

# 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  $4\Omega$  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
- b. With the help of schematic diagram, explain the working of short circuit test plant. (08 Marks)

(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.
- 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)

(06 Marks)

(05 Marks)

(05 Marks)

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