CBCS SCHEME

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16/17EPS151

First Semester M.Tech. Degree Examination, June/July 2018
EHV AC Transmission

Time: 3 hrs. Max. Marks: 80

Note: *Answer FIVE full questions, choosing one full question from each module.*

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

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Module-1

1 a. Explain the importance of power handling capacity in AC transmission lines and line losses. **(08 Marks)**

b. List the considerable factors of AC power transmission at very high voltage? **(04 Marks)**

c. What are the factors which depend on EHV AC power transmission? **(04 Marks)**

OR

2 a. What are the factors which depends on degree of severity in EHV vibration conductor? **(08 Marks)**

b. What are the effects of conductor resistance in EHV lines? **(04 Marks)**

c. What are the effects of ground return current in EHV – AC transmission line? **(04 Marks)**

Module-2

3 a. State the Gauss law? And derive an expression for capacitance of isolated sphere. **(10 Marks)**

b. The field strength on the surface of a sphere of 1cm radius is equal to the corona-inception gradient in air of 30kN/cm. Find the charge on the sphere? **(06 Marks)**

OR

4 a. Derive an expression for capacitance of single conductor concentric with cylinder. **(10 Marks)**

b. A conductor of 5cm diameter is strong inside an outer cylinder of 2cm radius. Find :

i) Corona inception gradient on the conductor
ii) Corona inception voltage in KV
iii) Gradient factor for electrode arrangement
iv) Capacitance of coaxial arrangement/meter
v) Surge impedance? **(06 Marks)**

Module-3

5 a. Explain how audible noise produce in EHV conductor due to Corona effect. **(08 Marks)**

b. What are the factors which depend on audible noise generated by the HV lines? **(08 Marks)**

OR

6 a. Derive equation of standing wave voltage and current in long transmission line at power frequency. **(10 Marks)**

b. A 750kV transmission line has a surge impedance of 275ohms and the transformer to be connected to it has a surge impedance of 1100 ohms for its HV winding. The length of winding is 5km and its far end is connected to a zero resistance ground. A surge of 2400kV is coming in the line which is to be limited to 1725 kV at the transformer bushing by using a short cable. Calculate :

i) Surge impedance and voltage rating of the cable to be interposed between line and transfer
ii) Calculate the voltage at the H.V terminal of the winding as soon as the first reflection arrives from the grounded end?

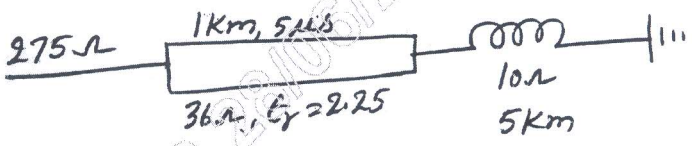

Fig Q6(b) **(06 Marks)**

Module-4

7 a. Define:
   i) protective ratio
   ii) Earn fault factor as refer to lighting surge Absorber? **(04 Marks)**

b. A tower has a 40 Ω footing resistance and two ground wires each with $Z_g = 500\Omega$. The lighting stroke surge impedance is $Z_s = 400\Omega$, For $I_s = 50kA$ crest, calculate the tower top potential by considering
   i) All impedances
   ii) Neglecting the ground wire and stroke surge impedance
   iii) Considering only one ground wire and stroke surge impendence. **(12 Marks)**

OR

8 a. List the mass factors to be investigate by physical modeling of line design using transient network analyser. **(12 Marks)**

b. List the parameters which affects the over voltage in EHV AC transmission line. **(04 Marks)**

Module-5

9 a. Define sub-synchronous resonance and what are the counter measures taken to prevent sub-synchronous resonance problem? **(10 Marks)**

b. What are the remedies for countering induction generator effect? **(06 Marks)**

OR

10 a. Explain how static reactance compensating system use to counter the sub –synchronous resonance. **(08 Marks)**

b. Enumerate the limits and constraints of EHV line design under steady state condition. **(08 Marks)**

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