Total No. of Questions :8]

SEAT No. :

P3318

[Total No. of Pages :2

[5670]-587
B.E. (Electrical)
SWITCHGEAR & PROTECTION
(2015 Pattern) (End sem.) (Semester-II) (403147)

Time : 2½Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of non-programmable scientific calculator is allowed.***
5) ***Assume suitable data, if necessary.***

Q1) a) Explain the need of protective system. What are different causes of fault? Explain the effects of fault. **[6]**

b) Derive the expression for restriking voltage and calculate the value of $RRRV_{max}$ **[7]**

c) Draw neat diagram and explain the construction and working principle of vacuum circuit breaker. **[7]**

OR

Q2) a) The current rating of an overcurrent relay is 5 A. The relay hacan plug setting of 150% and time multiplier setting (TMS) of 0.4. The CT ratio is 400/5. Determine the operating time of relay for a fault current of 6000 A. at TMS=1, operating time at various PSM are given table below. **[6]**

PSM	2	4	5	8	10	20
Operating time in Second	10	5	4	3	2.8	2.4

b) Describe in details the concept of resistance switching associated with high voltage circuit breaker. **[7]**

c) Draw neat diagram and explain the construction and working principle of puffer type SF_6 circuit breaker**.** **[7]**

Q3) a) With neat block diagram explain Numerical relays. Also state its advantages and disadvantages. **[10]**

b) Explain with neat diagram single phase preventer in case of three phase induction motor. **[8]**

OR

P.T.O.

Q4) a) What are the abnormal conditions and causes of failure in three phaes induction motor? **[8]**

b) State and explain the sampling theorem. Also explain anti-aliasing filter. **[10]**

Q5) a) Explain the protection of alternator against: **[8]**

i) Unbalanced loading

ii) Loss of prime mover

b) A three phase, 11kV/132kV, Delta-Star connected power transformer is protected by differential protection. The CTs on the LV side have a current ratio of 500/5. What must be the current ratios of CTs on the HV side and how should they be connected? **[8]**

OR

Q6) a) Explain the 'magnetic inrush current' phenomenon in transformer. Suggest suitable protection for the same. **[8]**

b) A 3 phase, 12kV alternator winding is required to be protected against earth faults. The 80% of winding is protected against earth fault by a relay having pick up current of 1 Amp. The CT has a ratio of 1000/5. Calculate resistance to be connected between neutral to ground. If resistance of 10 ohm is connected between neutral to ground , how much percentage of winding is protected against earth fault. **[8]**

Q7) a) What do you mean by power swings and arc resistance? Explain the effect of power swings and arc resistance on the performance of the distance relay. **[8]**

b) Explain the three stepped distance protection for transmission line with neat diagram. **[8]**

OR

Q8) a) Draw block diagram and explain components of power Line carrier Communication (PLCC) for long transmission lines. **[8]**

b) Write s short note on Wide Area Measurement System (WAMS) **[8]**

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