

M.E. First Semester (Electrical Engg. (Electrical Power System))
13572 : Digital Protection of Power Systems : EP 2105

P. Pages : 2

Time : Three Hours



AW - 3864

Max. Marks : 80

- Notes :
1. Answer **Three** question from Section A and **Three** question from Section B.
 2. Assume suitable data wherever necessary.
 3. Illustrate your answer necessary with the help of neat sketches.
 4. Use of pen Blue/Black ink/refill only for writing the answer book.

SECTION - A

1. Discuss in detail the working of numerical relay with it's block diagram. **13**

OR

2. a) State the explain sampling theorem in detail. **7**
Also comment on aliasing error.
- b) Explain least squared error technique of function approximation. **6**
3. a) Explain in detail phase comparison travelling wave relay. **7**
- b) Derive an expression for impedance and it's angle for digital protection scheme based upon fundamental signal. **7**

OR

4. a) Explain in detail the amplitude comparison relaying scheme for digital protection of EHV/UHV transmission line based upon travelling wave phenomena. **7**
- b) Explain distance relay based on solution of differential equation algorithm. **7**
5. Explain in detail faults and various abnormal conditions occurring in synchronous generator. Also discuss their effects on it. **13**

OR

6. a) Explain in detail microprocessor based unit protection scheme of synchronous generator. **6**
- b) Explain the digital protection scheme of synchronous generator based upon induced 2nd harmonic current in the rotor field circuit. **7**

SECTION - B

7. Explain principle and working of percentage differential scheme for digital protection of transformer. **13**

OR

8. a) What are the different types of faults in a transformer? Discuss in brief. 6
- b) What is inrush magnetizing current in a transformer? Discuss the factors on which it depends. 7
9. a) Explain Co-ordination criterion for directional multizone distance relays. 7
- b) What is computer graphics? Discuss its application in detail. 7

OR

10. What do you understand by the term Relay setting? Explain in detail zone-1, zone-2 and zone-3 setting of distance relay. 14
11. a) Explain the assumptions for conducting short circuit studies of a large scale power system. 6
- b) What is the need of transformation of phase quantities to component quantities? Discuss in brief the transformations used. 7

OR

12. 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.
