

B.Tech IV Year I Semester (R13) Supplementary Examinations June 2017

ELECTRICAL DISTRIBUTION SYSTEMS

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

PART – A

(Compulsory Question)

- 1 Answer the following: (10 X 02 = 20 Marks)
- Define coincidence factor and contribution factor.
 - What is the significance of load factor in distribution system?
 - What is difference between radial and loop type primary distribution feeders?
 - List out the factors affecting the feeder voltage level.
 - What is the perpendicular bisector rule used for optimal location of a substation.
 - What are the features of single bus bar arrangement with sectionalizer?
 - Write the two-third rule for locating the shunt capacitors in distribution systems.
 - What are the differences between fixed and switched capacitors?
 - Write the functions of SCADA.
 - What are the requirements of distribution system automation?

PART – B

(Answer all five units, 5 X 10 = 50 Marks)

UNIT – I

- 2 (a) Explain detail about commercial and agricultural loads and their respective characteristics.
 (b) Obtain the relation between the load factor and loss factor.

OR

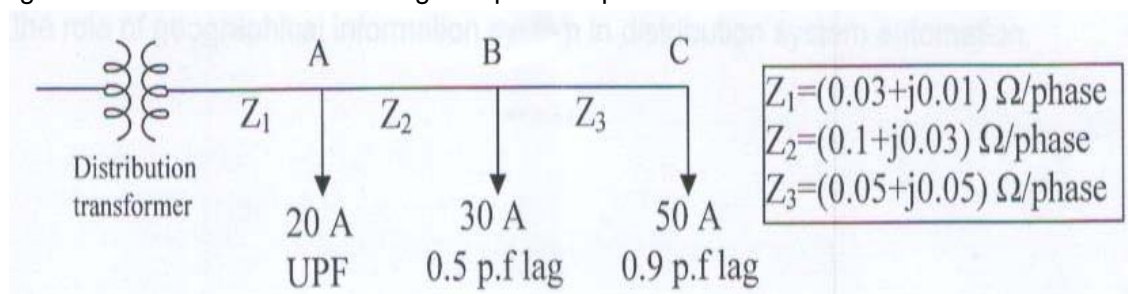
- 3 (a) Explain briefly classification of loads? How is load modeling done in distribution networks?
 (b) A power supply is having the following loads:

Type of load	Maximum demand	Diversity of group	Demand factor
Domestic	1500 kW	1.2	0.80
Commercial	200 kW	1.1	0.80
Industrial	10000 kW	1.25	1.0

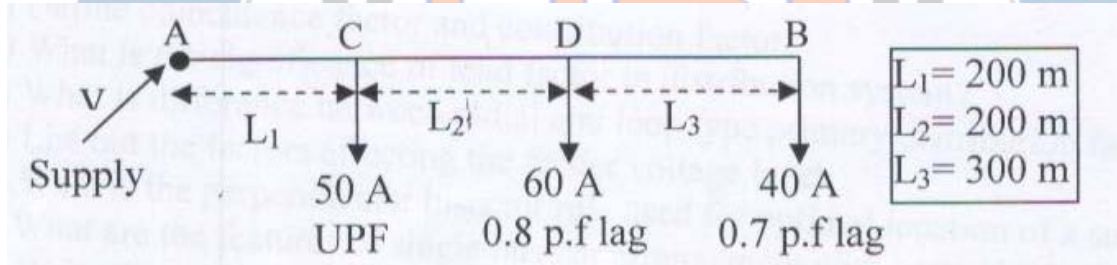
If the overall system diversity factor is 1.35, determine: (i) Maximum demand. (ii) Connected load of each type.

UNIT – II

- 4 (a) Discuss the design practices of secondary distribution system.
 (b) Consider a three phase, 3 wire, 240 V secondary system with balanced loads at A, B and C as shown in figure below. Determine the voltage drop in one phase of laterals.

**OR**

- 5 (a) Discuss the factors affecting the primary feeder voltage levels and primary feeder loading.
 (b) Consider the single phase radial distributor shown in the figure below. The magnitude of load currents, p.f.s and distances are indicated in the figure. The resistance and reactance of each wire are 0.1Ω per km and 0.2Ω per km respectively. It is required to maintain voltage at point B as $230 \angle 0^\circ$ Volts. Find voltage drop in the three sections and total voltage drop in the feeder. The p.f. angles of individual loads are w.r.t. voltage at point B.



UNIT - III

- 6 (a) How do you analyze a substation service area with 'n' primary feeders?
 (b) Discuss the features, advantages and disadvantages of main and transfer bus bar arrangement and one and half breaker system arrangement.

OR

- 7 (a) Give layout of air insulated substation showing all the location of all substation equipment.
 (b) Explain the methodology for optimal location of substations and indicate the benefits derived through this approach.

UNIT - IV

- 8 (a) Explain the procedure employed to determine the best capacitor location.
 (b) A 40 kW induction motor has power factor 0.95 and efficiency 0.85 at full load, power factor 0.7 and efficiency 0.65 at half-load. At no-load, the current is 20% of the full-load current and power factor 0.2. Capacitors are supplied to make the line power factor 0.9 at half-load. With these capacitors in circuit, find the line power factor at: (i) Full load. (ii) No-load.

OR

- 9 (a) Explain the role of shunt and series capacitors in power factor correction. Compare their performance in power factor correction.
 (b) Discuss the need of power factor improvement in distribution system.

UNIT - V

- 10 (a) Explain the SCADA system for distribution system automation.
 (b) Discuss about consumer information service and automatic meter reading.

OR

- 11 (a) Discuss the communication requirements for distribution system automation.
 (b) Discuss the role of geographical information system in distribution system automation.
