B.E./B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, APRIL/MAY 2013

ELECTRICAL AND ELECTRONICS ENGINEERING

SEMESTER VII – (REGULATIONS 2008)

EE 9037 EHV POWER TRANSMISSION

Time:3 hrs Max Marks:100

Answer ALL Questions

Part A – (10×2=20)

1. What is the highest transmission voltage level in Tamil Nadu?
2. Compare ACSR and ACAR
3. What is meant by bundling of conductors?
4. Write down the expression for Maxwell's coefficient.
5. How is power controlled in HVDC system?
6. What do you mean by CIA and CEA?
7. What are the objectives of using FACTS devices in power system?
8. Show the schematic representation of thyristor controlled series capacitor.
9. What is meant by primary shock current?
10. Why do birds survive even though they come into contact with EHV lines?

Part B – (5×16=80)

11. (i) Show that the percentage power loss in transmission is independent of the line length. (6)

(ii) A power of 10,000 MW is required to be transmitted over a distance of 1000 km at voltage levels of 400 kV and 740 kV. Determine currents transmitted, total power loss and percentage power loss. Compare and interpret the results. The resistance and reactance (Ω/km) values are as follows: R_{400}=0.031, R_{750}=0.0136, X_{400}= 0.327, X_{750}=0.272 and $\delta=30^{o}$. (10)

12.a.Explain the procedure for constructing capacitance matrix for three phase (horizontal line configuration) untransposed and transposed systems. From the matrices, give the significance of each element. (16)

OR

b. Describe the concept of modes of propagation. How is eigen vectors interpreted for different modes? Also state few applications of modes of propagation. (16)

13.a Explain different types of HVDC links with suitable diagrams. Compare their merits and demerits. (16)

OR

b. With suitable explanations, draw combined converter and inverter characteristics, with power flow directions. Also describe various controls involved. (16)

14.a.(i) What is meant by static synchronous compensator? Draw its simplified circuit and discuss its role in power system. (10)

(ii) Write short notes on uncompensated transmission line. (6)

OR

b. (i) With suitable diagram, describe the function of UPFC in power system? (10)

(ii) Write short notes on SVC. (6)

15.a. Describe the effect of high electrostatic field on humans, animals, plants and heavy vehicles. (16)

OR

b. Consider double circuit configuration for an EHV transmission line. One circuit is energized and other is unenergised. Derive the equation for voltage induced in any one of the conductor present in unenergised circuit. (16)