IU A 6n/A 2u5   **R13**

Code No: 117CT

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year I Semester Examinations, November/December - 2017
ELECTRICAL DISTRUBUTION SYSTEMS
(Electrical and Electronics Engineering)

Time: 3 Hours   Max. Marks: 75

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B
consists of 5 Units. Answer any one full question from each unit. Each question
carries 10 marks and may have a, b, c as sub questions.

PART- A
(25 Marks)

1.a) Define the loss factor and give its significance. [2]
  b) What is the importance of load factor and diversity factors in distribution systems? [3]
  c) What are the merits and demerits of radial type primary feeders? [2]
  d) How the rating of distribution system is decided? [3]
  e) What is the significance of power loss calculations in distribution systems? [2]
  f) What are the various types of non-three phase systems used in distribution system? [3]
  g) What is the principle of operation of circuit reclosures? [2]
  h) What are the main objectives of distribution system protection? [3]
  i) How line drop compensation control the voltage? [2]
  j) How do you determine the best capacitor location? [3]

PART-B
(50 Marks)

2.a) What is distribution system? Give and explain classification of load, with their characteristics.
  b) The annual input to a sub-transmission system is 87,000 MW. On the peak-load day of the year, the peak is 25 MW and the energy input that day is 300 MWh. Find the load factor for the year and for the peak load day. [5+5]

OR

3.a) Derive a relationship between the load factor and loss factor with different conditions.
  b) A substation supplied the following loads: 175MW, 100MW, 80MW, 50MW and 4 MW. The station has a maximum demand of 225MW. Find the following, if annual load factor of the station is 45%
  i) Number of units supplied annually
  ii) Diversity factor
  iii) The demand factor. [5+5]

4.a) What are the various factors that are to be considered in selecting primary feeder rating with typical primary distribution feeder?

b) Draw and explain the single line diagrams of radial type and loop type primary feeders and mention the various components. [5+5]

OR

5.a) Draw and describe the basic design practice of the secondary distribution system.

b) Derive the expression for voltage drop of sub-station service area with 'n' primary feeders. [5+5]

6.a) Derive the expressions for voltage drop and power loss of non-uniformly distributed loads of three phase feeder.

b) Prove that the power loss due to the load currents in the conductors of single-phase lateral ungrounded neutral case is 2 times larger than one in the equivalent three-phase lateral.[5+5]

OR

7.a) Illustrate the computation of the voltage drop of a balanced three-phase feeder, supplied at one end, in terms of the load and the line parameters.

b) An unbalanced 3-phase star connected load is connected to a balanced 3-phase, 4-wire source. The load impedances Z_R, Z_Y and Z_B are given as $20\angle30^0$, $35\angle-40^0$, and $15\angle35^0$ ohms respectively and the phase to 'R' line voltage has an effective value of 11 kV. Use the line to neutral voltage of phase 'R' as the reference and determine the line and neutral currents and total real and reactive powers. [5+5]

8.a) Considering a typical example, describe the procedure for fault current calculations in a distribution system, mentioning the assumptions to be made for the analysis

b) Explain the difference between a fuse and circuit breaker, mentioning advantages of each of them. [5+5]

OR

9.a) Explain the general coordination procedure of protective devices in radial distribution systems.

b) Explain the principle of operation of line sectionalizers. [5+5]

10.a) Why Voltage control and p.f. correction are necessary in distribution systems? What are the disadvantages of low voltage and low p.f. of the system?

b) Explain how series capacitors control the voltage in the distribution systems. [5+5]

OR

11.a) Explain the effect of shunt capacitors in improving p.f.

b) A star connected 400 h.p., 3.5 kV, 50 Hz motor works at a power factor of 0.75 lagging. A bank of mesh connected condensers is used to raise the power factor to 0.93 lagging. Calculate the capacitance of each unit and total number of units required, if each is rated 500V, 50 Hz. The motor efficiency is 85%. [5+5]

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