Total No. of Questions :8] *[Total No. of Printed Pages :2*

 Roll No.....

MEHP/MEPS/MTPS-103

M.E./M.Tech. I Semester

Examination, June 2017

Advance Power System Protection Relays

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.
ii) All questions carry equal marks.

1. a) What is a relay? How are relays classified? Describe the essential features of a protective relay with reference to reliability, selectivity, speed of operation and discrimination.
   b) What is the role of instrument transformers in power system protection? Explain.

2. a) What is meant by percent bias? How is this achieved in a practice in a differential relay? Under what circumstances is a percentage differential relay is preferred over the differential one.
   b) How does a distance relay derive its name from its function? Draw a neat sketch and explain in brief its working.

3. a) What is a static relay? What are the merits and demerits of static relays over electromagnetic relays?
   b) Explain the duality between comparators.

4. a) Derive generalized mathematical equation for amplitude and phase comparison.
   b) Enumerate the various types of protections used in an alternator. Describe one method for the protection of stator of an alternator against faults.

5. a) Explain the principle of operation of differential scheme. How do you apply it in the protection of alternators?
   b) Sketch the connection diagram of a scheme of differential protection for a 3-phase Δ/Y transformer and explain its operation.

6. a) State the importance of bus-bar protection. Explain the differential protection system for bus-bar protection.
   b) Describe the distance protection scheme for the protection of transmission lines.

7. a) State and explain the principle of operation of digital and computer aided relays.
   b) Explain the microprocessor implementation of digital distance relaying algorithms.

8. Write short notes on any two of the following:
   a) Reverse power relay
   b) Generator-transformer unit protection
   c) 500 kV relaying protection
   d) Under and over frequency relays

******