



17508

21415

3 Hours/100 Marks

Seat No.

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Instructions : (1) **All** questions are **compulsory**.

(2) Attempt **06** questions including Question No. **1** which is **compulsory**.

MARKS

1. A) Attempt **any three** of following : **(3×4=12)**

- State different causes of over voltages in power system network.
- Write essential features of good protective system.
- Draw diagram of :
 - Bus bar reactor
 - Generator reactor
 - Feeder reactor
- Define :
 - Pick up current
 - Relay time
 - Plug setting multiplier
 - Reset current.

1. B) Attempt **any one** : **(1×6=6)**

- Fig. 1 shows single line diagram of three phase system. The percentage reactance of each alternator is based on its own capacity. Find short ckt. current that will flow into a complete three phase short ckt. at 'A'.

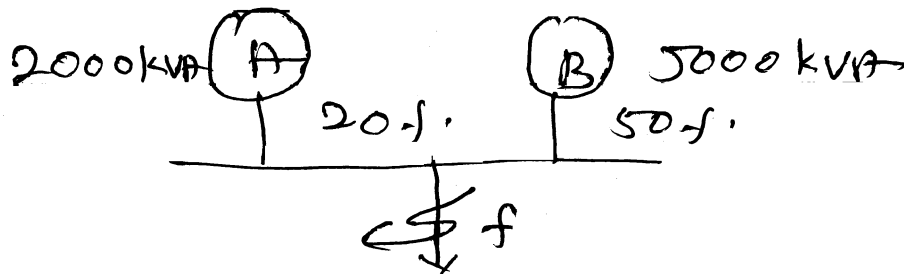


Fig. 1

- Draw ckt. diagram for merz price protection scheme for star-star connected 3 ϕ phase power transformer.

P.T.O.

**MARKS**

2. Attempt **any four** of following :

(4×4=16)

a) Define the following terms :

- 1) Arc voltage
- 2) Recovery voltage
- 3) Restriking voltage
- 4) RRRV.

b) Compare HRC fuse and kit.kat fuse on any four point.

c) Explain basic principle of lightning arrester and enlist different types of lightning arrester.

d) State the meaning of term reactance earthing, list any three advantages of reactance earthing. Explain what is several power protection.

e) Draw ckt. diagram of balanced beam type of relay labelled its different part.

f) Explain inter turn faults in alternators is detected and how protection is given ?

3. Attempt **any four** of following :

(4×4=16)

a) Draw neat ckt. diagram of MOCB. (Minimum Oil Ckt. Breaker).

b) Explain with neat diagram working of air blast ckt. breaker.

c) Write any four safety precautions while using CT and PT.

d) Give location of Buchholz relay and state application of it for transformer protection.

e) Draw the restricted earth fault protection scheme for 250 MVA delta/delta transformer.



MARKS

4. A) Attempt **any three** of following : **(3×4=12)**
- a) Explain with neat diagram multigap type lightning arrester.
 - b) Draw neat connection diagram of ELCB for residential installation.
 - c) Write different faults that occurs in alternator.
 - d) How impedance relay used for transmission line protection ?
4. B) Attempt **any one** : **(1×6=6)**
- a) Describe differential protection of bus bar with neat labelled diagram.
 - b) Explain difference between short circuit and overload. Explain how motive is protected from short circuit and overload.
5. Attempt **any four** of the following : **(4×4=16)**
- a) Give any four characteristics of Sf6 gas.
 - b) Explain with neat diagram vertical break isolator with their application.
 - c) State the principle of operation electromagnetic induction shaded pole type of relay.
 - d) Define TSM and PSM in relays.
 - e) Draw neat ckt. diagram of induction type over current relay labelled its different parts.
 - f) Explain with neat diagram solenoid type over current relay.

**MARKS**6. Attempt **any four** of the following :**(4×4=16)**

- a) Explain how differential protection is used in transformers.
 - b) “Relays can be used to sense single phase open ckt. fault in an alternator”.
State whether true or false. Justify your answer.
 - c) Draw block diagram of microprocessor based over current relay.
 - d) Draw ckt. diagram for biased differential protection used for transmission line protection.
 - e) Explain limitation of differential protection in a transformer.
 - f) Explain how pilot wire protection is given to transmission line.
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