

Code No: V3110

R07

Set No: 1

III B.Tech. I Semester Supplementary Examinations, April/May – 2013

POWER SYSTEMS-II

(Electrical and Electronics Engineering)

Time: 3 Hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. a) Derive the expression for Inductance of a single-phase two-wire line of a transmission line.
b) Obtain the relation that for small changes in temperature, the resistance increases with temperature.
2. a) What do you mean by the term regulation of a transmission line?
b) Show a diagrammatic representation of a medium line in terms of its nominal π model?
3. Obtain the sending end voltage and sending end current of a long transmission line by Rigorous method.
4. What are the main causes of momentary excessive voltages and currents? Explain them.
5. a) What are the factors that effect corona loss on transmission lines?
b) Explain briefly about Radio Interference.
6. a) Explain about suspension type insulators and also mention the advantages of suspension insulators?
b) Define string efficiency, explain it briefly?
7. a) Calculate Sag and tension of a conductor when supports are at equal levels?
b) An overhead line has the following data: Span length 160 meters, conductor dia 0.95 cm, weight per unit length of the conductor 0.65kg/metre. Ultimate stress 4250 kg/cm², wind pressure 40 kg/cm² of projected area. Factor of safety 5. Calculate sag.
8. a) Draw a 3 – core belted cable. Explain it?
b) Mention the limitations of solid type cables?

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Set No: 2

III B.Tech. I Semester Supplementary Examinations, April/May – 2013

POWER SYSTEMS-II

(Electrical and Electronics Engineering)

Time: 3 Hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. a) Derive the expression for Inductance of Three-phase lines in a transmission line.
b) Explain the Effect of Earth on Transmission line capacitance.
2. Explain how transmission lines are classified into short medium and long lines and explain their characteristics.
3. A 3-phase transmission line 200Km long has the following constants:
Resistance/phase /km =0.16 Ω
Reactance/phase /km =0.25 Ω
Shunt admittance/phase /km = 1.5×10^{-6} S
Calculate by rigorous method the sending end voltage and current when the line is delivering a load of 20MW at 0.8p.f. Lagging. The receiving end voltage is kept constant at 110KV.
4. Obtain the Mathematical expression for travelling waves on transmission lines.
5. Define critical disruptive voltage. Derive the expression for it of a single-phase transmission line.
6. a) Mention the causes of insulator failure and give the value of safety factor?
b) What are the methods available to equalize the potentials across various units of the string?
7. a) Calculate Sag and tension of a conductor when supports are at unequal levels?
b) A transmission line has a span of 200 metres between level supports. The conductor has a cross-sectional area of 1.29 cm², weighs 1170 kg/km and has a breaking stress of 4218 kg/cm². Calculate the sag for a safety factor of 5, allowing a wind pressure of 122 kg per square metre of projected area. What is the vertical sag?
8. a) What are the types of insulating materials used in cables?
b) Classify the cables according the voltage for which they are manufactured?

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Set No: 3

III B.Tech. I Semester Supplementary Examinations, April/May – 2013

POWER SYSTEMS-II

(Electrical and Electronics Engineering)

Time: 3 Hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. Determine the capacitance of a Three-Phase line with Unsymmetrical spacing.
2. a) Derive A, B, C & D constants of a medium length transmission line and draw the phasor diagram assuming a π configuration?
b) Define regulation of a short 3 phase ac transmission system and develop an expression for approximate voltage regulation?
3. write short notes on the following
 - a) Velocity of propagation of waves.
 - b) SIL of Long lines.
4. a) Explain the Attenuation and Distortion of a travelling wave. Also give the difference between attenuation and distortion.
b) Briefly explain the Reflection and Refraction of travelling waves.
5. a) Explain the methods used for reducing corona loss.
b) Discuss effect on Regulation of the Transmission line.
6. a) Describe the mathematics expression for string efficiency?
b) What are the points to be noted regarding the potential distribution over a string of suspension insulators?
7. a) Briefly explain about stringing chart and also mention its applications?
b) Derive Sag template. Explain it with its applications?
8. a) Describe the construction of a 3 – conductor cable, with a neat diagram?
b) Write the properties of insulating materials used in cables?

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Set No: 4

III B.Tech. I Semester Supplementary Examinations, April/May – 2013

POWER SYSTEMS-II

(Electrical and Electronics Engineering)

Time: 3 Hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. a) Derive the expression for capacitance of a Three-Phase line with Equal Spacing.
b) A three-phase 50Hz transmission line has flat horizontal spacing with 3.5m between adjacent conductors. The conductors are No. 2/0 hard-drawn seven strand copper (outside conductor diameter=1.05 cm). The voltage of the line is 110KV. Find the capacitance to neutral and the charging current per kilometre of line.
2. a) Draw the Phasor diagram of a short transmission line and derive an expression for voltage regulation?
b) Derive an approximate formula for the voltage regulations of a single phase transmission lines?
3. Draw the equivalent circuit of a 3-phase long transmission line on a phase neutral basis.
4. Draw and explain the Bewley 's Lattice diagram. What are its advantages?
5. Write short notes on the following
(a) Skin Effect (b) Proximity effect (c) Ferranti Effect.
6. Explain briefly about (a) Capacitance grading & (b) Static shielding
7. a) Explain the effect of wind and ice loading on weight of a conductor?
b) A transmission line has a span of 150 m between level supports. The conductor has a cross-sectional area of 2 cm^2 . The tension in the conductor is 2000 kg. If the specific gravity of the conductor material is 9.9 g/cm^3 and wind pressure is 1.5 kg/m length, calculate the sag. What is the vertical sag?
8. a) Compare the merits and demerits of underground system versus over head system?
b) Mention the requirements must fulfil by a cable?
