

Seventh Semester B.E. Degree Examination, July/August 2022 Power System Protection

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 a. What is the nature of faults in Power System? Explain the causes for it. (05 Marks)
- b. With a neat figure show different zones of protection in a typical power system and explain the features. (06 Marks)
- c. What are the essential qualities of a protection system? Explain briefly. (05 Marks)

OR

- 2 a. What are the advantages and demerits of Static relays over electromechanical relays? (05 Marks)
- b. With a neat figure, explain the construction and working of a Wattmetric type induction disc relay. (06 Marks)
- c. Give the schematic block diagram of a numerical relay and explain briefly. (05 Marks)

Module-2

- 3 a. Explain with relevant figure, Time – graded over current protection of a feeder. (05 Marks)
- b. Explain how an electromechanical reactance relay is realized. Also explain its characteristic on R – X diagram. (05 Marks)
- c. What is an Impedance Relay? Explain its operating principle. (06 Marks)

OR

- 4 a. Explain the effect of Arc – resistance on the performance of distance relays. (05 Marks)
- b. Give the block diagram of a static instantaneous over current relay and explain the function of each block. (05 Marks)
- c. With a schematic diagram and characteristic, explain the working of an amplitude comparator type static MHO relay. (06 Marks)

Module-3

- 5 a. With a schematic diagram and relevant waveforms, explain the working of carrier current protection scheme. (08 Marks)
- b. Describe the basic working principle of differential protection. (04 Marks)
- c. Explain the working of a Buchholz Relay. (04 Marks)

OR

- 6 a. What is the drawback of simple differential protection? How it has overcome in percentage differential protection? Explain. (08 Marks)
- b. Briefly discuss about stator overheating protection of a large generator. (04 Marks)
- c. With the help of a schematic diagram, explain the circulating current wire – pilot relaying scheme. (04 Marks)

Module-4

- 7 a. Explain the Recovery Rate theory of Arc – Interruption in a circuit breaker. (04 Marks)
 b. What is Restriking Voltage? Derive an expression for Restriking voltage. (08 Marks)
 c. Define the following with reference to circuit breaker : (04 Marks)
 i) Breaking capacity ii) Making capacity.

OR

- 8 a. Mention any five advantages of SF6 circuit breaker. (04 Marks)
 b. With a neat figure, explain construction and working of an Air – Break circuit breaker. (08 Marks)
 c. Describe with relevant figures, Operating principle of one type of HVDC circuit breaker. (04 Marks)

Module-5

- 9 a. With a neat figure, explain the construction and working of a HRC fuse. (06 Marks)
 b. What are the causes of Over voltages in a power system? Explain briefly. (06 Marks)
 c. Explain briefly the Phenomena of lightning. (04 Marks)

OR

- 10 a. Discuss the protection of transmission line against direct lightning strokes. (06 Marks)
 b. Write a note on Gas Insulated Substation (GIS). (06 Marks)
 c. With reference to cut – off characteristic of a fuse define the following :
 i) Prospective current ii) Cut – off current
 iii) Prearcing time iv) Arcing time. (04 Marks)
