11/10/13

B.E./B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, NOV / DEC 2013

ELECTRICAL AND ELECTRONICS ENGINEERING

SEMESTER IV – (REGULATIONS 2002/2004/2008)

32

EE335 / EE281 / EE9251– TRANSMISSION AND DISTRIBUTION

Time:3 hrs Max Marks:100

Answer ALL Questions

Part A – (10×2=20)

1. How many regional grids are present in India? Name them.
2. What is meant by distributor?
3. Mention the advantages of stranded conductors
4. Define skin effect
5. Classify the transmission line based on their length
6. Define transmission efficiency
7. Name any two insulators used in overhead lines
8. The underground cable is not used for long transmission. Why?
9. List out the objectives of grounding
10. What is meant by tower spotting?

Part B – (5×16=80)

11. (i) With suitable diagram, explain the structure of electric power system with different voltage levels. (8)
    (ii) State and compare the merits and demerits of HVAC and HVDC systems. (8)

12. a. Derive the expression for calculating the internal and external flux linkages of a conductor carrying current. Using these expressions, derive the equation for the inductance of a single phase line. (16)

OR

b. Derive from first principles, the capacitance per km to neutral of a three phase overhead transmission line with asymmetrical spacing of conductors assuming transposition. Discuss the importance of transposing of transmission lines. (16)

13. a.(i) State the assumptions made while modeling the short transmission line and hence derive the expression for voltage regulation of the line. (8)

(ii) A single phase overhead line is transmitting 1200kW power to a factory at 11 kV and at 0.8 power factor lagging. The total resistance and loop inductance of the line are 3 Ω and 4.5 Ω respectively. Determine sending end voltage and percentage regulation. (8)

OR

b.(i) With suitable expressions show that, to maintain a good voltage profile, the control of reactive power is necessary. (8)

(ii) A 220 kV line has tap changing transformers at both ends. The transformer at the sending end has a nominal ratio 11/220 kV and that at the receiving end 220/11 kV. The line impedance is 15+j50 ohms and the load at the receiving end is 90 MW at 0.9 pf lagging. Assuming that the product of off-nominal tap settings is 1, find the tap settings to give 11 kV at load bus. (8)

14. a. Discuss the reason, why the voltage distribution across the units of string insulator is not uniform? Describe various methods used to make the voltage distribution more uniform. (16)

OR

b. What is meant by grading of cables? Describe intersheath grading and explain how this method is useful for good performance of the cable with suitable equations. (16)

15. a. Assuming that the shape of an overhead line can be approximated by a parabola, deduce expressions for calculating sag and conductor length. How can the effect of wind and ice loadings be taken into account? (16)

OR

b. Discuss the following two methods of grounding:

(i) Solid earthing

(ii) Resistance earthing

State the applications and compare these methods. (16)