Total No. of Questions :10]

SEAT No. :

P3076

[Total No. of Pages :3

[5154] - 642

B.E. (Electrical)

SWITCHGEAR & PROTECTION

(2012 Pattern) (Semester - II) (End Sem.)

Time : 2½ Hours] *[Max. Marks :70*

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of electronic pocket calculator is allowed.***
5) ***Assume suitable data, if necessary.***

Q1) a) What are different effects of faults in power system. **[4]**

b) Define following terms w.r.t. circuit breaker switching **[6]**

i) RRRV

ii) Recovery voltage

iii) Restriking voltage

OR

Q2) a) In a system of 132 kV the phase to ground capacitance is 0.01 µF & the inductance per phase is 6H. Calculate the voltage appearing across the pole of a circuit breaker if magnetising current of 10Amp (instantaneous) is interrupted. Also find the value of resistance to be used across contact space to eliminate the restriking voltage transients. **[4]**

b) With neat diagram explain working of vacuum circuit breaker. **[6]**

P.T.O.

Q3) a) Classify relays on the basis of operating time of relay. **[4]**

b) Explain following ratings of circuit breaker **[6]**

i) Rated making capacity.

ii) Rated breaking capacity.

OR

Q4) a) State chemical properties of SF_6 gas. **[4]**

b) Determine the time of operation of a relay having rating of 5A, IDMT type & having relay setting of 125% TSM = 0.6. The relay is connected to a supply circuit through a C.T. of ratio 400/5. The fault current in system is 4000A. Given the following relay characteristics curve. **[6]**

PSM	5	8	12
Time (sec)	4	3.15	2.8

Q5) a) Draw block diagram of static relay & explain its working. **[8]**

b) With neat diagram, describe direct & indirect lightning strokes. **[8]**

OR

Q6) a) Explain: **[8]**

i) Sampling theorem

ii) Antialiasing filter

b) Draw & explain block diagram of PMU. **[8]**

Q7) a) Explain protection of alternator against- **[12]**

i) Unbalanced loading

ii) Loss of prime-mover

iii) Loss of excitation

b) A 3 phase 66 kV/ 11 kV, Star-Delta connected transformer is protected by Merz price system. The CT's on LT side have a ratio of 420/5. Find the CT ratio on HT side. **[6]**

OR

Q8) a) With neat diagram explain construction & working of Buchholz relay. State its advantages & disadvantages. **[12]**

b) The neutral point of a 3 phase 20 MVA, 11 kV alternator is earthed through a resistance of 5Ω. The relay is set to operate when there is out of balance current of 1.5 Amp. The CT's have ratio of 1000/5. What is the percentage of winding protected against earth faults.

If 90% of winding is required to be protected against earth fault, calculate the value of neutral earthing resistance. **[6]**

Q9) a) Draw block diagram & explain components of Power Line Carrier Communication (PLCC). **[8]**

b) Draw & explain protection of bus-bar using high impedance differential relay. **[8]**

OR

Q10)a) Explain effect of **[8]**

i) arc resistance

ii) power swings

on the operation of distance relay.

b) Draw & explain three zone distance protection for transmission lines. **[8]**

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