Code No: **R1642023** 　　　**R16**　　　Set No. 1

IV B.Tech II Semester Regular/Supplementary Examinations, June - 2022
ELECTRICAL DISTRIBUTION SYSTEMS
(Electrical and Electronics Engineering)

Time: 3 hours　　　　　　　　　　　　　　　　　　　　Max. Marks: 70

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any FOUR questions from Part-B
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PART–A *(14 Marks)*

1. a) Define Coincidence factor [2]
   b) What is the need of substations [3]
   c) What is the main objective of distribution system protection? [2]
   d) What is the need of voltage drop calculating indistribution systems. [2]
   e) What are the causes of low power factor [3]
   f) What are the equipments used for voltage control. [2]

PART–B *(4x14 = 56 Marks)*

2. a) Discuss the characteristics of different loads [7]
   b) Derive the relationship between the load factor and loss factor. [7]

3. a) Compare the four and six feeder's patterns in substation location. [7]
   b) Classify different types of primary feeders and give their merits and demerits [7]

4. a) Discuss a four wire multi-grounded common neutral distribution system. [7]
   b) Consider a three phase, 3 wire, 240V secondary system with balanced loads at A, [7]
      B and C as shown in Figure. Determine: (i) The voltage drop per phase (ii) The
      real power per phase for each load (iii) The reactive power per phase for each
      load.
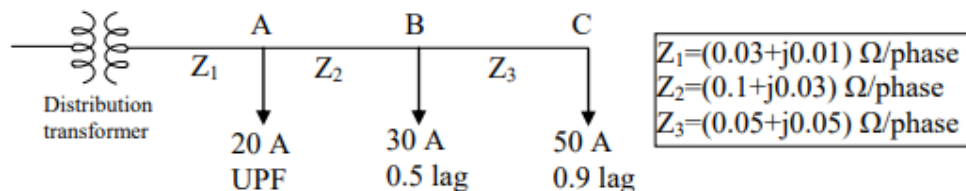
5. a) Explain the principle of operation of circuit reclosure with a neat sketch. [7]
   b) Explain the general coordination procedure of protective devices. [7]

6. a) Discuss the general procedure to determine the best location of capacitors in [7]
      distribution system.
   b) A synchronous motor improves the p.f of a load of 300 kW from 0.8 lagging to [7]
      0.95 lagging. Simultaneously the motor carries a load of 150 kW. Find the leading
      kVAR taken by the motor, kVA rating of the motor and the p.f at which the motor
      operates.

7. a) How an AVR can control voltage. With the aid of suitable diagram explain its [7]
      function.
   b) Describe the effect of series capacitor for voltage control with neat diagrams. [7]

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Time: 3 hours   Max. Marks: 70

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any FOUR questions from Part-B
*****

PART–A *(14 Marks)*

1. a) Define Contribution factor   [2]
    b) What is Primary distribution system   [3]
    c) What is the function of Circuit breaker?   [2]
    d) What is the need of power loss calculating in distribution systems?   [3]
    e) What is most economical power factor   [2]
    f) What is the need of voltage control in distribution systems.   [2]

PART–B *(4x14 = 56 Marks)*

2. a) Discuss the characteristics of the following categories of loads: (i) Residential   [7]
        (ii) Agriculture
    b) Explain the load modelling of distribution system.   [7]

3. a) How the rating of distribution substation can be calculated. Explain taking a   [7]
        general case with `n' no. of feeders
    b) Explain radial type primary feeder with neat diagram   [7]

4. a) Discuss the voltage drop in A.C distribution? how it is estimated approximately   [7]
    b) A single phase feeder circuit has total impedance of (0.5+j0.2) Ω and V_R =11kV   [7]
        and $I_R = 5\angle-30$ A , respectively. Find (i) Power factor of the load, (ii) Load p.f.
        for which the impedance angle is maximum and(iii) load p.f. for which
        impedance angle is maximum and derive the formula used.

