

Total No. of Questions : 8]

SEAT No. :

P6584

[Total No. of Pages : 3

[6181]-135

B.E. (Electrical Engineering)
SWITCHGEAR & PROTECTION
(2019 Pattern) (Semester - VIII) (403148)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.
- 4) Assume suitable additional data if necessary.
- 5) Use of non-programmable calculator is allowed.

Q1) a) State the various type tests on high voltage A.C. Circuit Breaker. [4]

b) A 3 phase VCB is rated as 1500 A, 1000 MVA, 33 kV, 3 seconds.

Determine - [6]

- i) Symmetrical breaking current
 - ii) Rated making current
 - iii) Short time rating
 - iv) Rated normal current
 - v) Breaking capacity
 - vi) Rated service voltage
- c) Compare VCB with SF6 CB with reference to application, advantages, disadvantages, arc interrupting medium. [8]

OR

Q2) a) Discuss chemical properties of SF6 gas. [4]

b) Compare Gas Insulated Substation with Air insulated Substation. [6]

c) With neat diagram explain temperature rise test of Circuit Breaker. [8]

P.T.O.

Q3) a) Draw block diagram of static relay. Explain its working. State its advantages & disadvantages. [10]

b) Explain the use of Anti-Aliasing filter in the numerical relay [7]

OR

Q4) a) Draw a block diagram of numerical relay. Explain its working. State its advantages over conventional and static relays. [10]

b) Draw and explain block diagram of PMU. [7]

Q5) a) With neat diagram, explain inter turn fault protection in case of 3 phase alternator. [4]

b) A three phase 11 kV/ 132 kV, delta / star connected power transformer is protected by percentage differential protection scheme. The CTs on LT side have ratio of 600/5. Determine the CT ratio on HT side. [6]

c) With neat diagram, explain construction & working of Buchhloz relay. [8]

OR

Q6) a) What is single phasing in case of 3 phase induction motor? Draw neat diagram of single phase preventor. [4]

b) An 11 kV, 100 MVA, three phase alternator is protected by percentage differential scheme. Its neutral point is earthed through a resistance. The relay is set to operate when there is an out of balance current of 1A. The CT's have a ratio of 1000/5. If 90 % winding is protected against earth fault, what must be value of resistance to be connected in neutral to ground circuit? [6]

c) Discuss the following abnormal operating conditions in 3 phase alternator- [8]

i) Loss of prime mover

ii) Unbalanced loading Suggest suitable protection scheme in each of above cases.

Q7) a) Explain with diagram how impedance relay is used for distance protection? State drawbacks of impedance relay. Draw its characteristics on R-X plane. [10]

b) Draw block diagram of PLC scheme used for transmission line protection. Briefly explain its components. [7]

OR

Q8) a) Explain the effect of [10]

i) arc resistance

ii) Power swing on the operation of distance relays. In each of these cases, which relay gets highly effected?

b) Discuss Wide Area Measurement System. [7]

