

CBCS SCHEME

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15EE72

Seventh Semester B.E. Degree Examination, Dec.2018/Jan.2019

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. With a neat diagram, explain zones of protection in a power system. (06 Marks)
- b. List the merits and Demerits of static Relays. (05 Marks)
- c. Explain various methods of back-up protection. (05 Marks)

OR

- 2 a. Briefly explain the essential qualities of a protective relay. (06 Marks)
- b. How protective relays are classified list them. (04 Marks)
- c. Draw the schematic diagram of Numerical relay and briefly describe the functions of its various components. (06 Marks)

Module-2

- 3 a. With a neat sketch, explain Directional over current relay. (08 Marks)
- b. Explain with a neat sketch the basic operation of a impedance Relay. (08 Marks)

OR

- 4 a. With a neat circuit diagram, explain Directional Earth fault Relay. (08 Marks)
- b. With a neat schematic diagram, explain the construction and working and Reactance Relay. (08 Marks)

Module-3

- 5 a. Explain the term 'pilot' with reference to power line protection. What are the different types of pilots? Discuss their field of applications. (08 Marks)
- b. Describe the balanced (opposed) voltage differential protection scheme. (08 Marks)

OR

- 6 a. A generator is protected by restricted earth fault protection. The generator ratings are 13.2kV, 10MVA. The percentage of winding protected against phase to ground fault is 85%. The relay setting is such that it trips for 20% out of balance. Calculate the resistance to be added in the neutral to ground connection. (08 Marks)
- b. With a neat diagram, explain the working of a Buchholz's relay. (08 Marks)

Module-4

- 7 a. Explain how interruption of capacitive current takes place in AC circuit Breaker. (08 Marks)
- b. With a neat sketch, explain the construction and working of Non-Puffer type of SF6 circuit Breaker. (08 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg. 42+8 = 50, will be treated as malpractice.

OR

- 8 a. A 50Hz generator has e.m.f to neutral 7.5kV(rms). The reactance of generator and the connected system is 4Ω and distributed capacitance to neutral is $0.01\mu\text{F}$ with resistance negligible find :
- Maximum voltage across the circuit Breaker contacts
 - Frequency of oscillations
 - Maximum time to reach maximum voltage
 - Average RRRV
- (08 Marks)
- b. With the help of schematic diagram, explain the working of short circuit test plant. (08 Marks)

Module-5

- 9 a. With the help of neat circuit diagram. Explain the construction and working of HRC fuse. (06 Marks)
- b. What are causes of over voltages in a power system. (06 Marks)
- c. Discuss the advantages and disadvantages of Gas Insulated Substations (GIS) as compared to conventional Air Insulation Substations (AIS). (04 Marks)

OR

- 10 a. Define the following :
- Fusing factor
 - Fuse
 - Fusing current.
- (06 Marks)
- b. With a neat sketch, explain the working of Klydonograph. (05 Marks)
- c. What are the various components of a GIS? Briefly describe their functions. (05 Marks)
