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B.TECH.
THEORY EXAMINATION (SEM–IV) 2016-17
ELEMENTS OF POWER SYSTEM

Time : 3 Hours *Max. Marks : 100*

Note : Be precise in your answer. In case of numerical problem assume data wherever not provided.

SECTION – A

1. Explain the following: **10 x 2 = 20**

(a) What is proximity effect?

(b) What is the need of transposition of transmission lines?

(c) What is the need of grounding the neutral in power system?

(d) Write the name of different types of conductors in power system.

(e) Define the critical disruptive voltage.

(f) What is the limitation of kelvin's law?

(g) What is the difference between isolator and circuit breaker?

(h) Where do we use grounding transformer?

(i) Discuss the problem associated with EHVAC transmission.

(j) Explain the utilities of "Bundled conductors in Power System?

SECTION – B

2. Attempt any five of the following questions: **5 x 10 = 50**

(a) What are the factors which are responsible for the presence of skin effect in AC. Transmission? Discuss and suggest some measures to reduce it.

(b) Derive A, B, C and D parameters for nominal Π model of a medium line and draw its phasor diagram.

(c) An overhead line having a conductor of diameter 10mm and a span length of 150 meters has sag of 3.5 meters at -5^0 C with 10 mm thick ice coating and a wind pressure of 40 kg/m^2 of projected area. E = 1.27×10^6 kg/cm^2 , $\alpha = 16.6 \times 10^{-6}/^0$ C, ice density 910 kg/m^2 copper density 8850 kg/ m^2 . Determine the temperature at which the sag will remain the same under fair weather condition.

(d) Draw and explain single line diagram of power system.

(e) A string of six insulator units has mutual capacitance 10 times the capacitance to ground. Determine the voltage across each unit as a fraction of the operating voltage. Also determine the string efficiency?

(f) What are the basic needs of HVDC transmission over EHV AC? Also discuss the advantages and disadvantages of HVDC transmission system. What are the limitations of EHV AC transmission systems?

(g) Explain the phenomenon of corona and factors affecting corona.

(h) (i) Explain the "surge impedance loading "in power system.

(ii) List the advantage and disadvantage of neutral grounding.

SECTION – C

Attempt any two of the following questions: **2 x 15 = 30**

3 Derive expressions for calculating the economic voltage and economic conductor cross section of a line. Comment on the results.

4 Write a short note on:

(i) Kelvin's law

(ii) Effect of wind and ice loading on mechanical design of a line.

5 Explain the factors, which are considered during designing a transmission line? Also explain how ground wire selection is done.