

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE - SEMESTER-VII • EXAMINATION – SUMMER • 2015**

Subject Code : 162403

Date : 08/05/2015

Subject Name : Switch Gear and Fault Analysis

Time:10.30am-01.00pm

Total Marks : 70

**Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) List the disadvantages of rewirable fuses. Explain the construction, working and advantages of HRC fuse. **07**
- (b) Define the static relay. List the advantages of static relay over electromagnetic relays. **07**
- Q.2** (a) Define restriking voltage. Derive the expression for restriking voltage and RRRV. **07**
- (b) Define fault. List the functions of protective relaying and explain the protective zones. **07**
- OR**
- (b) List the functions of isolator and earthing switch. Draw the neat sketch of pantograph isolator. **07**
- Q.3** (a) Explain the interruption of low magnetizing current while disconnecting transformers on no-load in power system. **07**
- (b) Explain the construction and working of air break circuit breaker with neat diagram. **07**
- OR**
- Q.3** (a) Define electric arc. Explain high resistance methods of interruption of electric arc. **07**
- (b) Explain the construction of minimum oil circuit breaker with neat diagram. **07**
- Q.4** (a) Explain the effect and derive the expression of current due to sudden short circuit of RL series circuit. **07**
- (b) A three-phase generator has  $X_1 = 0.15$  p.u.,  $X_2 = 0.15$  p.u. is with solidly grounded neutral. Calculate the ratio of the line currents for line-to-line fault to three phase fault. Assume emf equal to  $1 + j0$  p.u.. **07**
- OR**
- Q.4** (a) Explain the line-to-line fault on unloaded alternator. **07**
- (b) A three-phase, 11 kV, 5000 kVA generator has a steady state reactance  $X_d$  of 20%. It is connected to a 3000 kVA transformer having 5.0% leakage reactance and ratio of 11/33 kV. The 33 kV side is connected to a transmission line. A three-phase fault occurs at the other end of the transmission line. The series reactance between the faulted point and the transformer is 30 ohms. Calculate the steady state fault current assuming no load prior to the fault. **07**
- Q.5** (a) Explain the attracted armature relay in detail. **07**
- (b) Explain the principle of circulating current differential protection. List difficulties with it. **07**
- OR**
- Q.5** (a) Explain the induction disc relay in detail. **07**
- (b) Explain the characteristics of relay unit for over current protection. Draw the connection scheme for over current protection with three over current relays. **07**

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