

Code: EE5T3

III B.Tech - I Semester – Regular Examinations - November 2014

**SWITCH GEAR PROTECTION AND CARRIER
COMMUNICATION
(ELECTRICAL & ELECTRONICS ENGINEERING)**

Duration: 3 hours

Marks: 5x14=70

Answer any FIVE questions. All questions carry equal marks

1. a) What are the various components of a protection system?
Briefly describe their functions with the help of a schematic diagram. 7 M
- b) Discuss the essential qualities of a protective relay. 7 M
2. Explain the operating principle of:
 - a) Electro Magnetic attraction relay. 7 M
 - b) Electro Magnetic induction type relay. 7 M
3. a) Explain with neat sketch the operation of an Directional relay. 7 M
- b) Classify the types of over current relays and give their applications along with their approximate characteristics? 7 M

4. a) What is an impedance relay? Explain its operating principle. 7 M
- b) What is an Off-Set Mho characteristic? Discuss how it is realized and field of applications. 7 M
5. a) Discuss the various types of faults associated with generator. 7 M
- b) A 500kVA, 6.6kV star connected alternator has a synchronous reactance of 1.5Ω per phase and negligible resistance. The differential relay operates if the out-of-balance current through it exceeds 25% of the normal full load current of the alternator. If the star point of the alternator is earthed through a resistance of 8Ω . What percent of the stator winding is left unprotected? Show that the effect of the alternator reactance can be neglected. 7 M
6. a) Explain 3-zone distance protection of a transmission line. 7 M
- b) A 132 KV, 3-phase, 50Hz overhead line of 100 km length has a capacitance to earth of each line of $0.01\mu\text{F}$ per km. Determine inductance and KVA rating of the arc suppression coil suitable for this line. 7 M

7. a) What are the causes of over voltages arising on a power system? Why is it necessary to protect the lines and other equipment of the power system against over voltages? 7 M
- b) Why is insulation co-ordination required in a large power system? What is meant by BIL of an equipment. 7 M
8. Explain the construction and operation of SF6 circuit breaker with a neat sketch. 14 M