

Code :RR310203

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**III B.Tech I Semester(RR) Supplementary Examinations, May 2011**  
**POWER SYSTEMS II**

(Electrical & Electronics Engineering)

Time: 3 hours

Max Marks: 80

**Answer any FIVE questions**  
**All questions carry equal marks**

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1. (a) Derive the ABCD parameters of a nominal T represented medium length transmission line.  
 (b) Define Voltage regulation of a transmission line and explain clearly the Ferranti effect with a phasor diagram.
2. (a) Give brief account of factors affecting corona loss.  
 (b) A single-phase overhead line has two conductors of dia 1 cm with a spacing of 1m between centers. If the dielectric strength of air is 21kV/cm, determine the line voltage for which corona will commence on the line. Derive the formula used.
3. An overhead line is supported between two towers having heights of 30m and 70m from the datum level. If the horizontal distance between them is 300m, find the height of the conductor from the datum level between the supports. Assume maximum tension of 1720kgf and weight per meter run is 0.727kgf.
4. (a) What do you mean by grading of Cables? Explain briefly different types of grading of cables.  
 (b) A conductor of 1 cm diameter passes centrally through a porcelain cylinder of internal diameter 2cms and external diaeter 7cms. The cylinder is surrounded by a tightly fitting metal sheath. The permittivity of porcelain is 5 and the peak voltage gradient in air must not exceed 34kV/cm. Determine the maximum safe working voltage.
5. (a) Why is their a phase difference between voltage and current in an ac circuit? Explain the concept of power factor?  
 (b) Derive an expression for most economical power factor which may be attained by a consumer?  
 (c) Explain, why a consumer having low power factor is charged at higher rates?
6. Which devices are used in a transmission system for increasing the line voltage when it is reduced below normal level. Explain them with the aid of neat sketches and vector diagrams.
7. (a) A balanced star connected load takes 30A from a balanced three phase four wire supply. If the fuses in two lines are removed find the symmetrical components of the line currents before and after fuses are removed.  
 (b) Draw the vector diagrams for unbalanced phase currents in terms of balanced sequence component currents vectors.
8. (a) Draw the positive , negative and zero sequence networks for the system described as follows. The system consists of a 3- $\phi$  star connected alternator is supplying power to the 3- $\phi$  star connected synchronous motor through a delta-star step up transformer, a transmission line and a star- delta step down transformer .The neutral points of the machine windings are solidly grounded and the transformer winding neutrals are un grounded.  
 (b) Explain the concept of sequence impedances of a 3- $\phi$  star connected rotating load whose neutral is grounded through some impedance and draw its sequence impedance networks.

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