Total No. of Questions : 10] **SEAT No. :**

P1329 **[Total No. of Pages : 4**

[4858] - 1067
T.E. (Electrical) (Semester - II)
Power System - II
(2012 Pattern) (End Sem.)

Time : 3 Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***

Q1) a) Determine sending end complex power, of a transmission line delivering 50MVA at 132kV, 50Hz and 0.8 power factor lagging. The ABCD constants of transmission lines are $A = D = 0.9855 \angle 0.32^\circ$, $B = 67.3 \angle 68.69^\circ \Omega$. **[5]**

b) Give the advantages and limitations of HVDC transmission. **[5]**

OR

Q2) a) Explain surge impedance & surge impedance loading. **[5]**

b) Explain phenomena of corona in EHV transmission lines. **[5]**

Q3) a) Draw single line diagram of HVDC transmission system and explain the components used (any four). **[5]**

b) A transmission circuit is represented by symmetrical π network in which the series impedance is $120 \angle 60^\circ \Omega$ and each shunt admittance is $2.5 \times 10^{-3} \angle 90^\circ S$.

i) Calculate value of general circuit constants ABCD

ii) the characteristic impedance of the circuit.

[5]

OR

P.T.O.

Q4) a) Estimate the corona loss per phase per km by using peek's formula for three phase 110kV, 50Hz, 150km long transmission line consisting of three conductors each of 10mm diameter and spaced 2.5 m apart in an equilateral triangle formation. The temperature of air is 30ºC and the atmospheric pressure of 75 mm of Hg. Take the irregularity factor as 0.85. Ionization of air may be assumed to take place at a maximum voltage gradient of 30kV per cm (peak). **[5]**

b) Prove that apparent power S = V.I*. **[5]**

Q5) a) What do you mean by p.u. system? Prove that the single phase and three phase values are same in p.u. **[8]**

b) A sample power system has following line data. Form bus admittance matrix (Y_{BUS}) for this system. **[8]**

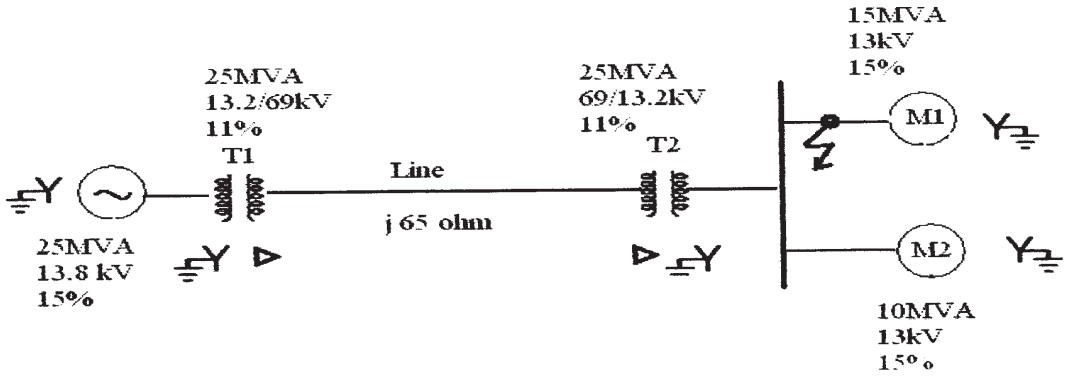
Bus code	Series impedance in pu	PU line charging admittance Y/2
1-2	0.02+j0.08	0.0+j0.04
1-3	0.06+j0.24	0.0+j0.03
2-3	0.04+j0.16	0.0+j0.025
2-4	0.04+j0.16	0.0+j0.025
3-4	0.01+j0.04	0.0+j0.015

OR

Q6) a) Derive static load flow equations for *n* bus system. **[8]**

b) Compare Newton Raphson method with Gauss Seidal method of load flow analysis. **[8]**

