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B TECH
(SEM VIII) THEORY EXAMINATION 2017-18
EHV AC & DC TRANSMISSION

Time: 3 Hours **Total Marks: 100**

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt all questions in brief. **2 x10 = 20**

a. Explain the need of EHV transmission?
b. Compare EHV AC and DC transmission?
c. Explain how corona forms and way to reduce it?
d. What is the effect of Radio interference on EHV AC lines?
e. What do you mean by standard voltages?
f. Explain lightening impulse.
g. What are the applications of HVDC transmission?
h. What are the problems associated with the HVDC transmission
i. What are surge arresters?
j. What are the applications of MTDC system?

SECTION B

2. Attempt any three of the following: **10 x 3 = 30**

a) What do you mean sphere gap? Why it is used? Derive the relation for the field of sphere gap.
b) Explain Corona loss and derive different formulas for its calculation also describes corona current and its expression.
c) Explain Voltage divider methods for the measurement of high voltages.
d) Explain different types of HVDC transmission links.
e) What do you mean by MTDC transmission system classify them?

SECTION C

3. Attempt any one part of the following: **10 x 1 = 10**

(a) Derive the relation for the maximum surface gradient for the bundled conductor having two conductors.

(b) A 750-kV line has $N = 4$, $r = 0.017$ m, $B = 0.457$ m for the bundled conductor of each phase. The line height and phase spacing in horizontal configuration are $H = 12$, $S = 12$ m. Calculate the maximum surface voltage gradients on the center phase and outer phases using Mangoldt formula.

4. Attempt any one part of the following: 10 x 1 = 10

(a) Explain Audible noise. What are the limits for audible noise? Explain how the audible noises are measured.

(b) Explain Ferro resonance overvoltage and calculate the overvoltage due to switching of RLC circuit with step response.

5. Attempt any one part of the following: 10 x 1 = 10

(a) Explain the generation of High voltage AC with proper system and also explain the construction and working of set up for HVAC generation.

(b) Explain the factors for designing of EHV lines under steady state conditions. Also give its limitations which will govern the design of lines.

6. Attempt any one part of the following: 10 x 1 = 10

(a) Explain converter station and discuss the effect of source inductance on the operation of converters.

(b) Explain the principle of dc link control and explain firing angle control and current &excitation angle control methods.

7. Attempt any one part of the following: 10 x 1 = 10

(a) Explain faults in the converters and the method of protection against the overvoltage and overcurrent.

(b) What do you mean by smoothing reactor? Explain how harmonics are generated and the designing of ac filter.