No. of Printed Pages : 4

BIEEE-006

DIPLOMA IN ELECTRICAL ENGINEERING (DELVI)

Term-End Examination

00993

December, 2016

BIEEE-006 : SWITCHGEAR AND PROTECTION

Time : 2 hours *Maximum Marks : 70*

Note : *Question no. 1 is* ***compulsory****. Answer any* ***four*** *questions from questions no. 2 to 7. Use of scientific calculator is allowed.*

1. Fill in the blanks with the most suitable option. *7×2=14*

   (a) Earth relays have _____ current settings.

   (i) low

   (ii) high

   (iii) very high

   (b) An effective protective relaying should have _____.

   (i) reliability

   (ii) selectivity

   (iii) Both (i) and (ii)

(c) Electromagnetic relays are _____ .

(i) induction type

(ii) rectifier type

(iii) Either (i) or (ii)

(d) For transmission line protection _____ relays are the most suitable.

(i) under voltage

(ii) distance

(iii) earth fault

(e) _____ is used to lower down the magnitude of current.

(i) CT

(ii) PT

(iii) Relay

(f) A phase comparator compares the _____ of two input quantities.

(i) magnitude

(ii) phase angle

(iii) Both (i) and (ii)

(g) SF_6 is used in circuit-breakers for _____ .

(i) cooling

(ii) heating

(iii) arc quenching

2. Define the following properties of a relay : $4 \times 3\frac{1}{2} = 14$

   (a) Selectivity

   (b) Sensitivity

   (c) Reliability

   (d) Speed

3. What are the different types of electromagnetic relays ? Explain the construction and working of induction relay and derive its torque equation. *14*

4. (a) Explain impedance relay in detail. *7*

   (b) Draw and explain the operating characteristic of a reactance relay on R-X diagram. *7*

5. A 3-phase, 20 MVA, star-connected generator is protected by the current balance system of protection. If the ratio of CTs is 1200/5, the minimum operating current of relay is 0·75 A and the neutral resistance is 6 Ω, calculate the percentage of each phase of stator winding which is unprotected against earth faults when the machine is operating at normal voltage. *14*

6. (a) Describe the carrier current protection scheme of transmission lines. 7

(b) Discuss the circulating current scheme for bus bar protection. 7

7. (a) Explain the construction and working of SF_6 circuit-breaker. 7

(b) What are the different tests conducted on circuit-breakers ? Explain in detail. 7