R09

Code No: C5606

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
M.Tech I - Semester Examinations, March/April -2011
ELECTRICAL DISTRIBUTION SYSTEMS
(POWER SYSTEMS HIGH VOLTAGE)

Time: 3hours **Max. Marks: 60**

Answer any five questions
All questions carry equal marks

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1) Define the following terms and write their importance with the help of examples.
   a) Load factor b) Coincidence factor c) Loss factor
   d) Utilization factor e) demand factor [12]

2) a) Draw one line diagram of (i) Network Type (ii) Loop type sub transmission systems. [4]
   b) Compare single bus, main transfer substation configurations**.** [4]
   c) Derive the formula for % Voltage drop for a substation service is with n primary feeders. [4]

3) a) An unbalanced three phase wye-connected and grounded load is connected to a balanced three phase four wire source. The load impedances Z_a, Z_b and Z_c are given as $70\angle 30^0$, $85\angle 40^0$ and $50\angle 35^0$ Ω/ph, respectively and the phase a line voltage has an effective value of 11kV. Use the line to neutral voltage of phase a as the reference and determine the following (a) the line and neutral voltage (b) the total power delivered to the loads.
   b) Show that power loss due to load currents of the two-phase, three-wire lateral with multi grounded neutral is 1.64 times larger than the one in the equivalent three phase lateral. [6+6]

4) a) Explain in detail the economic benefits can obtained due installation of capacitors in distribution systems. [6]
   b) A 2.4/4.16 kV wye-connected feeder serves a peak load of 400A at a lagging p.f of 0.8 connected at the end of the feeder. The maximum daily load is approximately 185 A at a p.f of 0.62. If the load impedance of the feeder is 0.5+j1.35 Ω. Determine
   (i) The necessary kVA rating of shunt capacitors located at the load to improve the peak load p.f to 0.96
   (ii) The reduction in kVA and line currents due to the capacitors. [6]

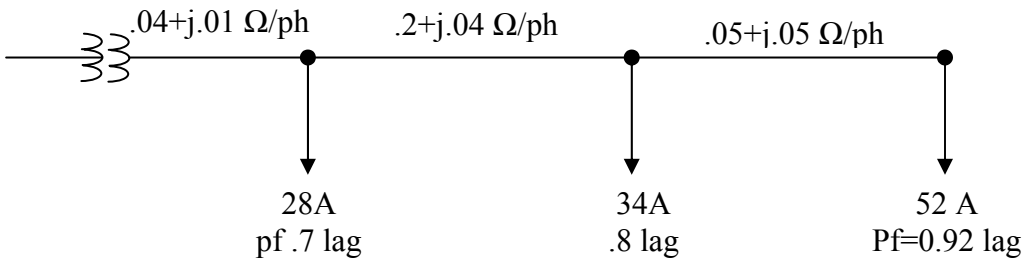
5) a) Why is it necessary to maintain a constant voltage in a distribution system, explain in detail? [4]
   b) Distinguish between shunt capacitor and series capacitors used in power system network [4]
   c) Explain with the help of a neat sketch AVR used in power system network. [4]

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6) a) Deduce the relationship between the load factor and loss factor.
   b) Write the important rules considered in selecting the ideal location for a substation.
   c) Draw the block diagram of SCADA system. [12]

7) a) Explain any two methods used to improve the power factor of a system. [4]
   b) A Three Phase, 4- wire 416-V secondary system with balanced per phase loads at A, B and C as shown in below Fig.1. Determine the following. Calculate (i) total voltage drop in one phase of the lateral by using the approximate method.

   (ii) Total kVA output and load power factor of the distribution transformer. [8]



8) Write short notes on the following [12]
   a) Coordination of protective devices used in power system.
   b) Load modeling and characteristics.

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