j) State rate of rise of restriking voltage. | 2M | C05 | BL1 |

PART- B**(10*5 Marks = 50 Marks)**

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|---|----|-----|-----|
| 2 a) Explain the nature and causes of faults. Discuss the consequences of faults on a power system. | 5M | C01 | BL2 |
| b) Discuss the essential qualities of a protective relay. | 5M | C01 | BL3 |

OR

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|--|-----|-----|-----|
| 3 Briefly explain what you understand by primary and back-up protection. What is the role of back-up protection? | 10M | C01 | BL2 |
| 4 a) Write the applications of impedance relay, reactance relay and mho relay. | 5M | C02 | BL2 |
| b) Name the switched distance relaying schemes. Briefly explain each of them. | 5M | C02 | BL3 |

OR

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|---|-----|-----|-----|
| 5 In what way is distance protection superior to overcurrent protection for the protection of transmission lines. | 10M | C02 | BL3 |
|---|-----|-----|-----|

- 6 a) Describe in detail the protection of parallel feeder and ring mains. 5M C03 BL2
b) With a neat sketch, discuss the differential scheme for bus-zone protection. 5M C03 BL2
- OR**
- 7 Use a neat schematic diagram, explain the working principle of generator main protection. 10M C03 BL2
- 8 a) How can a quadrilateral distance relay be realised using a microprocessor? 5M C04 BL3
b) Enumerate the principle of a coincidence circuit for phase comparator. 5M C04 BL2
- OR**
- 9 Define "quadrilateral characteristic". In what way is it superior to other characteristics? How is it realised using a phase comparator? 10M C04 BL3
- 10 a) Illustrate the recovery rate theory and energy balance theory of arc interruption in a circuit breaker. 5M C05 BL3
b) Give the advantages of an air blast circuit breaker over the oil circuit breaker. 5M C05 BL2
- OR**
- 11 Classify the different types of air blast circuit breaker. Discuss their operating principle and area of applications. Which type is less affected by current chopping? 10M C05 BL3