Total No. of Questions : 8]

SEAT No. :

P-7567

[Total No. of Pages : 3

[6180]-82
T.E. (Electrical)
POWER SYSTEM - II
(2019 Pattern) (Semester - II) (303148)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Solve Q1 or Q2, Q3 or Q4, Q5 or Q6 and Q7 and Q8.***
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) Take base MVA=2OMVA and base kV=6kV on motor load in figure 1 and draw per-unit impedance diagram to these base values. **[10]**

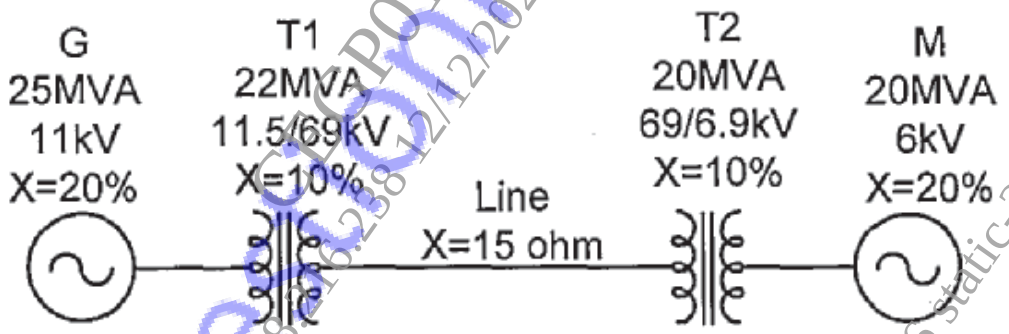

Figure 1

b) Justify the following statements. **[8]**

i) For PV bus active power and voltage of the bus are unknowns.

ii) Per unit system is preferred over actual system parameters.

iii) The decoupled load flow method is faster than the Newton-Raphson load flow method.

iv) The Y-bus matrix is sparse matrix.

OR

Q2) a) Prove that per unit impedance of transformer on both sides are same.**[8]**

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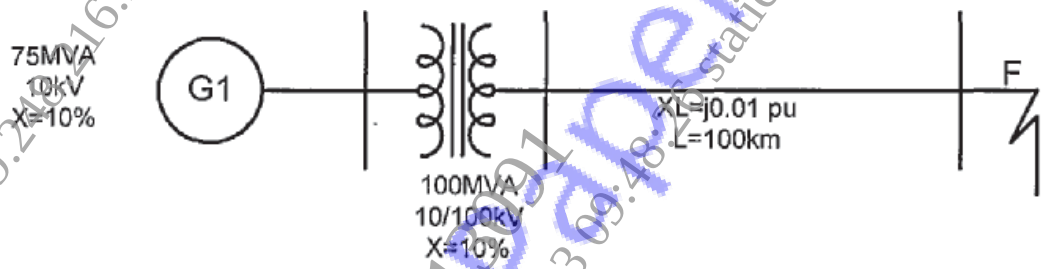
b) In following Y_{BUS} matrix find the missing elements. Assume that shunt elements are neglected **[10]**

$$Y_{BUS} = \begin{bmatrix} -j10 & j5 & j2 & ? \\ ? & ? & j3 & 0 \\ ? & ? & ? & ? \\ ? & ? & j5 & ? \end{bmatrix}$$

Q3) a) What are the different types of current limiting reactor? With circuit diagram, elaborate operation of each type. **[9]**

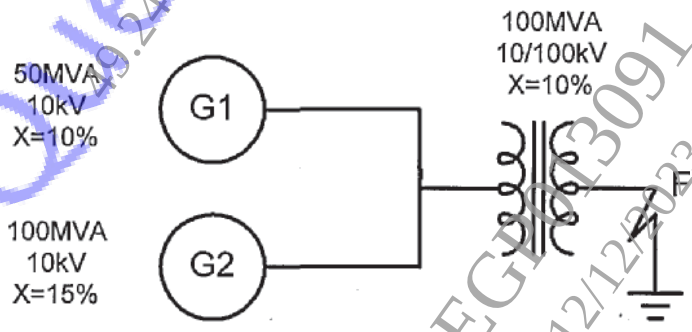
b) For the following system if the symmetrical fault is at point F, calculate the fault current. **[9]**



OR

Q4) a) In case of three phase fault at the terminal of an unloaded alternator, prove that $x_d'' < x_d' < x_d$ and $I_f'' > I_f' > I_f$ with mathematical relation and diagram. (where I_f is fault current) **[9]**

b) Find the fault current supplied by each generator if the symmetrical fault is taken place at point F shown in following figure. **[9]**



Q5) a) In case of LLG fault, show that fault current **[8]**

$$I_f = \frac{-3E_{a1}Z_2}{Z_1Z_2 + Z_2Z_0 + Z_0Z_1}$$

b) A three phase 100MVA synchronous generator with line to line voltage of 11kV having sequence reactance are $x_1 = j0.3pu$, $x_2 = j0.1pu$ and $x_0 = j0.05pu$. If the generator neutral is grounded through a reactance of $x_n = j0.05pu$, determine fault current for LG and LL fault. **[9]**

OR

Q6) a) An unsymmetrical loaded transmission line, show that **[8]**

$Z_0 = Z_s + 2Z_m + 3Z_n$ and $Z_1 = Z_2 = Z_s - Z_m$

b) Draw the zero sequence network for the following transformer connections: **[9]**

i) Delta to delta

ii) Star to star grounded

iii) Delta to star grounded with neutral impedance.

Q7) a) Compare HVDC and EHVAC transmission system based on following points with due justification **[8]**

i) Insulation requirement

ii) Power transfer capability

iii) Economics

iv) Right of way

b) Draw the complete single line diagram of HVDC system showing all components and elaborate any three components in detail. **[9]**

OR

Q8) a) Write short note on : **[8]**

i) Bipolar HVDC link

ii) Multi terminal HVDC link

b) Explain Constant current control in HVDC lines. **[9]**