

Code: 9A02703

R09

B.Tech IV Year I Semester (R09) Regular & Supplementary Examinations December 2014

SWITCH GEAR AND PROTECTION
(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks

- 1 (a) What are the features of auto-restoring circuit breaker? List out its limitations.
(b) In a 220 KV system the phase to ground capacitance is $0.03 \mu\text{F}$; the inductance is 7.5 H . calculate the voltage appearing across the pole of C.B, if a magnetizing current of 8 A is interrupted. Also calculate the value of resistance to be used across the contact space to estimate the striking voltage transient.
- 2 Explain the operation of SF6 circuit breaker with relevant sketch in a detailed manner.
- 3 (a) What are the different types of distance relays? Compare their merits and demerits.
(b) Discuss the principle of operation of induction cup relay with relevant diagram.
- 4 (a) Discuss about over current definite time relays.
(b) Explain the terms:
(i) Amplitude comparators.
(ii) Phase comparators.
- 5 (a) What are the abnormal conditions in a large synchronous generator against which protection is necessary?
(b) An 11 kV, 30 MVA star connected generators has reactance of 5Ω per phase and negligible resistance. Merz-price protection is used for protection of winding. The neural grounding resistance is 9Ω . If only 15% of the winding is to remain unprotected, find the setting of the relay.
- 6 (a) Explain the percentage differential relay protection for star/delta transformer with relevant diagram showing of the relay.
(b) A 3- ϕ transformer rated for 33/11 kV is connected star/delta and the corresponding CT on the LV side has a ratio of 300/5. Determine the ratio of transformer on the HV side.
- 7 (a) Discuss the three zone distance relay protection.
(b) What is the need for the protection of bus bars?
- 8 (a) Why is insulation coordination required in a large power system? What is meant by BIL of equipment?
(b) Explain why surge diverters are located very close to the equipment to be protected.
