

Roll No.

Total Pages : 4

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B.Tech. 6th Semester Examination (Under CBS)
POWER SYSTEM-II
(EL-312)

Time : 3 Hours] [Max. Marks : 60

Notes:

- (i) Questions no. 1 is compulsory from Part-I
- (ii) Answer any four questions from Part-II.
- (iii) Choose appropriate missing data if any.

PART-I

1. (a) What is restricted earth fault protection for alternators?
- (b) What is an HRC fuse? Compare an HRC fuse with a circuit breaker as interrupting device.
- (c) Explain how arc is initiated and sustained in a circuit breaker when the circuit breaker contacts separate.
- (d) What is the disadvantage of ungrounded neutral?
- (e) What is meant by dead zone when referred to a directional relay and explain clearly how it is taken care of.
- (f) What is Buchholz relay and why is this form of protection an ideal protection scheme?
- (g) What is IDMT characteristic? Explain how this is achieved in practice?

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- (h) What is PLC and its use in power system?
- (i) What is the significance of using p.u. system in power system?
- (j) Differentiate between amplitude comparator and phase comparator. (2 × 10 = 20)

PART-II

2. (a) Two 50 MVA, 50 Hz, 11 kV alternators with sub-transient reactance of $j0.01$ p.u. and a transformer of 40 MVA, 11 kV/66 kV and reactance of $j0.08$ p.u. are connected to bus A. Another generator 60 MVA, 11 kV alternator with reactance of $j0.12$ p.u. is connected to bus B. Bus A and B are interconnected through a reactor of 80 MVA, 20 percent reactance. If a three phase fault occurs on the high voltage side of the transformer, calculate the current fed into the fault. (5)
- (b) Explain the phenomenon of current chopping in circuit breaker. (5)
3. (a) In a short circuit test on a circuit breaker, the following readings were obtained on a single frequency transient:
- (i) Time to reach the peak restriking voltage 40 micro sec.
- (ii) The peak restriking voltage 100 kV.
- Determine the average RRRV. (2)
- (b) Compare the performance of SF₆ gas with air when used for circuit breaking. (3)

- (c) What are volt time curves? What is their significance in power system studies? (5)
4. (a) Explain clearly how the rating of a lightning arrester is selected. What is the best location of a lightning arrested and why? (5)
- (b) Give schemes of protection for a parallel feeder fed from (i) one end, and (ii) both the ends. (5)
5. (a) Explain the principle of Merz- Price system of protection used for power transformers. What are the limitations of this scheme and how are they overcome? (5)
- (b) Describe neat block diagram, the microprocessor based relaying scheme for the protection of synchronous generator by monitoring the field current of the alternator. (5)
6. (a) Explain carrier current protection scheme. With a block diagram and neat sketches discuss how the phase comparison scheme can be used for the protection of feeder fed from one end. What is the basis for the choice of frequency in power line carrier system? Explain whether this scheme can be used for the protection of underground cables. (7)
- (b) Describe with neat block diagram the functioning of static differential relay. (3)

7. (a) A 25 MVA, 13.2 kV, alternator with solidly grounded neutral has a sub transient reactance of 0.25 p.u. The negative and zero sequence reactances are 0.35 and 0.1 p.u. respectively. A single line to ground fault occurs at the terminals of an unloaded alternator. Determine the fault current. Neglect resistance. (5)
- (b) Explain clearly how the selection of current and time settings is done in a time current graded system? (5)