EEE-041 **Roll No.** | | | | | | | | | | |

B.Tech.

(SEM VII) ODD SEMESTER EXAMINATION, 2015-16

EHV AC & DC TRANSMISSION

[Time: 3 hrs.] **[Max. Marks: 100]**

Note- Attempt **all** questions. All question carry **equal** marks.

1. Attempt any **five** of the following **4x5=20**

(a) What is the need of EHV-AC transmission? Explain.
(b) What are problems associated with AC interconnection.
(c) Explain the advantage of double circuit EHV AC line over EHV AC single circuit line.
(d) Of the following transmission line voltages (given in Kv) used in the world, which ones are used in India at present: 66,132,169,220,275,345,400,500-525,735-765, 1000, 1150.
(e) What is surface voltage gradient and explain the voltage gradient for single conductor.
(f) Derive the voltage gradient for 2 bundle conductor.

2 Attempt any **two** parts of the following: **10x2=20**

(a) Discuss the phenomenon of ferroresonance. Explain its impact.
(b) Explain the occurrence of corona on HV lines. What is meant by the term disruptive critical voltage and visual voltage? Write factor affecting corona on HV line.
(c) Explain the formation of corona on HV transmission line and write list of corona –loss formulae. The following data for 750 Kv line are given. Calculate the corona loss per kilometer and corona loss current.
Rate of rainfall ρ =5mm/hr, $K=5.35*10^{-10}$ P_{fw} =5kw/km
V=750 Kv , Line to Line H=18m ,δ=15m phase spacing.
N=4 sub –conductors each of r= 0.0175m with bundle spacing B=0.4572m (Bundle radius R=B/√2=0.3182) . Use surface voltage gradient on center phase for calculation.

3 Attempt any **two** parts of the following: **10x2=20**

(a) Describe, with a neat sketch, the working of Van de Graaff generator. What are the factors that limit the maximum voltage obtain.
(b) Discuss the different methods of measuring high DC voltage. Write down the limitations in each method.
(c) Derive an expression for rectifier voltage six pulse bridge circuit with phase control and load current/overlap angle rectifier mode.

4 Attempt any **two** parts of the following: **10x2=20**

(a) What are the various types of HVDC link? Explain briefly each with neat circuit diagram.
(b) Explain the converter station with schematic diagram of typical HVDC converter station. What is meant by back to back HVDC station with one example in India?
(c) A bridge connected rectifier is fed from 220Kv/110Kv transformer with primary connected to 220 Kv. Determine the DC output voltage when the commutation angle is 15^0 and delay angle (i)0^o, (ii)30^o, and(iii) $45^{0.}$

5 Attempt any **two** parts of the following: **10x2=20**

(a) List the basic objectives of HVDC control system. Explain constant excitation angle control.
(b) Explain the type of Multi terminal DC (MTDC) system, advantage and its application.
(c) Write brief note on any three.
(i) Converter valve **(iv)** Ground Electrodes
(ii) Converter station **(v)** Smoothing rectifier

(iii) HVDC Cable Transmission