

Total No. of Questions :8]

SEAT No. :

**P3917**

**[5561]-587**

[Total No. of Pages :2

**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

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**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]