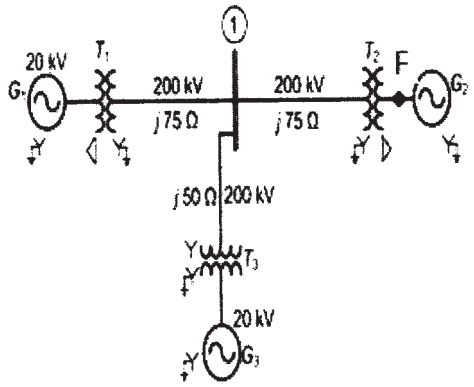
Q7) a) A one line diagram of a three phase power system is shown in fig. A three phase short circuit fault occurs at point shown in fig. Choose 13.8kV, the generator voltage as the base voltage and 25MVA as the base MVA, Find fault current at fault location. **[8]**



b) Explain the concept of sub transient, transient and steady state current and impedances of unloaded alternator under symmetrical fault condition. **[8]**

OR

Q8) a) A three phase short circuit fault occurs at a point F shown in the figure. Find fault current and Fault MVA. **[8]**

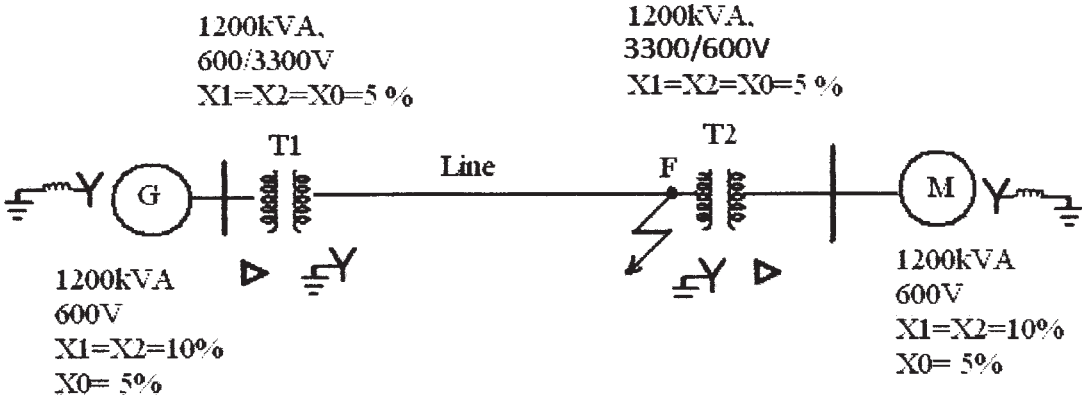


Generator G_1	200 MVA, 20 kV, X_d = 15%
Generator G_2	300 MVA, 18 kV, X_d = 20%
Generator G_3	300 MVA, 20 kV, X_d = 20%
Transformer T_1	300 MVA, 220Y/22 kV, X_d = 10%
Transformer T_2	Three single-phase units each rated 100 MVA, 130Y/25 kV, X = 10%
Transformer T_3	300 MVA, 220/22 kV, X = 10%

b) What is current limiting reactor. Explain it with a suitable example. **[8]**

Q9) a) A Single line to ground fault occurs on line at point F as shown in fig. near transformer T_2 find the fault current and fault MVA for following data

The reactances of transmission line are $X_1 = X_2 = 20\%$ and $X_0 = 40\%$ on the base of 1200kVA, 3300V. The reactance of the neutral grounding reactors are 5% on the kVA base of the machine. **[9]**



b) Draw zero sequence diagram for all types of combinations of transformer. **[9]**

OR

Q10) a) Show that fault current $If = \frac{E}{X_1 + \left(\frac{X_2 * X_0}{X_2 + X_0} \right)}$ when L-L-G fault occurs at the terminals of solidly grounded star connected alternator. Draw the sequence network. **[9]**

b) The line to neutral voltages in a three phase system are

$Van = 200\angle 0^\circ, Vbn = 600\angle 100^\circ$ $Vcn = 400\angle 270^\circ$. Find the symmetrical components of the voltages. **[9]**