

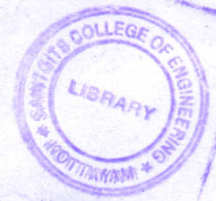
**B.TECH. DEGREE EXAMINATION, MAY 2015****Seventh Semester**

Branch : Electrical and Electronics Engineering

EE 010 701—ELECTRICAL POWER TRANSMISSION (EE)

(New Scheme—2010 Admission onwards)

[Improvement/Supplementary]



Time : Three Hours

Maximum : 100 Marks

**Part A***Answer all questions.**Each question carries 3 marks.*

1. What are the advantages of using bundled conductors ?
2. Explain the reactive power generation of a line.
3. Mention the factors affecting a mechanical design of overhead transmission lines.
4. Explain different types of substations.
5. Mention various application of HVDC.

(5 × 3 = 15 marks)

**Part B***Answer all questions.**Each question carries 5 marks.*

6. A single-phase 10 km line is 8m above the ground. The diameter of the conductor is 2 cm and is separated by 4 m horizontally. Find capacitance between the conductors and capacitance between phase and neutral.
7. Derive an expression for a power flow in a long transmission line.
8. With a neat diagram, describe murray loop test for the location of faults in the underground cables.
9. Explain the various factors affecting corona loss.
10. Mention the advantages of HVDC transmission over HVAC transmission.

(5 × 5 = 25 marks)

**Part C***Answer all questions.**Each question carries 12 marks.*

11. What is an inductance per loop length ? Derive the inductance per conductor in a single-phase two wire system.

Or

12. Derive the expression for the capacitance of 3-phase line with asymmetrical spacing. (12 marks)

Turn over



13. Derive the expression for receiving and sending end power flow through a transmission line. (12 marks)

Or

14. What do you mean by compensation of transmission line? Explain different types of compensation in the transmission line. (12 marks)

15. Define string efficiency. Explain the various methods to improve the string efficiency. (12 marks)

Or

16. An ACSR conductor has the following data : normal copper area =  $120 \text{ mm}^2$ , size =  $(30 + 7) / 6.30 \text{ mm}$ , weight =  $0.4 \text{ kg/m}$ , tensile strength =  $1250 \text{ kg}$ , safety factor =  $5$ . If span length is  $200 \text{ m}$ . find

- Sag in still air ;
- Sag, if the conductor is covered with  $0.5 \text{ cm}$  thick ice (ice density of  $915 \text{ kg/m}^3$ ) ;
- Sag (total and vertical), if the conductor is covered with ice  $0.5 \text{ cm}$  thickness and a wind pressure of  $10 \text{ kg/m}^2$  is acting on the projected area.

(12 marks)

17. Explain :

- Solid grounding ;
- Resistance grounding ;
- Reactance grounding.

(12 marks)

Or

18. (a) With a neat sketch explain the earthing of transformer. (6 marks)
- (b) A 3-phase transmission line is having three conductors equilaterally spaced  $6 \text{ m}$  apart. The diameter of each conductor is  $2 \text{ cm}$ . The air temperature is  $27^\circ \text{ C}$  and pressure is  $72 \text{ cm}$  of Hg. If the surface factor is  $0.82$  and irregularity factor is  $0.90$ , find the critical disruptive and visual critical disruptive voltages.

(6 marks)

19. With a neat sketch explain the different types of HVDC links. Why the bipolar line more commonly used.

(12 marks)

Or

20. Explain :

- Static synchronous compensator ;
- Static Var compensator ;
- Thyristor controlled series reactor ;
- Unified power flow controller.

(12 marks)

[5 × 12 = 60 marks]