

M.E. First Semester (Electrical Engg. (Electrical Power System))

**13572 : Digital Protection of Power Systems**

**EP 2105**

P. Pages : 2

Time : Three Hours



**AW - 3593**

Max. Marks : 80

- Notes :
1. Answer **three** question from Section A and **three** question from Section B.
  2. Due credit will be given to neatness and adequate dimensions.
  3. Assume suitable data wherever necessary.
  4. Illustrate your answer necessary with the help of neat sketches.
  5. Use of pen Blue/Black ink/refill only for writing the answer book.

**SECTION - A**

1. The following data were obtained experimentally, use least square method to fit the straight line to this data : 14

X	-1.0	-0.1	0.2	1.0
Y	1.0	1.099	0.808	1.0

**OR**

2. a) Explain numerical over current protection. 7  
b) State and explain sampling theorem in detail. Also comment on aliasing error. 7
3. a) Draw the block diagram of basic component of digital relays. 7  
b) Explain distance relay based on solution of differential equation algorithm. 6

**OR**

4. Explain digital protection of EHV transmission line base upon travelling waves phenomenon. 13
5. Explain the theory and principle of microprocessor based unit protection scheme of synchronous generator. 13

**OR**

6. a) Explain in detail faults and various abnormal conditions occurring in synchronous generator. Also discuss their effects on it. 13

**SECTION - B**

7. a) What do you understand by inrush current in transformer ? Discussed the factor upon which the inrush magnetizing current depends. 9

- b) List out various types of faults in a transformer. 5

**OR**

8. Explain theory and principle of operation of microprocessor base percentage differential relay scheme for the protection of transformer. 14

9. a) Explain co-ordination criterion for directional multizone distance relay. 7

- b) What is computer graphics ? Discuss its application in detail. 6

**OR**

10. a) Explain the brief setting of first, second and third zone of distance relay. 8

- b) Explain principle of IDMT Relay. 5

11. Discuss the algorithms for calculating system conditions after the occurrence of following faults. 13

i) Three phase to ground fault through fault impedance  $Z_F$  per phase.

ii) Single phase to ground fault.

**OR**

12. a) Explain the assumption for conducting short circuit studies of a large scale power system. 6

- b) Describe various method of transformation of phase quantities to component quantities. 7

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