

Total No. of Questions : 4]

SEAT No. :

PA-10046

[Total No. of Pages : 2

[6009]-329

T.E. (Electrical)(Insem)

POWER SYSTEM - II

(2019 Pattern) (303148) (Semester - II)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates :

- 1) Answer Q1 or 2, Q3 or 4.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.
- 4) Use of calculator is allowed.
- 5) Assume suitable data if necessary.

Q1) a) Derive the equations for ABCD parameters in a long transmission line.[7]

b) A 132-kV, three-phase, 150km 50-Hz transmission line has the following parameters: $R = 0.11 \text{ ohm/km}$ $L = 1.5 \text{ mH/km}$ $C = 0.01 \text{ } \mu\text{F/km}$ [5]

Calculate

- i) Surge impedance
 - ii) Surge impedance loading
 - iii) Propagation constant
- c) What are the methods used to improve surge impedance loading? [3]

OR

Q2) a) In a three phase transmission line, $A=0.98 \angle 2^\circ$, $B=100 \angle 80^\circ \Omega$, $C=0.002 \angle 90^\circ$, if voltage on both end of the transmission line is maintained at 400kV with angle difference of 30° , determine [7]

- i) receiving end active power and
 - ii) maximum possible active power transfer
 - iii) receiving end reactive power
- b) Give the classification of transmission line in detail. [5]

P.T.O.

- c) State whether the following statement is true or false with mathematical justification.

“In long transmission line, voltage regulation of line is always positive under no load condition”.

[3]

- Q3)** a) A single circuit transmission line at voltage level of 750kV and 50Hz is planned over a distance of 1000km. The average values of line parameters are as given below: For system voltage of 750kV, $r = 0.0136 \Omega/\text{phase/km}$ and $x = 0.272 \Omega/\text{phase/km}$.

[7]

Determine

- Power transferred through this line with equal magnitude of sending and receiving end voltages with 30 degree phase difference.
 - Also calculate power transferred when line is compensated with 50% series capacitive compensation.
- b) State the formula for power loss due to corona. Elaborate the methods which will reduce the corona loss.
- c) Elaborate the effect of smoothness factor of conductor and air density on the critical disruptive corona voltage.

[5]

[3]

OR

- Q4)** a) A three phase transmission line has conductor radius of 0.50 cm and are spaced 3 m in an equilateral arrangement. The air temperature is 26° Celsius and pressure is 74cm of Hg. Surface factor is 0.85. Take breakdown strength of air 30kV/cm (peak). Determine the

[7]

- Disruptive critical voltage in kV/ph
 - Local visual critical voltage in kV/ph. Irregularity factor for local visual corona is 0.72
 - Visual critical voltage for general corona. Irregularity factor for general visual corona is 0.82.
- b) What are the advantages of EHV AC transmission line?
- c) State the following statements is true or false with proper mathematical justification:
- “The corona losses are increases with increase in distance between two conductors.”

[5]

[3]