

Code No: 127CT

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year I Semester Examinations, November/December - 2018

ELECTRICAL DISTRIBUTION 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 contribution factor. [2]
- b) What is the significance of load factor? [3]
- c) How the distribution systems are classified? [2]
- d) What is the need of substations? State different types of substations. [3]
- e) What is the significance of power loss calculations? [2]
- f) What is meant by three-phase balanced primary lines? [3]
- g) What are the types common faults. [2]
- h) Define the principle of operation of Circuit Reclosures. [3]
- i) What are the equipments used for voltage control. [2]
- j) What are the draw backs of low power factor? [3]

PART-B

(50 Marks)

- 2.a) Obtain the relation between load factor and loss factor.
- b) A substation is to supply three regions of loads whose maximum values are 6000 kW, 10000 kW and 5000 kW. The diversity factor of the load at the substation is 1.5 and the average annual load factor is 0.65. Calculate the peak demand on the substation and annual energy supplied from the substation. [5+5]

OR

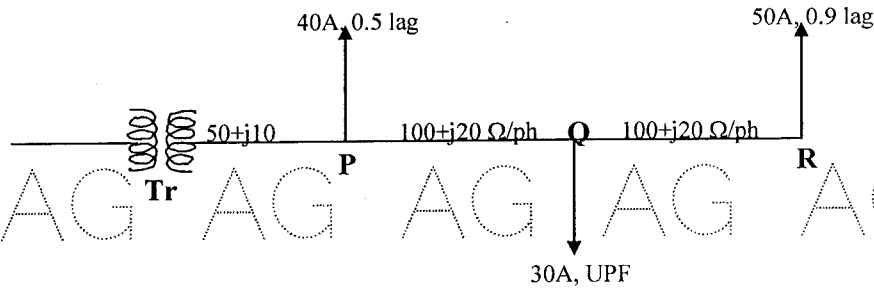
3. Discuss the characteristics of the following categories of loads: [10]
a) Residential, b) Commercial, c) Agricultural and d) Industrial

- 4.a) What are the types of basic distribution system? Explain.
- b) Draw the single line diagram of radial type primary feeder and mention the factors that influence the selection of primary feeder. [5+5]

OR

5. How do you fix the rating of a distribution sub-station? Explain. [10]

- 6.a) Derive the expression for voltage drop and power loss for non-uniformly radial type distribution load.
- b) Find the output power of a 3- ϕ , 400 V LV side of distribution transformer shown in below figure. [5+5]



OR

7. Assume that a star connected three-phase load is made up of three impedances of $50\angle 25^\circ$ ohms each and that the load is supplied by a 3-phase, four wire primary feeder. The balanced line to neutral voltages at the receiving end are: $V_{an}=7630\angle 0^\circ$ V, $V_{bn}=7630\angle 240^\circ$ V and $V_{cn}=7630\angle 120^\circ$. Determine the a) The phase currents in each line and (b) The total active and reactive power supplied to the load. [10]

- 8.a) Explain the coordination procedure between recloser and fuse.
- b) What are the main objectives of distribution system protection? Discuss. [5+5]

OR

9. Considering a typical example, describe the procedure for fault current calculations in a distribution system, mentioning the assumptions to be made for the analysis. [10]

- 10.a) What do you understand by sizing of the capacitors? And how do you justify economically the connection of capacitors for the improvement of power factor?

- b) A 3-phase synchronous motor is connected in parallel with a load of 800kW at 0.8 p.f. lagging. The synchronous motor has a total load of 150 kW and its excitation is so adjusted that the over all power factor becomes 0.93 lagging. Calculate the kVA input to the motor and its power factor. Neglect motor losses. [5+5]

OR

- 11.a) Explain about line drop compensation.
- b) Explain how series capacitors control the voltage in the distribution systems. [4+6]