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 ohm/km L = 1.5 mH/km C = 0.01 µF/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 30º, 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 Ω/phase/km and x = 0.272 Ω/phase/km. **[7]**

Determine

i) Power transferred through this line with equal magnitude of sending and receiving end voltages with 30 degree phase difference.

ii) 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. **[5]**

c) Elaborate the effect of smoothness factor of conductor and air density on the critical disruptive corona voltage. **[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]**

i) Disruptive critical voltage in kV/ph

ii) Local visual critical voltage in kV/ph. Irregularity factor for local visual corona is 0.72

iii) 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? **[5]**

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." **[3]**