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B.TECH.

THEORY EXAMINATION (SEM–VIII) 2016-17

EHV AC & DC TRANSMISSION

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. Attempt all of the following: **10 x 2 = 20**

a) What is the need of the EHV AC transmission? Explain.

b) What are the causes of over voltage?

c) List the factors which affect corona.

d) Why switching operation leads to rise in over voltages?

e) Explain Streamer's Theory as regards the breakdown of gaseous dielectrics in uniform field gap.

f) What is meant by "surge impedance loading"?

g) What is meant by "insulation coordination"?

h) What are the effects of pollution on the performance of EHV lines?

i) State and briefly explain Paschen's law.

j) What are the applications of Multi Terminal DC Systems (MTDC)?

SECTION – B

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

a) Discuss the method of measuring high impulse currents.

b) Explain the sub-synchronous problem in EHV lines and discuss the counter measures to minimize it.

c) The following data for a 750kV line are given. Calculate the corona loss current.

Rate of rainfall, ρ = 5mm/hr; K=5.35 X 10^{-10}; total fair-weather loss P_{FW} =5kW/km; V=750kV line-to-line; H=18m (height); S=15m, (phase spacing); N = 4 (sub-conductors each of r = 0.0175m with bundle spacing); B= 0.4572m (Bundle radius R=B/$\sqrt{2}$=0.3182 m). Use surface gradient on centre phase for calculation.

d) What is meant by extinction angle control? What are its limitations?

e) Discuss the method of reversal of power in HVDC link. Why is this feature needed?

f) What are the various types of HVDC links? Explain briefly.

g) What are harmonics on DC side of the converter? Explain DC harmonics filters.

h) What is audible noise? How the noise generated and what are its characteristics?

SECTION – C

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

3. Explain the measurement of high voltage by sphere gaps and potential dividers. Also discuss the advantages and disadvantages of sphere gaps method over potential dividers method.

4. Explain the voltage multiplier circuits. Also explain the cascade connection of transformer for producing very high AC voltages.

5. Explain the operation of 12-pulse converter and its requirement in HVDC transmission system.