Total No. of Questions : 10]

SEAT No. :

P3598

[Total No. of Pages : 2

[4959]-1072

B.E. (Electrical)

SWITCHGEAR AND PROTECTION

(2012 Pattern)

Time : 2.30 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) State the different causes of faults. **[4]**

b) Derive the expression for restriking voltage and RRRV. **[6]**

OR

Q2) a) A 220 KV, 50 Hz system have the reactance and capacitance upto the location of circuit breaker is 8Ω/ph and 0.025 μF respectively. If magnetizing current of 10A is interrupted (instantaneous). Determine the following :- if the resistance 600Ω is connected across the contacts of circuit breaker. **[4]**

i) Voltage appearing across the pole of circuit breaker
ii) Damped frequency of oscillation
iii) Critical value of oscillation free resistance.

b) Explain construction and working of ACB. **[6]**

Q3) a) An 11 KV, 500 MVA 3sec circuit breaker suddenly closes on to a fault. Determine : **[4]**

i) The symmetrical breaking current
ii) The asymmetrical breaking current assuming 50% dc component.
iii) The peak making current as per IEC specification.
iv) The short time current rating.

b) Explain construction and working of induction type directional power relay. **[6]**

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OR

Q4) a) Explain different zones of protection. **[4]**

b) Explain the working principle of a current differential relay. **[6]**

Q5) a) Draw and explain wave shape of a lightning stroke. **[8]**

b) Discuss the merits and demerits of a static relay. **[8]**

OR

Q6) a) Draw and explain Rod-Gap Arrester. **[8]**

b) Explain with block diagram Numerical Relay. **[8]**

Q7) a) Explain restricted earth-fault protection for a transformer. **[8]**

b) A 6.6 KV, 10 MVA star-connected alternator has a reactance of 2Ω/ph and negligible resistance. Merz price protection is used for protection of winding.The neutral grounding resistance is 5Ω. If only 10% of the winding is to remain unprotected, determine the setting of the relay. **[8]**

OR

Q8) a) Explain magnetic inrush and overfluxing phenomenon along with its disadvantages. **[8]**

b) Draw and explain single phasing protection for 3ϕ Induction motor. **[8]**

Q9) a) State the advantages of WAM. **[4]**

b) Explain the differential protection scheme of busbar using high impedance relay. **[6]**

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

OR

Q10) a) State the algorithm for impedance numerical relay. **[4]**

b) Mention the types of overcurrent protection for Feeder using directional over current relay. Explain any one method in detail. **[6]**

c) Explain the effect of arc resistance and power swing on the performance of distance relay. **[8]**