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Reg. No. : .....

Name : .....

Sixth Semester B.Tech. Degree Examination, March 2017
Branch : Electrical and Electronics
08.605 : POWER SYSTEM ENGINEERING – II
(2008 Scheme)

Time : 3 Hours Max. Marks : 100

Instruction : *Answer **all** questions from Part – **A** and **any one** question from **each** Module in Part – **B**.*

PART – A

1. Mention the advantages and disadvantages of reactor control of short circuit currents.

2. Show that symmetrical component transformation is power invariant.

3. State the salient points to be noted while drawing sequence network of generator and transmission line.

4. Write short notes on rate of restriking voltage indicating its importance in arc extinction.

5. Explain the process of current chopping in a circuit breaker.

6. How is discrimination achieved between :
   i) two fuses
   ii) fuse and overcurrent relay ?

7. Illustrate the principle of pilot wire, with reference to power line protection.

P.T.O.

8. A 3-phase transformer rated for 66 KV/11 KV is connected in γ / Δ. The protection CT on LV side have a ratio of 400/5. Determine the ratio of CT's on HV side.

9. Explain the working of a Buchholz relay.

10. Define touch potential and step potential. What are the tolerable limits of body current ? **(10×4=40 Marks)**

PART – B

MODULE – I

11. a) Two 50 MVA, 50 Hz, 11 KV alternator with subtransient reactance of $X'' = j\ 0.1$ pu and a transformer of 40 MVA, 11 KV/66 KV, reactance of 0.08 pu are connected to bus A. Another generator of 60 MVA 11 KV with reactance of 0.12 pu is connected to bus B. Bus A and B are interconnected through a reactor of 80 MVA with 20 percent reactance. If a 3-phase fault occurs on high voltage side of the transformer. Assume a base of 50 MVA.

b) Distinguish between symmetrical and unsymmetrical fault. List the steps involved in fault calculation. How can the load current be taken into account in fault calculation ? **20**

12. a) Derive the conditions for any one type of unsymmetrical fault. Draw sequence network to represent the same.

b) An alternator has the following sequence impedances

$z_1 = (0 + j\ 1.0)\ \Omega$

$z_2 = (j\ 0.2)\ \Omega$

$z_0 = (0 + j\ 1.0)\ \Omega$

The line to neutral voltage at the generator terminal is 1000 V. A fault between yellow and blue phases occur. Find the fault current and line-neutral voltage of healthy phase. **20**

MODULE – II

13. a) Describe the construction, principle of operation and application of SF6 circuit breaker. **12**

b) Explain with a neat sketch the operating principle of HVDC breaker. **8**

14. a) With a neat sketch, explain the working principle of induction type directional overcurrent relay. **10**

b) An IDMT type overcurrent relay is used to protect a feeder through a (500/1) A CT. The relay has a plug setting of 125% and TMS of 0.3. Find the time of operation of the relay if a fault current of 5000 A flows through the feeder. Make use of the following characteristics.

PSM	2	3	5	8	10	15
Time TMS = 1 100% current	10	6	4.5	3.2	3	2.5

10

MODULE – III

15. a) Explain with a flow chart working of a microprocessor based impedance relay. **10**

b) With a neat schematic, explain the percentage differential protection employed in a power transformer. **10**

16. a) Explain the restricted earth fault protection of an alternator. **7**

b) Discuss the protection scheme employed in a bus-bar. What are its limitations ? Explain the modified bus bar protection scheme. **7**

c) Write notes on arc suppression coil. **6**