ANNA UNIVERSITY COIMBATORE

B.E. / B.TECH. DEGREE EXAMINATIONS : JUNE 2009

REGULATIONS : 2007

FOURTH SEMESTER – ELECTRICAL AND ELECTRONICS ENGG.

070280031 - GENERATION TRANSMISSION AND DISTRIBUTION

TIME : 3 Hours **Max.Marks : 100**

PART – A

(20 x 2 = 40 MARKS)

ANSWER ALL QUESTIONS

1. What are the different gases delivered through the stach of a thermal power plant?
2. What are the functions of a control rod in a nuclear plant?
3. Which areas are more potential for wind power generation in INDIA?
4. What are the different materials used for power generation using solar power?
5. What are the primary constants of transmission lines?
6. Write the expression for the loop inductance of a single phase,two wire system.
7. What is ACSR conductor?
8. State the importance of skin and proximity effects.
9. Define regulation of a transmission line.
10. What is ferranti effect?
11. State the applications of power circle diagram.
12. List the factors affecting the corona loss
13. What is safety factor of insulator?
14. Compare and contrast : Underground cabling and cabling done using transmission lines.
15. What is the purpose of a metalic sheath in a cable?

16. What is grading of cables? State its importance.
17. List the various drawbacks of radial system.
18. Define concentrated load. How does it act on AC distributors ?
19. Why HVDC line do not require any reactive power compensation?
20. Which is the first HVDC link in the world?

PART – B

(5 x 12 = 60 MARKS)

ANSWER ANY FIVE QUESTIONS

21. a) Compare the thermal and hydro power generating plants in respect to environmental, load management, reserve capacity, waste disposal aspects (8)

    b) Draw the layout of nuclear power plant. (4)

22. a) Derive the inductance of a three phase transmission line with unsymmetrical spacing. (8)

    b) A three phase overhead transmission line has its conductors arranged at the corners of an equilateral triangle of 2M side. Calculate the capacitance of each line conductor per Km. Given the radius of each conductor is 0.65cm. (4)

23. Determine the following for a single circuit transmission line delivering a load of 45MVA at 132KV and 0.8 power factor lagging.The constants of the line are $A=D=0.99\angle 2^0$ and $B=105\angle 80^0$ Ω/phase.Determine (i) sending end voltage and power.(ii)sending end active and reactive power. (iii) line losss and the VAR's absorbed by the line. (iv) capacity of static compensation equipment at the receiving end to reduce the sending end voltage to 138KV for the same load conditions (v) the unity power factor load which can be supplied at the receiving end with 132KV ass the line voltages at both ends. (12)

24. a) A 3 unit insulator is fitted with a guard ring. The capacitance of the link pins to metal work and guard ring can be assumed to be 20% and 8% of the capacitance of each unit. Determine the voltage across each discs as a percentage of total voltage, string efficiency. (8)

b) The capacitance per kilometer of a three phase belted core cable is 0.2μf/Km between two cores with the third core connected to sheath. Calculate the KVA. The supply voltage is 6.6KV, and 30Km long. (4)

25. a) An electric train taking a constant current of 500A moves on a section of line between two sub stations 10 Km apart and maintained at 600 and 590 volt respectievely. The track resistance is 0.05Ω/Km both go and return. Find the point of minimum potential along the track and current supplied by two substations at that instant. (6)

b) Explain about STATCOM and UPFC? (6)

26. a) Derive the expression for capacitance of a three phase double circuit line flat vertical spacing with transposition. (8)

b) Write short notes on "inductive interference with neighbouring circuits". (4)

27. a) Determine the efficiency and percentage regulation of a three phase 100Km, 50Hz, transmission line delivering 20MW ata power factor of 0.8lagging, 66KV to a balanced load. The conductors are of copper each having resistance 0.1Ω/Km, 1.5 cm outside diameter, spaced equilaterally 2 meters between centres. Neglect leakage reactance and use nominal π method. (8)

b) Draw the receiving end circle diagram for short line. (4)

28. a) Derive an expression for stepped and tapered mains $\frac{a_1}{a_2} = \sqrt{\frac{I_1 + I_2}{I_1}}$ (8).

b) Explain the problems involved and environmental aspects in EHVAC transmission. (4)

*******THE END*******