

**GUJARAT TECHNOLOGICAL UNIVERSITY**  
**BE - SEMESTER– V • EXAMINATION – WINTER 2016**

**Subject Code: 150905****Date: 24/11/2016****Subject Name: Switchgear****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) What is circuit breaker? Discuss the arc phenomenon in a circuit breaker. **07**  
 (b) Discuss the energy balance theory of arc interruption in circuit breaker. **07**
- Q.2** (a) Describe in detail the ratings of a circuit breaker. **07**  
 (b) Derive an expression for restriking voltage (RV) and rate of rise of restriking voltage (RRRV) in terms of system voltage, inductance and capacitance. **07**
- OR**
- (b) A 50 Hz, 13.6 kV, 3-phase alternator with earthed neutral has inductance of 12 mH per phase, and is connected to bus-bar through a circuit breaker. The capacitance to earth between the alternator and the circuit breaker is 0.03  $\mu$ F per phase. Assuming the resistance of the alternator to be negligible, calculate: (1) Maximum value of restriking voltage across the contacts of the circuit breaker (2) Frequency of oscillations (3) Maximum value of RRRV (4) The average rate of rise of restriking voltage (RRRV) up to the first peak. **07**
- Q.3** (a) Compare the relative merits and demerits of minimum oil circuit breaker with that of air-blast circuit breaker. **07**  
 (b) Write short note on: Duties of circuit breaker. **07**
- OR**
- Q.3** (a) Give classification of Circuit Breakers. Describe with neat sketch Air-Break Circuit Breaker. **07**  
 (b) Describe with a neat sketch the axial blast type of air-blast circuit breaker, its principle of operation along with its limitations. **07**
- Q.4** (a) Enumerate the properties of SF<sub>6</sub> gas that make it more useful for circuit breaking. **07**  
 (b) What is vacuum? Describe the construction operating principle and application of vacuum circuit breaker (V.C.B). **07**
- OR**
- Q.4** (a) Write a short note on: Resistance switching in HV circuit breakers. **07**  
 (b) Write a short note on: D.C. circuit breaker. **07**
- Q.5** (a) What are the main parts of equipment which are used for testing of circuit breaker in laboratory type testing station? **07**  
 (b) Draw a basic short circuit testing plant of circuit breaker. **07**
- OR**
- Q.5** (a) Classify the different testing carried out on circuit breakers and explain any two of them. **07**  
 (b) Write a short note on: Indirect testing of circuit breaker. **07**

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