No. of Printed Pages : **4**

BIEEE-006

00281

DIPLOMA-IN-ELECTRICAL ENGINEERING

Term-End Examination

June, 2013

BIEEE-006 : SWITCHGEAR AND PROTECTION

Time : 2 hours *Maximum Marks : 70*

*Note : Attempt **any five.** Question No. **1 is compulsory.***

1. Choose the correct answers : **7x2=14**

   (a) Relay Contacts are normally made up of :

   (i) Silver contact

   (ii) Copper contact

   (iii) Aluminium

   (iv) Lead contact

   (b) Impedance relays can be used for :

   (i) Phase fault only

   (ii) Earth fault only

   (iii) Both earth and phase faults

   (iv) None of above

(c) Sparking between the contacts can be reduced by inserting :

(i) A capacitor in parallel with contact

(ii) A capacitor in series with contact

(iii) A resistor in the line.

(iv) A reactor in the line.

(d) The arc voltage produced in an AC circuit breaker is always :

(i) In phase with the arc current

(ii) Lagging the arc current by 90°

(iii) Leading arc current by 90°

(iv) In phase opposition with the arc current.

(e) Mho relay have an R-X characteristics depicted by :

(i) A straight line passing through origin.

(ii) A straight line parallel to X-axis.

(iii) A straight line parallel to R-axis

(iv) A circle passing through the origin

(f) The relay used for the feeder protection is :

(i) Under Voltage Relay

(ii) Translay Relay

(iii) Thermal Relay

(iv) Buchholz Relay

(g) Solid earthing is provided for the voltage below :

(i) 100 kV (ii) 600 V

(iii) 11 kV (iv) 66 kV

2. (a) Differentiate the following with example : **2x7=14**

(i) Primary and back up protections

(ii) Phase and amplitude comparators

(b) What are the basic characteristics of a relay ? Explain clearly.

3. (a) What are the different types of distance relays ? Compare their merits and demerits with fields of application. **2x7=14**

(b) Describe the construction, principle of operation and application of Buchholz relay. Why is this form of protection an ideal protection ?

4. (a) An IDMT type over current relay is used to protect a feeder through 500/1 A current transformer, the relay has a P.S. of 125% and TMS = 0.3. Find the time of operation of the said relay. If a fault current of 5000 A flows through the feeder. Make use of following characteristics : **2x7=14**

PSM	2	3	5	8	10	15
Time for unit TMS (100% current = 1A)	10	6	4.5	3.2	3	2.5

(b) Explain the working principle of Electromagnetic Induction type relays. What is use of shading ring ?

5. (a) An 11 kV, 100 MVA alternator is provided with differential protection the percentage of windings to be protected against phase to ground fault is 85%. The relay is set to operate when there is 20% out of balance current. Determine the value of resistance in the neutral to ground connection. **10**

(b) Define the term : **4**

(i) Pick up value

(ii) Reset value

(iii) Operating time

(iv) Inter lock.

6. Explain the SF_6 Circuit-breaker with neat and clean diagram. What are the advantages and disadvantages over air blast ckt-breaker ? **10+4=14**

7. Explain the Zonal protection scheme for feeder. Describe the reactance relay characteristic for three zone protection, also draw the contact circuit for the same. **14**