



Reg. No. :

Name :

Fourth Semester B.Tech. Degree Examination, May 2014
(2008 Scheme)

Branch : ELECTRICAL AND ELECTRONICS

08.406 : Power System Engineering – I (E)

Time: 3 Hours

Max. Marks: 100

PART - A



Answer all questions :

(4x10=40 Marks)

1. What are the main parameters of a healthy transmission line and mention the significance of each ?
2. What is method of images and how it can be used to determine the capacitance of overhead transmission lines ?
3. Distinguish between GMD and GMR of stranded conductors.
4. Find the capacitance of a 100 km long, 3 phase, 50 Hz overhead transmission line consisting of 3 conductors of diameter 2 cm and spaced 2 m at the corners of an equilateral triangle.
5. What is sag templates and how it is prepared ?
6. What do you mean by grading of cables ?
7. Mention the advantages of Corona.
8. What are the main sources of interference with communication lines and how they affect the communication system ?
9. Briefly explain the main power factor improvement methods.



10. Define the following terms :

- a) Diversity factor b) Load factor
c) Plant factor d) Maximum demand.

PART – B

Answer **any one** question from **each** Module :

Module – I

11. a) Derive the expression for capacitance of a 3 phase unsymmetrical line with and without transposed conductors. 10

b) A 3 phase transmission line is 300 km long. It has a total series impedance of $(35 + j 140) \Omega$ and a shunt admittance of $930 \times 10^{-6} \angle 90^\circ$ siemen. It delivers 40 MW at 220 kV with 90% pf lag. Find the sending end voltage and current by short line approximation. 10

OR

12. a) Explain how a 3 phase transmission line is modelled. 10

b) A 750 kV line utilizes a bundling arrangement of 4 subconductors per phase. The phases are 20 m apart in a horizontal formation. The subconductors forming a bundle are at the corners of a square of side 50 cm. The diameter of each subconductor is 40 mm. Compute the capacitance of the line per phase if the line is transposed. 10

Module – II

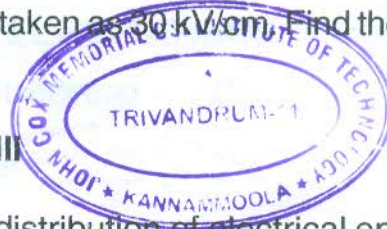
13. a) What is Corona and explain the factors affecting Corona and the remedial measures. 10

b) In a five insulator disc string, capacitance between each unit and earth is $1/6$ of mutual capacitance. Find the voltage distribution across each insulator in the string as % of voltage of the conductor to earth. Find the string efficiency. 10

OR



14. a) What is the significance of string efficiency in suspension insulators and explain the methods to improve its value. 10
- b) A 132 kV line with 2 cm diameter conductor is built so that Corona takes place if the line voltage exceeds 210 kV (rms). If the value of the potential gradient at which ionisation occurs can be taken as 30 kV/cm. Find the spacing between the conductors. 10



Module – III

15. a) Explain the different tariffs in use for the distribution of electrical energy. 10
- b) A single phase, 50 Hz motor takes a supply current of 50 A at 0.6 pf lagging. Calculate the capacity of the condenser required to improve the power factor to 0.9 lagging. 10

OR

16. a) Compare the different power distribution schemes and mention the advantages and disadvantages of each. 10
- b) If a generating station has a maximum load for the year of 18,000 kW and the load factor is 0.305 and maximum demands of the substation were 7500 kW, 5000 kW, 3400 kW, 4600 kW and 2800 kW. Calculate the units generated for the year and the diversity factor. 10