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P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belagavi)

Sixth Semester, B.E. - Electrical and Electronics Engineering

Semester End Examination; May/June - 2019

Switch Gear and Protection

Time: 3 hrs

Max. Marks: 100

Note: Answer FIVE full questions, selecting ONE full question from each unit.

UNIT - I

- 1 a. Explain the construction and working principle of HRC fuse. List out the applications of HRC fuse. 10
- b. Write a note on : 10
- i) Slepian's theory of arc interruption ii) Current chopping phenomenon
- 2 a. Draw and explain the construction of vertical break type Isolator. 10
- b. Calculate the RRRV of 132 kV circuit breaker with neutral earthed S.C. data as follows : 10
- Broken current is symmetrical; restriking voltage has frequency 20 kHz, P.f 0.15. Assume fault is also earthed.

UNIT - II

- 3 a. Explain the working of air blast circuit breaker with reference to; 10
- i) Axial blast ii) Cross blast.
- b. Explain the construction, working, advantages and the disadvantages of vacuum circuit breakers. 10
- 4 a. Explain the construction, working of SF₆ circuit breakers. 10
- b. List and explain the different tests conducted on circuit breakers. 10

UNIT - III

- 5 a. What is a protective zone? With a simple diagram, show the various zones in a typical power system. 10
- b. Explain with the help of neat sketch, the construction and working of directional induction type overcurrent relay. 10
- 6 a. Why the protective zones are arranged in overlap fashion? With the help of simple diagram show, how the zones are overlapped? 10
- b. Explain the characteristics of following relays on the R-X diagram: 10
- i) Impedance relay ii) Reactance relay iii) Mho relay

UNIT - IV

- 7 a. Explain the various faults and abnormal conditions in a generator. 10
- b. A 50 MVA, 3 ϕ , 33 kV synchronous generator is protected by the Merz-Price protection using 1000/5 ratio CT's. It is provided with restricted earth fault protection with the earthing resistance of 7.5 Ω . Calculate the percentage of winding unprotected in each phase against earth faults, if the minimum operating current of the relay is 0.5 A. 10

- 8 a. With a neat sketch, explain the Merz-Price protection scheme of generator. 10
- b. Write a note on :
- i) Rotor earth fault protection 10
 - ii) Negative sequence relays
- UNIT - V**
- 9 a. Explain the protection of Induction motor against phase faults. 10
- b. Draw and explain the Merz-Price protection scheme for,
- i) Star-Delta transformer 10
 - ii) Star-Star transformer
- 10 a. With a neat sketch, explain the construction and operation of Buchholz relay. 10
- b. Explain the protection of induction motor against single phasing and overload. 10

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