

**Faculty of Engineering & Technology**  
**Eighth Semester B.E. (Power Electronics) Examination**  
**POWER SYSTEM PROTECTION**  
**Sections—A & B**

Time : 3 Hours]

[Maximum Marks : 80

**INSTRUCTIONS TO CANDIDATES**

- (1) Answer any **THREE** questions from Section A and any **THREE** questions from Section B.
- (2) Due credit will be given to neatness and adequate dimensions.
- (3) Assume suitable data wherever necessary.
- (4) Illustrate your answers wherever necessary with the help of neat sketches.
- (5) Use of non-programmable calculator is permitted.

**SECTION—A**

1. (a) Explain the factors on which the magnitude of the fault current depends on. 4
- (b) What are the factors considered for selecting the operating time of a relay ? 4
- (c) Explain the basic protection circuit. 5

- 2. (a) Explain with the help of characteristic the classification of over-current relays. State the field of applications of each relay. 7
- (b) Draw the Phasor diagram of directional over current relay. From the phasor diagram explain its salient features. 7
- 3. (a) Explain time and current graded protection scheme of over current relays. 8
- (b) Justify the utility of summation transformer in power system protection. 5
- 4. What is carrier current protection ? Explain the components of this scheme and working of phase type of carrier protection. 13
- 5. Explain the effect of following on the performance of distance relays :— 13
  - (i) Arc resistance
  - (ii) Infeed
  - (iii) Ratio of source to line impedance
  - (iv) Power swing.

**SECTION—B**

- 6. Enumerate the different faults and abnormal running conditions which may appear on generator. Write their effects and corresponding protection. 13

- 7. Draw percentage differential protection scheme of a star-delta transformer. Explain its working. Enumerate the problems associated with this scheme and corresponding remedies. 13
- 8. (a) A bus-bar has two generators, one incoming line from other station and four out-going lines. Draw the differential protection scheme and enumerate its salient features. 7
- (b) Explain overload and short circuit protective devices for inductor motor protection. 7
- 9. (a) Enumerate the advantages and limitations of static relays. 6
- (b) Explain the generation of an over-current relay characteristic using static relay. 7
- 10. (a) Explain duality of comparators. 6
- (b) Explain the generation of static MHO relay characteristic using phase comparator. 7