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**MEPS/MEHP-103**

M. E./M. Tech. (First Semester)

EXAMINATION, Dec., 2010

**ADVANCE POWER SYSTEMS PROTECTION RELAY***Time : Three Hours**Maximum Marks : 100**Minimum Pass Marks : 40*

**Note :** Attempt any five questions. All questions carry equal marks.

1. (a) Explain clearly the basic principle of operation of a differential relay. Explain its working for (i) an internal fault, and (ii) a through fault. 10  
 (b) Classify the overcurrent relays depending on the time of operation of the relay. Also draw the characteristics for them. 10
2. (a) In what ways the static relay has been successful in replacing the conventional electromagnetic relay ? 10  
 (b) With reference to static relays discuss the use of the following : 10  
 (i) Smoothing circuit  
 (ii) Voltage regulator  
 (iii) Time-delay circuit
3. (a) What is comparator in a protective relay ? Derive the general equation for amplitude comparator. 10  
 (b) Discuss the characteristics of cosine and sine type phase comparators. 10

4. (a) Explain with a suitable diagram the biased differential protection scheme for protection of stator in a generator. 10  
 (b) Discuss the system employed for protection of rotor in a generator. 10
5. (a) Discuss the types of faults encountered in transformers. 6  
 (b) What type of protection scheme is employed for the protection of a large power transformer against short circuits ? With neat sketch discuss the working principle 14
6. (a) The CT ratio for all the CTs in the bus bar differential scheme has to be same and is decided by the feeder carrying maximum current. Explain. 10  
 (b) How do different distance relays perform with respect to their behaviour on load, effect of arc resistance on the reach and response to power swing in transmission line protection. 10
7. (a) Discuss the advantages of different types of digital and computer aided relays over conventional relays. 10  
 (b) Write an algorithm for bus bar protection. 10
8. Write short notes on any two of the following : 10 each  
 (a) Duality between amplitude and phase comparator  
 (b) Reverse power relay  
 (c) Auto-reclosing  
 (d) Generator-transformer unit protection

