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BIEEE-006

DIPLOMA IN ELECTRICAL ENGINEERING (DELVI)

Term-End Examination

00514 **June, 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) Current rating is not necessary in case of

(i) Isolators

(ii) Circuit Breakers

(iii) Load Break Switches

(iv) None of the above

(b) A power system is subjected to a fault which makes the zero sequence current equal to zero. The nature of fault is

(i) double line to ground

(ii) double line fault

(iii) L-G fault

(iv) three phase to ground

(c) Earth wire on EHV overhead line is provided to protect the line against

(i) lightning surge

(ii) switching surge

(iii) fault voltages

(iv) corona effect

(d) The phase comparators in case of static relays and electro-mechanical relays normally are

(i) Sine and cosine respectively

(ii) Cosine and sine respectively

(iii) Both sine

(iv) Both cosine

(e) The most suitable C.B. for short line fault without switching resistors is

(i) Air Blast C.B.

(ii) Minimum Oil Circuit Breaker (M.O.C.B.)

(iii) SF_6 C.B.

(iv) None of the above

(f) The rate of rise of restriking voltage depends upon

(i) the type of C.B.

(ii) the inductance of system only

(iii) the capacitance of system only

(iv) the inductance and capacitance of system

(g) A Buchholz relay is used for

(i) protection of transformers against all internal faults

(ii) protection of transformers against all external faults

(iii) protection of induction motors

(iv) All of the above

2. What do you understand by C.T. and P.T ? How are these used for transmission line protection ? *14*

3. (a) In a short circuit on 132 kV, 3-ϕ system, the breaker gave the following results :

- Power factor of the fault = 0·45
- Recovery voltage = 0·9 times the full line voltage
- The breaking current had a natural frequency of 15 kHz.

Determine the Rate of Rise of Restriking Voltage (RRRV) for grounded fault. *7*

(b) What is meant by a circuit breaker ? Discuss the "formation of arc" in a circuit breaker. *7*

4. (a) Derive the relation for Rate of Rise of Restriking Voltage (RRRV). *7*

(b) Discuss the different types of Bus-Bar systems used in generating systems. Bring out their relative advantages and disadvantages. *7*

5. Explain with the help of a neat diagram, the functioning of Buchholz Relay. *14*

6. Explain the principle of operation of differential scheme. How do you apply it in the protection of alternators ? *14*

7. Discuss the faults in a transformer. Explain with a neat sketch, the Merz-Price scheme of transformer protection. *14*

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

   (a) Overcurrent Relay

   (b) Impedance Relay

   (c) Air Blast Circuit Breaker
