

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2734

Roll No.

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B.Tech.

(SEM. VII) ODD SEMESTER THEORY EXAMINATION 2012-13

SWITCH GEAR & PROTECTION

Time : 3 Hours

Total Marks : 100

Note : Attempt all questions.

1. Attempt any **four** of the following : (5×4=20)
 - (a) "A Relay is said to be the brain of protective system." Explain the meaning of this statement. Can a Relay also prevent a fault ? Discuss.
 - (b) What do you understand by the 'Zone of protection' of a relay ? What is a 'Blind spot' ? Why is it undesirable in a protection scheme ?
 - (c) Draw a 'Trip circuit' including CT, PT, Relay, Battery and Circuit Breaker. Explain its operation.
 - (d) Draw neat diagrams for induction disc (wattmetric type) and induction cup relays to explain their operating principles.
 - (e) Describe any three major draw backs of electromagnetic relays.
 - (f) Discuss about Gas Actuated Relays in detail.
2. Attempt any **two** of the following : (10×2=20)
 - (a) Enumerate any six major advantages of static relays over electromagnetic relays and explain them.

- (b) Draw neat diagrams to demonstrate 'Trip', 'Restraining' and 'Threshold' conditions for the sine and the cosine types of comparators.
- (c) Describe in detail the synthesis of a Mho relay using static phase comparator.
3. Attempt any **two** parts of the following : **(10×2=20)**
- (a) Explain with the help of suitable diagrams the effects of arc resistance and power swing on performance of Plane impedance, Reactance and Mho relays.
- (b) Differentiate between instantaneous, DTOC and IDMT relays. Explain with the help of a diagram the time graded O.C. protection of a doubly fed feeder.
- (c) Write a detailed note on pitot wire protection of a transmission line.
4. Attempt any **four** of the following : **(5×4=20)**
- (a) What do you understand by high arc resistance and low arc resistance methods of arc quenching ? Describe the two theories related to arc extinction.
- (b) Draw the current and voltage waveforms showing AC circuit breaking phenomenon. Show the following in the diagram and describe them :
- (i) Major current loop
 - (ii) System voltage
 - (iii) Arc voltage
 - (iv) Restriking voltage
 - (v) Active recovery voltage
 - (vi) Recovery voltage
- What do you understand by 'Breaking current' and 'Making current' ?

- (c) Explain with the help of a suitable diagram as to what happens when a current is chopped by a circuit breaker before its natural zero.
- (d) What is the difficulty faced while breaking the fault current of a short transmission line ?
- (e) Give a detailed description of indirect testing of a circuit breaker.
- (f) How are the circuit breakers classified ? Give details of the same.

5. Attempt any **two** of the following : **(10×2=20)**

- (a) Draw and describe complete protection of an Alternator.
- (b) Draw and describe the operational details of an SF₆ circuit breaker.
- (c) Discuss in detail about a d.c. circuit breaker with suitable diagram and waveforms.