Total No. of Questions : 10]

SEAT No. :

P2443

[Total No. of Pages : 3

[5253]-166

T.E. (Electrical) (Semester - II)

POWER SYSTEM - II

(2012 Pattern)

Time : 2½ 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) ***Figures to the right indicate full marks.***
3) ***Use of electronic pocket calculator is allowed.***
4) ***Assume suitable data, if necessary.***

Q1) a) A long transmission line delivers a load of 60MVA at 124kV, 50Hz, at 0.8 power factor lagging. The constant at transmission are A = D = $0.986\angle 0.32^{\circ}$, B = $70.3\angle 69.2^{\circ}$ Ω, C = $4.44 \times 10^{-3}\angle 90^{\circ}$ ℧. Determine receiving end active power, Sending end voltage & current, Sending end active power, line losses. **[6]**

b) Explain the advantages & Disadvantages of HVDC Transmission. **[4]**

OR

Q2) a) A 132kV line with 2cm diameter conductor is built so that corona takes place if the line voltage exceeds 210kV (rms). If the value of the potential gradient at which ionization occurs can be taken as 30kV/cm. Find the spacing between the conductors. Assume irregularity factor = 1 & air density factor = 1. **[6]**

b) Write a note on receiving end power circle diagram. **[4]**

Q3) a) Which are the different types of HVDC links? Explain in detail. **[6]**

b) What is corona? Explain the different factors affecting the corona. **[4]**

OR

P.T.O.

Q4) a) A 3 phase 132kV overhead line delivers 50MVA at 132kV & power factor 0.8 lagging at its receiving end. The constants of the line are $A = 0.92\angle 2^\circ$ & $B = 125\angle 75^\circ\Omega$ per phase. Find **[6]**

i) Sending end voltage & power angle.

ii) Sending end active & reactive power.

b) Compare HVDC transmission with EHV AC transmission. **[4]**

Q5) a) A generator 15MVA, 11kVA with 15% reactance is connected to a bus bar. It feeds two motors 3MVA, 11kV & 10MVA, 11kV with 11% reactance through a transmission line having a reactance of 50Ω. Draw the reactance diagram assuming 20MVA & 15kV as base quantities. **[8]**

b) What do you mean by PU system? Explain the advantages & applications of per unit system. **[8]**

OR

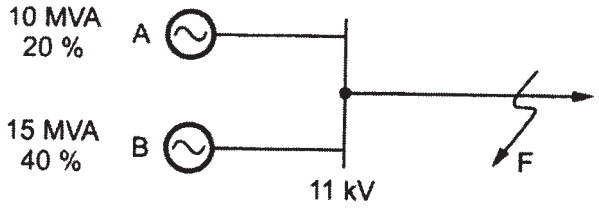
Q6) a) Explain the Newton-Raphson method for load flow solution. **[8]**

b) An incomplete nodal admittance matrix for a four bus system with negligible charging admittance is given below. Find out the missing elements. **[8]**

$$\begin{bmatrix} 1.372 - j5.491 & -0.392 + j1.569 & -0.588 + j2.353 & Y_{14} \\ Y_{21} & Y_{22} & -1.176 + j4.706 & 0 \\ Y_{31} & Y_{32} & Y_{33} & -1.176 + j4.706 \\ Y_{41} & Y_{42} & Y_{43} & Y_{44} \end{bmatrix}$$

Q7) a) What are the different types of faults occurring in a transmission line? Explain each in Detail. **[8]**

b) A single line diagram of a three phase system is shown in the fig. the percentage reactance of each generator is based on its own rating. Find the short circuit current up to a point of 3 phase short circuit fault. **[8]**



OR

Q8) a) What are the current limiting reactors? Explain in detail. Also give the advantages of current limiting reactors. **[8]**

b) Explain the following terms related with symmetrical fault analysis. **[8]**

i) Percentage reactance

ii) Base kVA

iii) Short circuit current

iv) Short circuit kVA

Q9) a) A 3 phase 11kV, 25MVA alternator with $X_{g0} = 0.05$ PU, $X_1 = 0.15$ PU, & $X_2 = 0.15$ PU is grounded through a reactance of 0.32Ω. Calculate the fault current for a single line to ground fault. **[10]**

b) Derive the expression for fault current in case of line to ground fault considering the sequence network with suitable diagram. **[8]**

OR

Q10)a) Explain the symmetrical components method used for analysis of unsymmetrical faults. **[8]**

b) A 30MVA, 11kV generator has $Z_1 = Z_2 = j0.21$ PU & $Z_0 = j0.05$ PU. If a line fault occurs on the terminals of the generator, find the line currents & line to neutral voltages under fault conditions. **[10]**