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∠2°, B=100∠80°Ω, C=0.002∠90°, 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 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 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

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? **[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]**

G1:
100MVA
X"=10%
11kV

T1:
120MVA
X"=8%
11.5/132kV

T2:
150MVA
X"=12%
132/6.9kV

G2:
150MVA
X"=15%
6.6kV

G1 ——||—— Z_{line}=25+j75 ohm ——||—— G2

Load:
50MW
0.8pf lag
6.6kV

■ ■ ■