Total No. of Questions : 10]

SEAT No. :

P3610

[Total No. of Pages : 3

[5560]-565
T.E. (Electrical Engineering)
POWER SYSTEM - II
(2015 Course) (Semester - II) (Backlog)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10.***
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) Derive the equation for receiving end active and reactive power flow in the transmission line. **[5]**

b) Derive the formula for critical disruptive voltage in corona. **[5]**

OR

Q2) a) A 132 kV single circuit, three phase transmission line has the ABCD parameters A = D = 1 ∠0º, B = 11.18 ∠63.43º Ω, C=0. The line is to deliver 75 MVA at 0.8 PF lagging at load end. The receiving end voltage is 132 kV. How much reactive and active power is to be dissipated from the sending end. **[5]**

b) What do you mean by PU system? Explain the advantages and applications of per unit system. **[5]**

Q3) a) Explain the phenomenon of corona and state factors affecting corona loss. **[5]**

b) Three motors are connected to a common bus. Each motor is rated 5000 HP, 3.3kV, 0.8 PF with 17% reactance. They are supplied by a generator 20MVA, 11kV with reactance 10% through 11/3.3kV, 18MVA transformer and having 5% leakage reactance. Draw the per unit reactance diagram. Take 1kVA = 1.1×HP. Take 20MVA and 11kV base on generator. **[5]**

OR

Q4) a) A three phase, 220kV, 50 Hz transmission line consists of 2cm radius conductor spaced 2 meters apart in equilateral triangular formation. If the temperature is 40°C and atmospheric pressure is 76cm, calculate the corona loss per km of the line. Take $m_0 = 0.85$. **[5]**

b) Derive static load flow equation for n bus system. **[5]**

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Q5) a) Write short note on selection of circuit breakers. **[8]**

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

i) Percentage reactance

ii) Base KVA

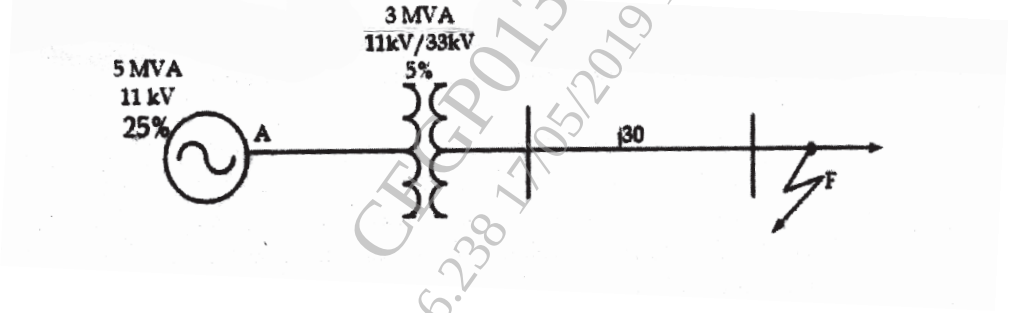
iii) Short circuit current

iv) Short circuit KVA

OR

Q6) a) Explain the concept of sub transient, transient and steady state current and impedances of unloaded alternator under symmetrical fault condition. **[8]**

b) Three phase 11kV, 5 MVA generator has a direct axis steady state reactance of 25%. It is connected to a 3 MVA transformer having 5% leakage reactance and ratio of 11kV/33 kV. The 33 kV side is connected to a transmission line having 30Ω reactance. A three phase fault occurs at other end of transmission line. Calculate steady state fault MVA and current assuming no load prior to fault. Take base of 11 kV, 5 MVA on generator. **[8]**



Q7) a) Derive formula for fault current in case of LL fault. **[8]**

b) The line to neutral voltages in a three phase system are $V_{RN} = 200 \angle 0^o$, $V_{YN} = 600 \angle 100^o$, $V_{BN} = 400 \angle 270^o$. Find the symmetrical components of voltages. **[8]**

OR

Q8) a) Derive the expression for fault current in case of line to ground fault considering the sequence network with suitable diagram. **[8]**

b) If x_1 and x_2 are positive and negative sequence reactance respectively, show that **[8]**

$$\frac{\text{L-L Fault Current}}{\text{L-L-L Fault Current}} = 1.732\left(\frac{x_1}{x_1 + x_2}\right)$$

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Q9) a) Compare EHVAC transmission with HVDC transmission. **[9]**

b) Draw and describe monopolar and bipolar HVDC transmission system with merits and demerits. **[9]**

OR

Q10) a) What are the recent developments in HVDC transmission system? State any two HVDC systems in India. **[9]**

b) Draw a single line diagram of HVDC transmission system and explain the components used. **[9]**

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