GANPAT UNIVERSITY
M. Tech Sem-II (Electrical Engineering)
Regular Examination – April-June-2016
3EE203: Modern Power System Protection

MAX. TIME: 3 HRS.   **MAX. MARKS: 60**

Instructions: (1) This Question paper has two sections. Attempt each section in separate answer book.
(2) Figures on right indicate marks.
(3) Be precise and to the point in answering the descriptive questions.

SECTION - I

Q.-1 (A) Explain essential qualities of a protection scheme in brief. [05]
(B) What do you mean by fault? What are the causes and consequences of fault on power system? [05]

OR

Q.-1 (A) Define (i) Reach (ii) CT burden (iii) Seal in relay (iv) Flag (v) PSM. [05]
(B) What is primary and backup protection? Explain different types of back up protection. [05]

Q.-2 (A) Enlist different faults in generator. Discuss stator inter turn protection of a generator. [05]
(B) Compare simple differential protection with biased differential protection. [05]

OR

Q.-2 (A) Explain the method of protecting bus bars using differential relaying. What are the limitations of this method and how can they be overcome? [05]
(B) Explain magnetising inrush protection of transformer. Also discuss main harmonics consist in magnetising inrush current of transformer. [05]

Q.-3 (A) Describe abnormalities of induction motors in brief. [05]
(B) Explain class A, B and C protection scheme used for generator. [05]

SECTION - II

Q.-4 (A) Explain Mann-Morrison technique of numerical relay. [05]
(B) Deduce a generalized mathematical model of distance relay for digital protection. [05]

OR

Q.-4 (A) What do you mean by numerical relay? Discuss role of each component of the block diagram of numerical relay. [05]
(B) Develop a flow chart for the discrete Fourier transform technique. [05]

Q.-5 (A) Enlist different impedance relays and explain operating principle and characteristic of impedance relay. **[05]**

(B) Explain the need of auto reclosing in modern power system. **[05]**

OR

Q.-5 (A) An earth fault develops at point F on the feeder as shown in fig. and the fault current is 16000 A. The IDMT relays R1 and R2 are fed via 800/5 A CTs. The plug setting of relay R1 is 125 % and time multiplier setting (TMS) of 0.2 The circuit breakers take 0.20 second to clear the fault, and the relay error in each case is 0.15 s. For a plug setting of 200 % on relay R2, determine the minimum TMS on that relay for it not to operate before the circuit breaker at B has cleared the fault. The operating time characteristics of the relays is given in table. **[05]**
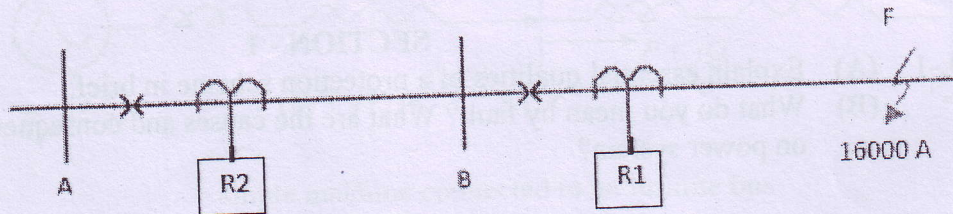
PSM	2	4	5	10	16
Operating time(S) (At TMS=1)	10	5	4	2.8	2.5

(B) Discuss the selection of distance relays for the protection of long, medium and short lines. **[05]**

Q.-6 (A) Discuss the advantage & disadvantage of numerical relay. **[05]**

(B) Explain adaptive relaying with reference to advance power system protection. **[05]**

END OF PAPER