

B.Tech IV Year I Semester (R13) Supplementary Examinations June 2018

**ELECTRICAL DISTRIBUTION SYSTEMS**

(Electrical and Electronics Engineering)

Time: 3 hours

Max. Marks: 70

**PART – A**

(Compulsory Question)

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- 1 Answer the following: (10 X 02 = 20 Marks)
- Define coincidence factor. What is its significance in distribution system?
  - A substation has a connected load of 45 MW and a maximum demand of 22 MW, the units supplied being  $60 \times 10^6$  per annum. Determine the load factor and demand factor.
  - What are the features of radial type primary feeders?
  - Why voltage drop considerations are important in a distribution system?
  - What are the advantages with optimally locating substations?
  - Write the advantages with main and transfer bus bar arrangement.
  - How to improve power factor in distribution system?
  - What are the effects of series capacitors in distribution system?
  - List out the functions of SCADA.
  - What are the components of SCADA?

**PART – B**

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

**UNIT – I**

- 2 (a) Explain load modeling and its characteristics.  
 (b) A 120 MW substation delivers 120 MW for 3 hours 60 MW for 8 hours and shut down for rest of each day. It is also shut down for the maintenance for 15 days each year. Calculate its annual load and annual loss factor.

**OR**

- 3 (a) Explain about constant power and constant impedance load models with necessary equations.  
 (b) One of the transformers of a substation supplies four primary feeders having a diversity factor 1.25 between them for both real and reactive powers. At the time of annual peak load the demand on each feeder is as follows:

Feeder No	Demand	Power factor
1.	900 kW	0.85 lag
2.	1000 KW	0.90 lag
3.	2100 kW	0.95 lag
4.	2000 kW	0.90 lag

Find the maximum kVA demand on the transformer.

**UNIT – II**

- 4 (a) List various design and operational aspects affecting primary feeder loading and voltage levels.  
 (b) Explain various types of radial primary feeders with diagrams.
- OR**
- 5 (a) Discuss advantages and disadvantages of radial and loop type primary feeders.  
 (b) Explain the design aspects of secondary distribution systems.

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**UNIT – III**

- 6 (a) How do you optimally locate the substations and explain benefits derived from optimal location?  
(b) Explain single bus bar and sectionalized single bus bar arrangements with relevant diagrams.

**OR**

- 7 (a) Draw single line diagram of a typical substation and locate different components in it. Explain the purpose of these components.  
(b) How do you analyze a substation service area with 'n' primary feeders?

**UNIT – IV**

- 8 (a) Explain the procedure for selecting best location of capacitor for compensation.  
(b) A 1-phase 50 Hz AC distributor AB 300 m long is fed from one end and is loaded as under:  
(i) 100 A at 0.707 p.f lag 200 m fed from one end A.  
(ii) 200 A at 0.8 p.f lag 300 m fed from one end A.

The total resistance and reactance of distributor is 0.2 ohms and 0.1 ohm per km. Calculate the total voltage drop in the distributor AB.

**OR**

- 9 (a) Explain the economic justification of power factor correction.  
(b) A synchronous motor having a power consumption of 40 kW is connected with a load of 150 kW, a lagging p.f of 0.8. If the combined load has a power factor of 0.9, what is the leading reactive kVA supplied by the motor and at what p.f is it working.

**UNIT – V**

- 10 (a) Discuss about consumer information service ((CIS) and automatic meter reading (AMR) in detail.  
(b) Discuss the role of geographical information system in distribution system automation.

**OR**

- 11 (a) Discuss the communication requirements for distribution system automation.  
(b) Discuss about consumer information service and automatic meter reading.

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