

22524

23124

3 Hours / 70 Marks

Seat No.

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- Instructions* –
- (1) All Questions are *Compulsory*.
 - (2) Illustrate your answers with neat sketches wherever necessary.
 - (3) Figures to the right indicate full marks.
 - (4) Assume suitable data, if necessary.
 - (5) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

- 1. Attempt any FIVE of the following: **10****
- a) State any four causes of faults.
 - b) State four functions of protective system.
 - c) Define isolator and state their types.
 - d) Define Reliability and Sensitivity.
 - e) State any four faults occurs in transformer.
 - f) List protection scheme used in motor.
 - g) State any four faults occurs in bus-bar and transmission line.

P.T.O.

- 2. Attempt any THREE of the following:** **12**
- a) Draw symbol of following:
 - i) Earth Switch
 - ii) Lightning arrester
 - iii) Circuit breaker
 - v) Isolator
 - b) Define terms related to circuit breaker:
 - i) Making capacity
 - ii) Breaking capacity
 - iii) Short time Rating
 - iv) Normal current Rating
 - c) Explain with neat sketch basic trip circuit of protection relaying.
 - d) A 3-phase 66/11 KV star-delta connected transformer is protected by merz-price protection scheme. The CTs on the LT side have a ratio of 420/5A. Find the ratio of the C.B. on H.T. side.
- 3. Attempt any THREE of the following:** **12**
- a) Two generators of 11 KV, 3-phase, 3000 KVA having reactance of 15% operates in parallel. The generator supply power to transmission line through 6000 KVA T/F ratio of 11/22 KV having reactance of 5%. Calculate fault current and fault KVA on H.T. side of the transformers.
 - b) Compare Fuse and MCCB on
 - i) Size
 - ii) Cost
 - iii) Reliability
 - iv) Replacement strategy.
 - c) With neat sketch explain working of attracted armature type relay.
 - d) State the location of buchholz relay with neat diagram. Which equipment is protected by it and for which faults.

- 4. Attempt any THREE of the following:** **12**
- a) Describe with neat sketch the principle of operation of vacuum circuit breaker.
 - b) With neat sketch explain watt-hr. meter structure of induction type relay.
 - c) Explain reverse power protection of alternator.
 - d) Explain the single phasing preventer with neat sketch.
 - e) Explain differential protection of bus bar.
- 5. Attempt any TWO of the following:** **12**
- a) Explain arcing phenomenon in circuit breaker and state methods of arc extinction.
 - b) With the help of block diagram explain operation of Micro-processor based over current protection.
 - c) With a neat labelled diagram explain differential protection scheme used for alternators.
- 6. Attempt any TWO of the following:** **12**
- a) Describe the construction of SF₆ circuit breaker with neat diagram and state any four properties of SF₆ gas.
 - b) Draw and explain operation of induction type direction of over current relay.
 - c) Explain with neat sketch, the pilot wire protection scheme applied to transmission lines.
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