Exam.Code:0935
Sub. Code: 33761

2076

B.E. (Electrical and Electronics Engineering)

Fifth Semester

PC-EE-501: Power System - II

Time allowed: 3 Hours Max. Marks: 50

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Unit.

x-x-x

1. a) Explain the effect of power factor on recovery voltage.
   b) Explain the doubling Effect in the short circuit of the armature of a generator.
   c) Why should transmission systems be neutral earthed?
   d) A circuit breaker is rated at 1,200 amps, 1,500 MVA, 33 kV, 3-sec 3-4 oil circuit breaker. What are its rated normal current, breaking current, and making current rating?
   e) What is a static relay, and under what conditions is it preferred? (5x2)

UNIT - I

2. a) Generators A and B are identical and rated at 13.8 kV, 21,000 kVA, with a transient reactance of 30% at their own kVA base. The transformers are also identical and are rated 13.8/66 kV, 7,000 kVA, and have a reactance of 8.4 percent to their own kVA base. The tie line is 50 miles long; each conductor has a reactance of 0.848 ohms per mile. The three-phase fault is assumed at F, 20 miles from station A. Find the current in the short circuit (Fig.1)



Fig.1

   b) Briefly explain the block diagram of a static relay and give the applications. (6,4)

3. a) A 5,000 kVA, 6,600 volts star-connected alternator has a synchronous reactance of 2 ohms per phase and 0.5 ohms resistance. It is protected by a Mertz Price balanced current system, which operates when the out-of-balance current exceeds 30% of the load current. Determine what proportion of the alternator winding is unprotected if the star-point is earthed through a resistor of 6.5 ohms.
   b) Show that the power in a three-phase circuit can be computed from symmetrical components. (6,4)

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4. a) Explain the principle of distance relays, stating clearly the difference between impedance relay, reactance relay, and mho relay. Indicate the difference on R-X diagrams and show where each type is suitable.

   b) Explain the concept of insulation coordination and basic insulation level. (6,4)

UNIT - II

5. a) From the following data of a 50 Hz generator: e.m.f. to neutral 7.5 kV (rms), reactance of generator and connected system 4 ohms, distributed capacitance to neutral 0.01 μF resistance negligible; find (i) the maximum voltage across the contacts of circuit breaker when it breaks a short-circuit current at zero current, (ii) the frequency of the transient oscillation and (iii) the average rate of rise of voltage up to the first peak of the oscillation.

   b) Show how restriking transient can be damped by connecting a resistance across the contacts of a circuit breaker. (6,4)

6. a) Describe the construction and principle of operation of (i) expulsion-type lightning arrester, (ii) value-type lightning arrester.

   b) Explain the construction and working of SF6 circuit breaker. Discuss its advantages and limitations. (5,5)

7. a) Explain with the aid of circuit and phasor diagrams the function of a Peterson Coil in a 3-phase system. What are permissible practical deviations from resonance in the tuning of the Peterson Coil? What type of relay is connected with such a coil, and how is the relay connected?

   b) What are the causes of overvoltage in a power system? Also, provide its classification and describe various causes of its occurrence in detail. (5,5)

x-x-x