

"Please check whether you have got the right question paper."

**N.B**

1) Q.1 and Q.6 is compulsory.

2) Solve any two questions from section A and section B each excluding compulsory question.

3) Assume suitable data if necessary.

#### SECTION A

- Q.1 Attempt any five question from the following 10
- Explain current transformer. Define C-T burden.
  - Define reach of the distance relay.
  - Write the names of relays used for transformer protection.
  - What are the advantages of static relay?
  - Draw and explain summation transformer
  - Write the applications of differential relay.
- Q.2 A) Draw neat circuit diagram of electromagnetic type of over current relay and explain its working. 08
- B) Derive the torque equation for induction type relay. 07
- Q.3 A) Draw neat diagram of merz-price protection used for star delta power transformer and explain its working. 08
- B) Write down the possible types of faults associated with transformer. Also suggest the protection method for each. 07
- Q.4 A) With neat diagram explain how the percentage differential relay is used for alternator protection 08
- B) With neat diagram explain how the protection against unbalanced stator currents can be provided for alternator windings. 07
- Q.5 A) Describe single phasing fault protection of Induction motor. 05
- B) Write merits and demerits of static relay. 05
- C) Explain Buchholz relay construction and working. 05

#### SECTION B

- Q.6 Attempt any five 10
- Explain R R R V
  - Explain ELCB
  - Give classification of circuit breakers
  - Define circuit breaker and write its application.
  - Define Arc. Write down the cause of arc formation.
  - What is meant by recovery voltage?
  - What are the rating of circuit breakers.
- Q.7 A) With neat diagram explain construction and working of Air circuit breaker. 08
- B) Explain the operating principle of Air blast circuit breaker. Write its application, rating and disadvantages. 07

- Q.8 A) Derive the expression for RRRV and maximum value of RRRV. 08  
 B) Explain resistance switching concept used in C.B. action. Write the expression for critical value of resistance for zero transient oscillations. 07
- Q.9 A) In a 220kv system, the reactance and capacitance up to the location of circuit breaker is  $8\Omega$  and  $0.025 \mu f$  respectively. A resistance of 600 ohms is connected across the contacts of the C-B. determine : 08  
 1) Natural frequency of oscillation  
 2) Damped frequency of oscillation  
 3) Critical value of resistance which will give no transient oscillation.  
 4) The value of resistance which will give damped frequency of oscillation, one-fourth of the natural frequency of oscillation  
 B) Explain different arc interruption theories. 07
- Q.10 Write short notes  
 a) Current chopping in C-B action 05  
 b) Peterson coil 05  
 c) Microprocessor based over current relay. 05