Total No. of Questions :8]

SEAT No. :

P3917

[Total No. of Pages :2

[5561]-587
B.E. (Electrical)
SWITCHGEAR & PROTECTION
(2015 Pattern) (403147) (Semester - II)

Time : 2½ Hours] *[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) What is fault? What are the causes of faults? State the different types of fault. **[6]**

b) Explain the resistance switching in case of circuit breaker. **[7]**

c) Explain the rated characteristics of High Voltage circuit breakers as per IS-2516. **[7]**

OR

Q2) a) What are the essential qualities of protective relaying? Explain. **[6]**

b) A 11 kV, 3-ph, 50Hz alternator is protected by the circuit breaker. The inductive reactance upto to circuit breakers is 5ohm and distributed capacitor. between phase and neutral is 0.01 microfarad. Determine- (i) peak restriking voltage across cb. (ii) Frequency of restriking voltage. (iii) Average rate of restriking voltage up to peak value. (iv) Maximum value of RRRV. **[7]**

c) Draw the neat sketch & explain in detail the construction & working principle of SF6 circuit breaker. **[7]**

Q3) a) Enlist the abnormal operating conditions and causes of failure of 3-phase induction motor? **[8]**

b) With neat block diagram, explain numerical relays. Also enlist its advantages. **[10]**

OR

P.T.O.

Q4) a) Explain the protection against the single phasing of 3-ph Induction motor. **[8]**

b) Explain static relays with block diagram and operating principle. Also state its merits and demerits. **[10]**

Q5) a) Explain the phenomenon of over fluxing in the transformer. Suggest suitable protection for the same. **[8]**

b) A 3-phase, 2-pole, 11 kV, 10 MVA alternator has neutral grounding resistance of 5 ohm. The machine is protected by differential protection in which relay trips when its current exceeds 25% of full load current. Determine percentage of winding protected against earth fault. **[8]**

OR

Q6) a) Prepare a list of various types of faults taking place in alternator on stator side and rotor side and explain protection against- (i) Loss of field (ii) Rotor temperature rise. **[8]**

b) A 3 phase, 33/3.3 kV star/delta connected transformer is protected by differential protection. CT's on LT side have a ratio of 400/5. Determine the CT ratio on HT side. Draw the connection diagram. **[8]**

Q7) a) Draw the block diagram and explain the working of carrier current protection scheme for long transmission lines. **[8]**

b) 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]**

OR

Q8) a) Compare Impedance relay, Reactance relay and Mho relay with reference to application and characteristics used for protection of transmission line. **[8]**

b) Draw the necessary sketches for 3-zone distance protection scheme for transmission lines and explain it. **[8]**