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Code No.: 32213 AS

VASAVI COLLEGE OF ENGINEERING (Autonomous), HYDERABAD
B.E. (E.E.E.) III Year II-Semester Advanced Supplementary Examinations, June/July-2017

Switchgear and Protection

Time: 3 hours

Max. Marks: 70

Note: Answer ALL questions in Part-A and any FIVE from Part-B

Part-A (10 × 2 = 20 Marks)

1. What is the importance of zone protection in power system protection?
2. Define the following terms in power system relay protection
a) operating time b) reset / dropout
3. With a neat sketch explain the block diagram of numerical relay
4. Mention the field applications of over current relays
5. Differentiate between operating point and bias coil. What are the typical values of operating coil and bias coil for alternator and transformer in percentage differential protection?
6. What are the various stator protection schemes in alternator?
7. Differentiate between SF6 and air blast circuit breakers.
8. What measures are taken to reduce restriking voltage and transient oscillations in circuit breaker?
9. How tower footing resistance is reduced?
10. How internal over voltages are originated in transmission line?

Part-B (5 × 10 = 50 Marks)

11. a) Discuss about time-graded and current-graded over current protection schemes. [6]
b) Explain the importance of primary and backup protection in power system protection. [4]
12. a) With a neat block diagram explain the function of static inverse over current relay. [5]
b) Explain how an amplitude comparator can be converted to a phase comparator and viceversa. [5]
13. a) Explain protection against loss of excitation in a generator. What happens when generator loses excitation? [5]
b) An 11 kV, 100 MVA alternator is grounded through a resistance of 6 Ω. the C.T.s have a ratio 1000/5. The relay is set to operate when there is an out of balance current of 1A. What percentage of the generator winding will be protected by the percentage differential scheme of protection? [5]
14. a) A circuit breaker is rated as 2500 A, 1500 MVA, 33 kV, 3 secs, 3-φ oil circuit breaker. Determine the rated symmetrical breaking current, rated making current, short time rating and rated service voltage. [6]
b) Briefly explain about type test and routine tests. [4]
15. a) Explain the significance of insulation coordination. [5]
b) Explain the Principle operation of horn gap and rod gap arrestor. [5]
16. a) Explain the construction and working principle of reverse power relay. [5]
b) Explain how the stepped time distance characteristics are obtained with impedance relay. [5]
17. Answer any *two* of the following:
a) How zero sequence component is useful to provide inter turn protection in generator. [5]
b) Resistance switching in circuit breaker. [5]
c) What is Peterson coil and how it is useful in providing protection against arcing grounds. [5]