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

P3352 [Total No. of Pages : 3

[4758] - 552
T.E. Electrical (Semester - II)
Power System - II
(2012 Pattern)

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

Instructions to the candidates:

1) ***All questions are compulsory.***
2) ***Figures to the right indicate full marks.***

Q1) a) A three phase 132 kV overhead line delivers 60 MVA at 132 kV and power factor 0.85 lagging at its receiving end. The constants of line are A = 0.98, $\alpha = 3°$ and B = 110, $\beta = 75°$ ohm per phase. Find **[5]**

i) Sending end voltage and power angle.

ii) Sending end active and reactive power.

b) Explain the advantages and drawbacks of EHVAC transmission. **[5]**

OR

Q2) a) Explain the phenomenon of corona and state various methods to reduce it. **[5]**

b) A 132kV three phase line has the following line constants : **[5]**

$A = 0.9 < 2.5°$, $B = 100 < 70°\ \Omega$, $C = 0.0006 < 80°$ S.

Draw the receiving end power circle for a load of 40 MW at 0.8 power factor lagging at the receiving end and determine the sending end voltage.

Q3) a) Explain the constant ignition angle control method in detail. **[5]**

b) Find the disruptive critical voltage and visual critical voltage for local and general corona for a three phase line consisting of 21mm diameter conductors spaced in 6m delta configuration. Take temperature 25° C, pressure 73cm of mercury, surface factor 0.84, irregularity factor for local visual corona 0.72 and for general (decided) visual corona 0.82.**[5]**

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OR

Q4) a) What are the various components of HVDC system. **[5]**

b) Prove the reactive power is proportional to voltage drop ($Q \alpha \Delta V$) **[5]**

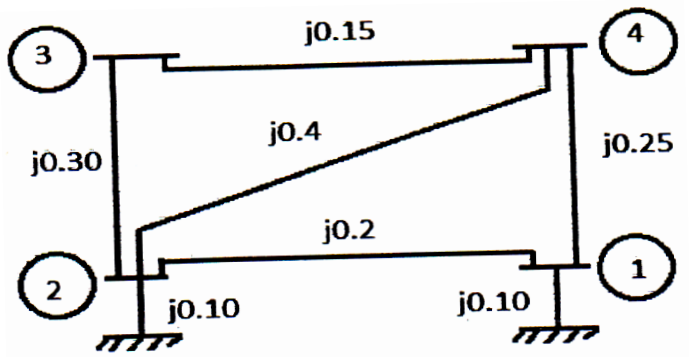
Q5) a) What is per unit system? Explain the advantages and applications of per unit system. **[8]**

b) Explain with flow chart Gauss Seidel method of load flow analysis. **[8]**

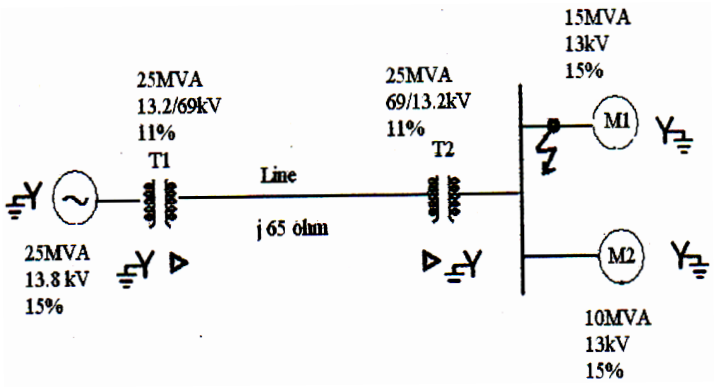
OR

Q6) a) Give in detail classification of bus for load flow analysis. **[8]**

b) For the given power system reactances are shown in the fig. find bus admittance matrix [Y_{BUS}] **[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 13.8k V, the generator voltage as the base voltage and 25MVA as the base MVA, Find fault current at fault location. **[8]**

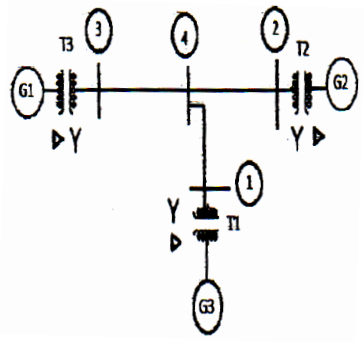


b) How the selection of circuit breaker is done in power system? What are the current limiting reactors? Explain its use in power system. **[8]**

OR

Q8) a) Explain the concept of sub transient, transient and steady state current and impedances of unloaded alternator under symmetrical fault condition. **[8]**

b) Thr power system network shown in figure has the following equipment ratings. A three phase short circuit fault occurs on bus 1 of the network. Find fault current and fault MVA. Select Base power = 500 MVA & base voltage = 400k V on transmission line. **[8]**



Generator G_1	500 MVA, 11 kV X" = 0.15 pu
Generator G_2	400 MVA, 11 kV, X" = 0.12 pu
Generator G_3	300 MVA, 11 kV, X" = 0.10 pu
Transformer T_1	500 MVA, 11/400 kV, star - delta, X = 0.08 pu
Transformer T_2	300 MVA, 11/400 kV, star - delta, X = 0.1 pu
Transformer T_3	300 MVA, 22/400 kV, star - delta, X = 0.1 pu
Transmission Lines 1 – 4 --- X = j 40 Ω, 2 – 4 ---- X = j 50 Ω, 3 – 4 --- X = j 30 Ω	

Q9) a) A 20 MVA, 11kV, Y connected synchronous generator is no load and rated voltage. If $X_1 = X_2 = 12\%$, $X_0 = 6\%$. Estimate **[9]**

i) Reactance X_n to limit SLG fault current, if the ratio of SLG fault current to three phase short circuit current is 1.

ii) LLG fault current with X_n in neutral grounding circuit.

b) For the three phase transmission line with self impedances Z_s and mutual impedance Z_M, show that $Z_1=Z_2=Z_S - Z_M$ and $Z_0=Z_S + 2\ Z_M$. **[9]**

OR

Q10) a) Derive the expression for fault current in case of LLG fault considering the sequence network under this type of fault with suitable diagram. **[9]**

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