

Total No. of Questions : 4]

SEAT No. :

PD108

[Total No. of Pages : 2

[6410]-429

T.E. (Electrical)

POWER SYSTEM - II

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

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) Solve Q1 or Q2, Q3 or Q4.
- 2) Use of calculator are allowed.
- 3) Figures to the right indicates full marks.
- 4) Assume suitable data, if necessary.

Q1) a) Derive the equation for active and reactive power transfer to receiving end when generalized ABCD constant of a transmission line is known. [7]

b) For a 400kV, 300km lossless long transmission line have  $z = j0.35\Omega/\text{km}$  and  $y = j4.2 \mu\text{S}/\text{km}$ .

Find :

- i) Characteristics impedance of transmission line [2]
- ii) Propagation constant of the transmission line [2]
- iii) Generalized ABCD constant [4]

OR

Q2) a) Derive the equation for ABCD parameters for long transmission line. [7]

b) In 132kV transmission line has following generalized constant :

$$A = D = 0.98\angle 2^\circ, B = 90\angle 85^\circ\Omega, C = 0.0004\angle 90^\circ\text{S}.$$

If both end voltage are maintained at constant voltage of 132kV and phase angle difference is  $30^\circ$ . Calculate

- i) Receiving end active power [3]
- ii) Sending end active power [3]
- iii) Transmission efficiency [2]

P.T.O.

- Q3) a) i) List the factor affecting corona loss. [2]**
- ii) Derive the equation for critical disruptive voltage of corona. [5]
- b) The average values of line parameters for 750kV and 1200kV transmission lines are as given below. The length of the line is 500km.

System voltage (kV)	750	1200
$r(\Omega/\text{phase}/\text{km})$	0.0136	0.0027
$x(\Omega/\text{phase}/\text{km})$	0.272	0.231

Determine for each case :

- i) Maximum power transfer. [3]
- ii) Power transfer capability, if phase angle of  $30^\circ$  is maintained between sending and receiving end voltage. [3]
- iii) Power transfer capability, if parallel transmission line is added maintaining phase angle difference of  $30^\circ$ . [2]

OR

- Q4) a) i) List the classification of transmission line according to voltage levels. [2]**
- ii) Elaborate any five advantages of EHVAC transmission line in details. [5]
- b) A three phase transmission line has conductor radius of 0.50 cm and are spaced 3m in an equilateral arrangement. The air temperature is  $26^\circ$  Celsius and pressure is 74cm of Hg. Surface factor is 0.85. Take breakdown strength of air 30kV/cm (peak). Determine the
- i) Disruptive critical voltage in kV/ph. [4]
- ii) Local visual critical voltage in kV/ph. Irregularity factor for local visual corona is 0.72. [2]
- iii) Visual critical voltage in kV/ph for general corona. Irregularity factor for general visual corona is 0.82. [2]

