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BIEEE-006

DIPLOMA IN ELECTRICAL ENGINEERING (DELVI)

Term-End Examination

00239

December, 2017

BIEEE-006 : SWITCHGEAR AND PROTECTION

Time : 2 hours *Maximum Marks : 70*

Note : *Attempt any **five** questions. All questions carry equal marks. Use of scientific calculator is allowed.*

1. Choose the best alternatives for the following questions : *7×2=14*

   (a) Arcing on transmission lines is prevented by connecting a suitable
   - (i) Circuit Breaker
   - (ii) Relay
   - (iii) Inductor in the neutral
   - (iv) Capacitor in the neutral

   (b) For high voltage and low current, the preferred breaker is
   - (i) Air blast C.B.
   - (ii) Oil C.B.
   - (iii) Vacuum C.B.
   - (iv) Any one of the above

(c) A Buchholz relay is used for

(i) Internal faults of transformer

(ii) External faults of transformer

(iii) Induction motors protection

(iv) Alternator protection

(d) SF_6 gas has excellent heat transfer properties because of its

(i) Higher molecular weight

(ii) Low gaseous viscosity

(iii) Higher dielectric strength

(iv) Combination of (i) and (ii)

(e) A MHO relay is a

(i) Voltage restrained directional relay

(ii) Voltage controlled over current relay

(iii) Directional restrained over current relay

(iv) Directional restrained over voltage relay

(f) Capacitor switching is easily done with

(i) Air blast C.B.

(ii) Oil C.B.

(iii) Vacuum C.B.

(iv) Any one of the above

(g) Auto-reclosing is used in case of

(i) Lighting arrester

(ii) Air C.B.

(iii) Bulk oil C.B.

(iv) Minimum oil C.B.

2. (a) What is the purpose of circuit breakers ? Explain current chopping. 7

(b) Describe the construction and principle of the operation of the SF_6 circuit breaker. 7

3. In a 132 kV, 3 ϕ, 50 Hz system the L-G capacitance is 0·02 μF and inductance is 4·5 H. Determine 14

(a) Voltage appearing across breaker pole when a current of 5 A is interrupted.

(b) Resistance to be connected across the contacts to eliminate the restriking voltage.

4. Explain the following phenomenon in circuit breakers : 2×7=14

(a) Arc formation and Extinction

(b) Making capacity and Breaking capacity

5. (a) Compare Primary and Backup protection schemes with suitable examples. 7

(b) What do you mean by "Time grading in the overcurrent protection system" ? 7

6. (a) Explain with a neat sketch, the construction and principle of operation of an Impedance Relay. 7

(b) Describe the construction and working of Buchholz Relay. 7

7. Explain carrier current protection of transmission lines. What are the basic apparatus used for power line carrier systems ? *14*

8. Write short notes on any ***two*** of the following : *2×7=14*

   (a) Directional Earth Fault Relay

   (b) C.T. and P.T. Connection

   (c) Minimum Oil Circuit Breaker

   (d) Circulating Current Protection Scheme for Bus-bars