Total No. of Questions : 12]

SEAT No. :

P1404

[Total No. of Pages : 4

[4858] - 167

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

Power System - II

(2008 Pattern)

Time : 3 Hours]   *[Max. Marks : 100*

Instructions to the candidates:

   1)   *Answers any three questions from each section.*

   2)   *Neat diagrams must be drawn wherever necessary.*

   3)   *Figures to the right indicate full marks.*

   4)   *Use of logarithmic tables, slide rule, Mollier charts, electronic pocket calculator and steam tables is allowed.*

   5)   *Assume suitable data, if necessary.*

SECTION - I

Q1) a) Derive the power flow equation using generalized constants for transmission line. **[8]**

    b) A three phase 132 kV overhead line delivers 50 MVA at 132 kV and powerfactor 0.8 lagging at its receiving end . The constants of line are $A = 0.98$, $\alpha = 3º$ and $B = 110$, $\beta = 75º$ ohm per phase. Find **[8]**

       i)   Sending end voltage and power angle

       ii)   Sending end active and reactive power

       iii)   Line losses and vars absorbed by the line.

    Capacity of static compensation equipment at the receiving end if the sending end voltage to 140 kV for the same load condition.

OR

Q2) a) What is line compensation? Why it is necessary? Compare static capacitor & synchronous compensator. **[8]**

    b) What is surge impedance loading? Explain different methods used to improve surge impedance loading. **[8]**

P.T.O.

Q3) a) Explain following terms in brief : **[8]**

    i)   Disruptive Critical voltage.

    ii)   Visual critical voltage.

  b) Explain the phenomenon of corona and state various methods to reduce it. **[8]**

<p align="center">OR</p>

Q4) a) Find the disruptive critical voltage and visual critical voltage for local and general corona for a three phase line consisting of 21 mm diameter conductors spaced in 6 m delta configuration. Take temperature 25ºC, pressure 73 cm of mercury, surface factor 0.84, irregularity factor for local visual corona 0.72 and for general (decided) visual corona 0.82. **[8]**

  b) What is corona loss? Why it is different in different weather conditions? How can it be estimated? **[8]**

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

  b) Explain in detail the subtransient, transient and steady states at the three phase short circuit fault condition on an unloaded alternator and explain how will you find subtransient, transient and steady state currents? **[10]**

<p align="center">OR</p>

Q6) a) What do you mean by DC offset current? What is the effect of instant of short circuit on the waveform of short circuit current of R-L circuit. **[10]**

  b) Two three phase 11 kV generators of capacities 8 MVA and 4 MVA and subtransient reactance of 8% is connected to a feeder of series impedance $(0.12 + j0.48)\Omega/ph/km$. The transformer is rated at 3 MVA, 6.6kV/33kV and has a reactance of 5%. **[8]**

    Determine the fault current supplied by the generator operating under no load with a voltage of 6.9 kV when a three phase symmetrical fault occurs at a point 15 km along the feeder.

[4858]-167   **2**

SECTION - II

Q7) a) A voltages of 3-phase supply connected to load of 10ohm resistance per phase in star are $200\angle 0°$, $100\angle 255.5°$ and $200\angle 151°$ volts. Find : **[10]**

      i) Symmetrical components of phase voltages and line currents.

      ii) Line currents and total power consumed.

  b) Show that fault current $I_f = \dfrac{3E}{Z1 + Z2 + Z0}$ when L-G fault occurs at the terminals of solidly grounded star connected alternator. **[8]**

OR

Q8) a) Derive the expression for fault current of an alternator, with sequence diagram in following types of faults. **[12]**

      i) Line to line fault

      ii) Double line to ground fault.

  b) Draw the equivalent circuit for zero sequence reactance of three phase transformer, for different combinations of connections. **[6]**

Q9) a) Explain the bus incidence matrix method of formation of Y_{bus} matrix. **[8]**

  b) Explain Newton Raphson method of load flow analysis along with flowchart. **[8]**

OR

Q10) a) Give classification of various types of buses in power system for load flow studies. What is the significance of reference bus? **[8]**

  b) Derive static load flow equation for 'n' bus system. **[8]**

Q11) a) Explain Different types of HVDC transmission system. Give the name of HVDC transmission line in Maharashtra with its type and specification. **[8]**

b) With the help of suitable diagram, explain different component of HVDC transmission system along with their function. **[8]**

OR

Q12) Write short note on (any three) : **[16]**

a) Advantages and problems of HVDC system.

b) Constant current control.

c) Constant ignition control.

d) Constant extinction control.

❀ ❀ ❀