ED – 881

VII Semester B.E. (E&E) Engineering Degree Examination, Dec. 2014/Jan. 2015
(2K6 Scheme)
EE-703 : SWITCH GEAR AND PROTECTION

Time : 3 Hours Max. Marks : 100

Instruction : *Answer **any five full** questions selecting atleast **two** from **each** Part.*

PART – A

1. a) Draw the single line diagram to connect a circuit breaker, isolator, earthing switch and write the sequence of operation while opening and closing of a circuit. **8**

   b) Explain with a neat sketch the construction and working of HRC fuse. Also explain its characteristics. **8**

   c) What is fusing factor ? State its significance. **4**

2. a) What are the essential properties of arc ? Explain how the arc is maintained in a circuit breaker. **6**

   b) Define the following terms as applied to circuit breaker. **6**

      i) Restriking voltage

      ii) R.R.R.V.

      iii) Resistance switching.

   c) For a 132kV 50Hz system the reactance and capacitance upto the location of circuit breaker are 3Ω and $0.015\mu f$ respectively. Calculate the following :

      i) Frequency of transient oscillations

      ii) Maximum value of restriking voltage across the contacts of the circuit breaker.

      iii) Maximum value of R.R.R.V. **8**

P.T.O.

3. a) Explain the phenomena of current chopping with waveforms. **6**

   b) What are the advantages and disadvantages of

      i) Bulk oil circuit breaker

      ii) Minimum oil circuit breaker **8**

   c) With a neat sketch explain the working of axial blast air circuit breaker. **6**

4. a) With a neat sketch explain the working of a single pressure puffer type SF6 circuit breaker. **6**

   b) Mention the different types of short circuit testing stations. With the help of a schematic diagram, explain the working of a short circuit test plant. **8**

   c) A circuit breaker is rated as 2000 A, 1500 MVA, 33 KV, 3 phase, 3 sec, O.C.B. Determine :

      i) Rated normal current

      ii) Rated symmetrical breaking current

      iii) Rated making current

      iv) Short time rating. **6**

PART – B

5. a) State and explain briefly the characteristics of good protective relaying. **8**

   b) Define the terms

      i) PSM

      ii) TMS

      iii) Pick up

      iv) Over reach-with respect to relays. **4**

   c) What are the limitations of a directional relay ? What modifications are required to overcome the limitation and explain the same ? **8**

6. a) Explain the working principle and characteristics of an impedance relay. **8**

   b) With a neat diagram explain the working of a Buchholz's relay. **6**

   c) Explain the protection of a generator against loss of excitation. **6**

7. a) Mention the various protections that are to be given for a large induction motor. Briefly explain any one. **8**

   b) Discuss the over current protection schemes for

      i) Parallel feeders and

      ii) Ring mains. **8**

   c) Mention the advantages of solid state relays over electromechanical relays. **4**

8. Write short notes on : **(4×5=20)**

   a) Logic circuit for fault detection

   b) Level detector

   c) Microprocessor based relays

   d) Computer based integrated protection system.
