GANPAT UNIVERSITY
B.TECH SEM-VI (ELECTRICAL)
REGULAR EXAMINATION APRIL-JUNE-2015
2EE602:-POWER SYSTEM ANALYSIS

Time: 3 Hours   Total Marks:-70

Instructions: - 1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

SECTION-I

Que.-1 (A) List the surge diverters used for protection of system insulation against transient [03] overvoltage. Explain any one of them.

(B) Derive the equation for refraction voltage of travelling wave when line is terminated [05] through the capacitor. A 500kV with 2 microsecond rectangular surge on a line having a surge impedance of 350 ohm. The value of capacitance is 3000 pF. Find out the value of the refraction wave.

(C) Discuss on ground wires. [04]

OR

Que.-1 (A) Explain the transient in both circuits: (i) R-C Circuit and (ii) R-L-C Circuit. [05]

(B) Why velocity of travelling wave in cables is smaller than overhead lines? [03]

(C) Draw the wave forms of voltage and current in open ended lines. [04]

Que.-2 (A) Explain Single Line Diagram for power system analysis. [02]

(B) Draw impedance and reactance diagram of given circuit. [04]
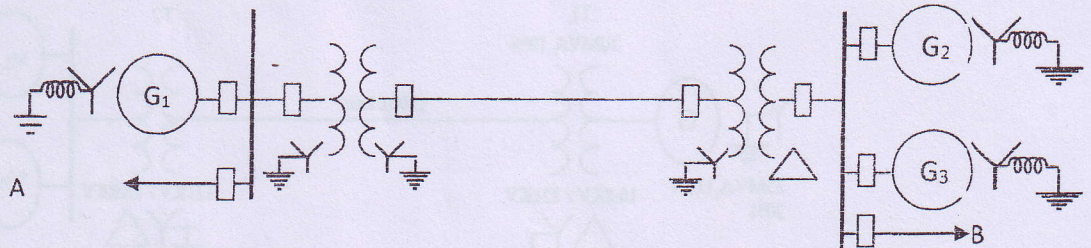
(C) Draw the per unit impedance diagram for the power system shown in figure. Neglect [05] resistance and use a base of 200 MVA, 220 kV in 50 Ω line. The rating of generator, transformers and motor are: - Generator: 300MVA, 25kV, X"=20%; Motor: 90 MVA, 11kV, X" = 30 %; Y – Y transformer: 200 MVA, 12Y / 220Y kV, X = 15 %; Y - Δ transformer : 200 MVA, 11Δ / 220Y kV, X = 15 %.
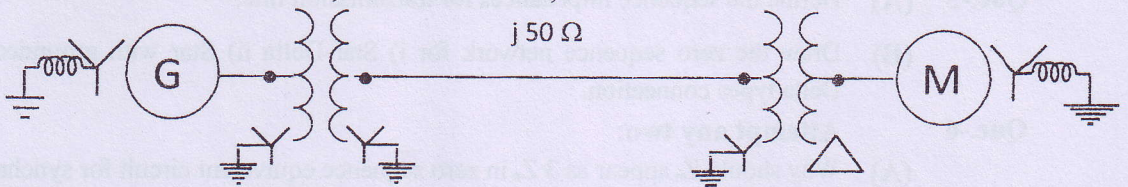
OR

Que.-2 (A) Write down a short note on PU quantities at different base. [03]

(B) Reactance of a generator is given by 0.25pu based on 18kV, 500MVA. Find new pu [03] of reactance on 20kV, 100MVA.

(C) Make a short-note on modelling of Synchronous machine. [05]

Que.-3   **Attempt any three:**   **[12]**

  (A)   Define complex power in brief.

  (B)   Discuss on Wilson's theory for charge formation.

  (C)   What is a circuit breaker? Make a short not on selection process of circuit breaker.

 (D)   Distinguish between symmetrical and unsymmetrical faults. Which type of fault most sever in practically?

SECTION-II

Que.-4 (A)   With necessary diagram explain the transient on transmission line and derive the equation for maximum symmetrical short circuit current.   **[06]**

  (B)   For the given network as shown in figure a three phase fault occurs at F. Determine the fault current. Take base value 100MVA and 11KV at generator.   **[06]**
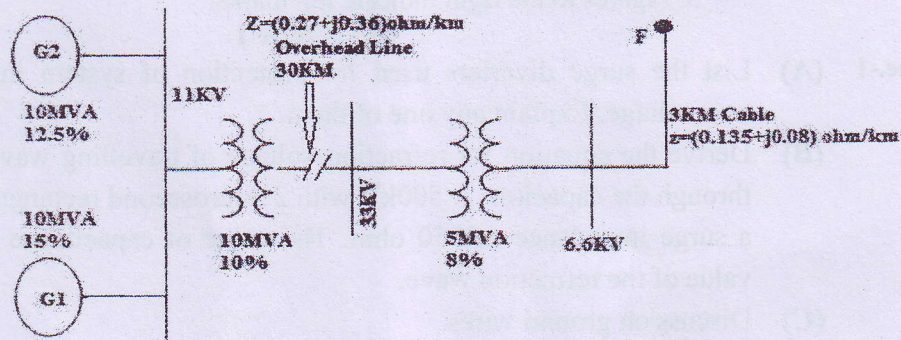
OR

Que.-4 (A)   For two conductors open condition derive the sequence voltage and current components and draw the equivalent sequence network for it.   **[06]**

  (B)   What is sequence operator? Obtain the value for following : $\alpha^2 + \alpha + 1$, α^2, $\alpha^2 - \alpha$, α^3 **[06]**

Que.-5 (A)   Draw the positive and negative sequence networks of the system with reactance marked in per unit. Take base 25 MVA, 11 KV at generator.   **[05]**
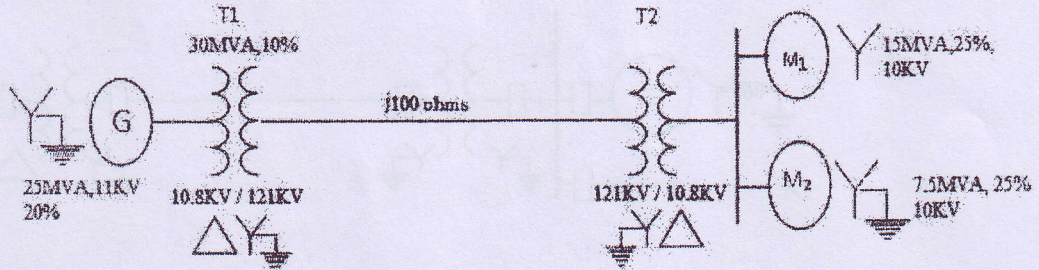
  (B)   Derive the expression for fault current in double line to ground fault on unloaded generator. Draw an equivalent network showing the inter connection of networks to simulate double line to ground fault.   **[0?]**

OR

Que.-5 (A)   Define the sequence impedances for transmission line.   **[05]**

  (B)   Draw the zero sequence network for i) Star-Delta ii) Star with grounded- Delta iii) Delta-Delta types connection.   **[06]**

Que.-6   **Attempt any two:**   **[12]**

  (A)   Why should Z_n appear as $3 Z_n$ in zero sequence equivalent circuit for synchronous machine?

  (B)   How algorithm method is used for short circuit studies of symmetrical fault analysis?

  (C)   Derive the necessary equation to determine the fault current for a single line to ground fault. Draw a diagram showing the inter connection of sequence networks.

END OF PAPER