

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VI • EXAMINATION – SUMMER 2013****Subject Code: 162403****Date: 28-05-2013****Subject Name: Switchgear and Fault Analysis****Time: 10.30 am - 01.00 pm****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) Define RRRV. Derive the equation for $RRRV_{max}$. **07**
(b) Explain the construction and working of HRC fuse. List the advantages and disadvantages of HRC fuse. Justify the use of silver for the fuse link. **07**

- Q.2** (a) List the advantages and limitations of static relays. **07**
(b) Draw the diagram indicating the protective zones in power system. List and explain the desirable qualities of protective relaying. **07**

OR

- (b) Define fault. Explain the current interruption in ac circuit breakers. Draw the waveforms of current and voltage during the fault clearing. **07**

- Q.3** (a) Explain Resistance Switching and Current Chopping with necessary diagrams in brief. **07**
(b) Explain the arc-extinction in the single pressure puffer type SF_6 circuit breaker. List the advantages and disadvantages of SF_6 circuit breakers. **07**

OR

- Q.3** (a) Define electric arc. Explain Slepianös and Energy Balance theories of arc interruption. **07**
(b) Explain the arc extinction in vacuum interrupters. Draw the neat diagram of vacuum interrupter and explain each part. **07**

- Q.4** (a) Explain positive and negative sequence networks of three-phase alternator. Explain single line to ground fault on unloaded three-phase alternator at rated terminal voltage. **07**
(b) Two 11 kV, three-phase, 3000 kVA generators having sub transient reactance of 15% operate in parallel. The generators supply power to a transmission line through a 6000 kVA transformer of ratio 11/22 kV and having a leakage reactance of 5%. Calculate fault current and fault MVA for three phase fault on (i) H.T. side (ii) L.T. side of transformer. **07**

OR

- Q.4** (a) Explain the principle of current limiting reactors. Explain the location of series reactors with necessary diagrams. **07**
(b) A three-phase, four-wire system supplies loads which are unequally distributed in the three phases. The analysis of the current flowing in R, Y and B lines shows that in R line, positive phase sequence component is $200\angle 0^\circ A$ and the negative phase sequence component is $100\angle 60^\circ A$. The total observed current flowing back to the supply in the neutral conductor is $300\angle 300^\circ A$. Calculate the currents in the three lines. **07**

- Q.5 (a)** Explain the construction and working of electromagnetic induction disc relay. Explain plug setting and time setting in induction disc relay. **07**
- (b)** Explain characteristics of over current protection relays. Explain the connection scheme of over current protection relays for three-phase system. **07**

OR

- Q.5 (a)** Explain the principle of operation of directional relays and explain induction disc type directional relay. **07**
- (b)** Explain the principle of circulating current differential protection. List the difficulties in differential protection. **07**
