

Total No. of Questions : 6]

SEAT No. :

P21

[Total No. of Pages : 3

TE/Insem./APR-24
T.E. (Electrical)
303146 : POWER SYSTEM - II
(2015 Course) (Semester - II)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) *Neat diagram must be drawn wherever necessary.*
- 2) *Figures to the right side indicate full marks.*
- 3) *Use of calculator is allowed.*
- 4) *Assume suitable data, if necessary.*

Q1) a) Elaborate step by step procedure for drawing receiving end circle diagram. **[7]**

b) 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 receiving end active power and maximum possible active power transfer. **[7]**

b) State 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

- i) Power transferred through this line with equal magnitude of sending and receiving end voltages with 30° degree phase difference.
 - ii) Also calculate maximum power that could be possible through this line when line is compensated with 50% series capacitive compensation.
- b) Elaborate the effect of smoothness factor of conductor and air density on the critical disruptive corona voltage **[3]**

OR

P.T.O.

- 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). [7]

Determine the

- 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? [3]

- Q5) a)** Determine Ybus matrix of following system [7]

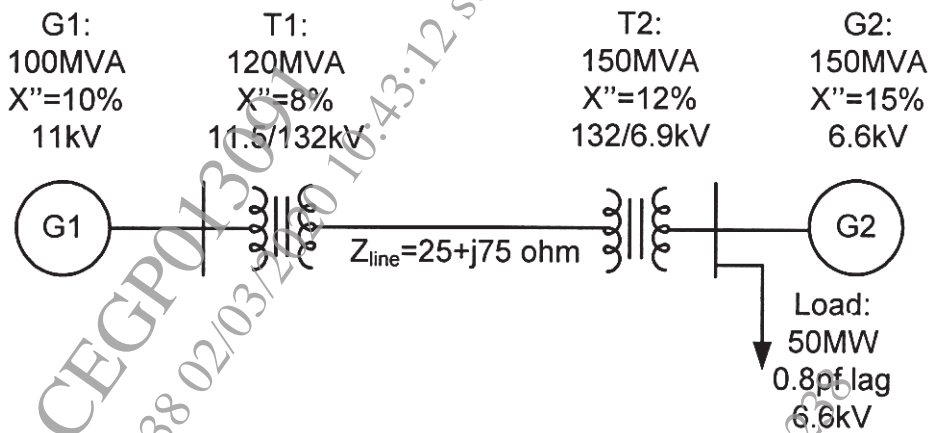
Bus		Impedance	Total line
From	To		Shunt admittance
1	2	j10pu	j5pu
1	3	j15pu	j5pu
1	4	j20pu	j5pu
2	3	j25pu	0pu
3	4	j10pu	0pu

- b)** Replace question mark symbol (?) in following table [3]

Type of Bus	Known variables	Unknown variables
Load Bus	?	?
Slack Bus	?	?

OR

Q6) Draw the per unit impedance diagram of following power system. Take base MVA as 100MVA and 132kV on transmission line. **[10]**



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