17508

21819

3 Hours / 100 Marks Seat No. | | | | | | | | |

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.

Marks

1. a) **Attempt any <u>THREE</u> of the following:** **12**

(i) List any eight essential features of effective protective system.

(ii) Draw diagram of

1) Busbar reactor

2) Generator reactor

3) Feeder reactor.

(iii) Define TSM and PSM in relays.

(iv) Name internal and external causes of system overvoltages.

Marks

b) **Attempt any ONE of the following:** **6**

(i) Fig. No. 1 shows single line diagram of three phase system. The percentage reactance of each alternator is based on its own capacity. Find short circuit current that will flow into a complete three phase short circuit at 'A'

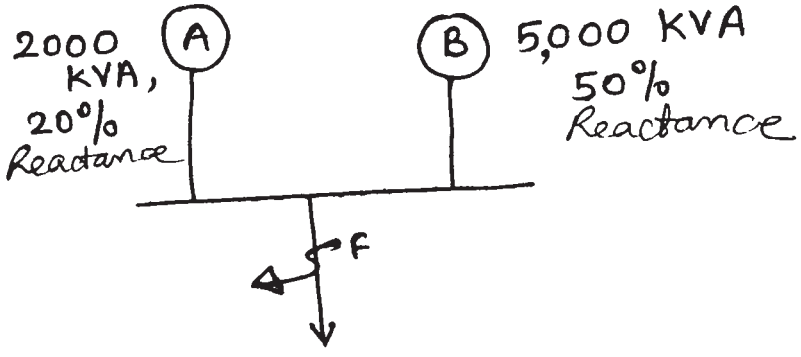

Fig. No. 1

(ii) Draw the circuit diagram of biased differential protection of Δ/λ transformer.

2. Attempt any FOUR of the following: **16**

a) Define

(i) Arcing time

(ii) Recovery time

(iii) Arcing voltage

(iv) Rate of rise of restriking voltage.

b) Draw a neat labeled constructional diagram of vertical type break isolator.

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

d) Give any four differences between equipment earthing and neutral earthing.

e) Whether MCB is operated for earth fault? Give reason.

f) List the difficulties experienced in differential relay in alternator protection. How are they overcome?

Marks

3. Attempt any FOUR of the following: **16**

a) Explain arcing phenomenon in circuit breaker.

b) Distinguish between circuit breaker and isolator.

c) With a neat diagram explain the working of static over current relay.

d) Describe the operation of Buchholz relay with principle and installation.

e) A 3 phase transformer of 220 V/11 KV line volts is connected in λ/Δ. The protective transformer on 220 V side have current ratio of 600/5. What should be the CT ratio on 11 KV side?

4. a) Attempt any THREE of the following: **12**

(i) Draw a neat labeled diagram of Merz Price protection scheme for an alternator.

(ii) With neat sketch explain Thyrite type Lightening Arrestor.

(iii) "ELCB is must for an residential installation". Justify the statement.

(iv) Explain time graded over current protection for ring main system of busbar.

b) Attempt any ONE of the following: **6**

(i) Explain what is single phasing of 3ϕ I.M? Draw a neat circuit diagram of single phase preventer.

(ii) Explain differential protection for busbar with diagram.

Marks

5. Attempt any FOUR of the following: **16**

a) Explain construction and working of HRC fuse with diagram.

b) State methods for arc extinction and explain working of any one method with neat circuit diagram

c) With the help of neat sketch, explain principle of operation and working of induction type overcurrent relay.

d) With neat sketch, explain watt-hr-meter structure of induction type relay.

e) Draw neat sketch of induction type reverse power relay and explain its working.

f) Compare electromechanical relay and static relay.

6. Attempt any FOUR of the following: **16**

a) Draw figure for restricted earth fault protection scheme for transformer.

b) Explain why the secondary of a CT should not be open circuited?

c) Explain how negative sequence current are set up in an alternator? Draw protective scheme for same.

d) Explain over heating protection scheme of 3 phase transformer.

e) Explain with neat sketch the operation of attracted armature type relay. State two advantages.