

B.TECH. SEM -VI ELECTRICAL 2014 COURSE (CBCS) :
WINTER - 2017
SUBJECT: SWITCHGEAR AND PROTECTION

Day : **Monday**
Date : **20/11/2017**

W-2017-2201

Time **10.00 AM TO 01.00 PM**
Max. Marks: 60

N.B.:

- 1) All questions are **COMPULSORY**.
- 2) Assume suitable data, if necessary.
- 3) Figures to the right indicate **FULL** marks.
- 4) Use of non-programmable **CALCULATOR** is allowed.
- 5) Draw a neat labeled diagrams **WHEREVER** necessary.

- Q.1** a) What are the different types of faults which may occur on power system? (06)
b) Explain the effect of faults on power system. (04)

OR

- a) Explain the construction, working and applications of ACB (06)
b) In case of circuit breaker explain the following (04)
i) Rated Breaking current
ii) Rated Making current.

- Q.2** a) Determine the time of operation of relay having rating of 5 A IDMT and having plug setting of 125% and TMS=0.6. The CT ratio is 400/5 and the fault current is 4000A. From IDMT curve (06)

| | | | |
|------------------------|---|------|-----|
| PSM | 5 | 8 | 12 |
| Time of operation(Sec) | 4 | 3.15 | 2.8 |

- b) Explain different zones of protection. (04)

OR

- a) Draw a neat block diagram of static relay and explain function of each block. (06)
b) With neat diagram explain principle of operation of distance relay. (04)

- Q.3** a) Explain the percentage differential protection of alternator. (06)
b) A 3 ph, 11 kV/132 kV, Delta-Star power transformer is protected by differential protection. The CTs on LV side have a current ratio of 500/5. What must be the current ratio of the CTs on HV side and how should be connected? (04)

OR

- a) An 11 kV, 70MVA, alternator is provided with differential protection. The percentages of winding protected against phase to ground fault is 75%. The relay is set to operate when there is 20% out of balance current. Determine the value of the resistance to be placed in the neutral to ground connection. (06)
b) Explain single phasing in case of Induction motor. (04)

- Q.4** With a neat diagram explain the characteristics of Mho relay (admittance type relay) (10)

OR

What are the adverse effects of arc resistance and power swing on performance of distance relay? (10)

- Q.5** Explain in detail various causes of internal over voltages on power system. (10)

OR

What is mean by arcing around? What are its effects? How can it be minimized by neutral earthing? (10)

- Q.6** What are the various electrical equipments used in substation? Explain function of each in detail. (10)

OR

Derive the various steps involved in development of algorithm of short circuit studies for designing relaying scheme. (10)