5. a) Derive the expression for fault current of line to ground fault in distribution   [7]
        systems.
    b) An earth fault occurs on one conductor of a three conductor are supplied by a   [7]
        10MVA, 6.6kV, three phase source with neutral earthed. The source has positive,
        negative and zero sequence impedances of (0.5+j4.7), (0.2 + j0.5) and j0.43
        ohms per phase. The corresponding impedance values for the cable up to the
        fault point are (0.36+j0.25), (0.36+j0.25),(2.8+j0.9) ohms per phase. Find the
        fault current

6. a) Explain the economic justification of power factor correction.   [7]
    b) A single-phase motor connected to a 230V, 50 Hz supply takes 25 A at p.f. of 0.7   [7]
        lag. A capacitor is shunted across the motor terminals to improve the p.f to 0.9
        lag. Determine the capacitance of the capacitor to be used.

7. a) Explain the effect of series capacitor compensation and its advantages   [7]
    b) What is the need of line drop compensator? Explain how it is done in the   [7]
        distribution systems

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Code No: **R1642023**　　　**R16**　　　| Set No. 3 |

IV B.Tech II Semester Regular/Supplementary Examinations, June - 2022
ELECTRICAL DISTRIBUTION SYSTEMS
(Electrical and Electronics Engineering)

Time: 3 hours　　　　　　　　　　　　　　　　　　　　Max. Marks: 70

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any FOUR questions from Part-B
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PART–A *(14 Marks)*

1. a) Define load factor? [2]
   b) What are the conditions for best location of substations. [3]
   c) What is the need of line sectionalizes [2]
   d) What is mean by uniformly distributed load? [2]
   e) What are the different types of power capacitor? [3]
   f) What are the draw backs of series capacitors in distribution system? [2]

PART–B *(4x14 = 56 Marks)*

2. a) Obtain the relation between the load factor and loss factor [7]
   b) Discuss the characteristics of the following categories of loads: (i) Commercial (ii) Industrial [7]

3. a) How do you analyze a substation service area with `n' primary feeders [7]
   b) Discuss the basic design practice of the secondary distribution system [7]

4. a) Derive the expression for voltage drop and power loss of non-uniformly distributed loads. [7]
   b) A 3-ϕ radial is feeder is receiving end voltage 11 kV, a total impedance of (5.0+j 12) ohms/phase, and a load of 5 MW with a lagging power factor of 0.85. Calculate the sending end phase and line voltages and the load angle. [7]

5. a) Describe the recloser to circuit breaker coordination with current time characteristics. [7]
   b) List out the frequently occurring faults on a distribution system and derive the formulae for fault currents. [7]

6. a) Explain about different types of power capacitors and their applications [7]
   b) Discuss in detail about the economic justification of capacitor compensation. [7]

7. a) Explain effect of the series capacitors in the distribution system with phasor diagrams. What are the limitations in this method? [7]
   b) Explain about the AVB in the distribution feeder with neat diagram [7]

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Set No. 4

IV B.Tech II Semester Regular/Supplementary Examinations, June - 2022
ELECTRICAL DISTRIBUTION SYSTEMS
(Electrical and Electronics Engineering)
Time: 3 hours   **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any FOUR questions from Part-B
*****

PART–A *(14 Marks)*

1. a) What are the various types of loads?   [2]
    b) Explain how the distribution system is classified   [3]
    c) What is the operating principle of Fuses   [3]
    d) What is meant by non-uniformly distributed loads?   [2]
    e) What is the need of shunt compensation   [2]
    f) What is the voltage drop in the single phase two-wire uni-grounded lateral with [2]
       full capacity neutral?

PART–B *(4x14 = 56 Marks)*

2. a) Discuss about different load modelling and its characteristics   [7]
    b) A substation is to supply three regions of loads whose maximum values are 4000 [7]
       kW, 7000 kW and 6000 kW. The diversity factor of the load at the substation is
       1.4 and the average annual load factor is 0.45. Determine the peak demand on the
       substation and annual energy supplied from the substation.

3. a) What are the various factors that are to be considered in selecting optimal [7]
       location of substation?
    b) Describe the design consideration of loop type primary feeder.   [7]

4. a) Prove that the power loss due to the load currents in the conductors of single- [7]
       phase lateral ungrounded neutral case is 2 times larger than one in the equivalent
       three phase lateral
    b) Derive the voltage drop and power loss equation for a uniform distributed loads. [7]

5. a) List out the types of common faults occurred on distribution system and explain [7]
       the procedure for fault calculations.
    b) Explain in detail about fuse- fuse coordination.   [7]

6. a) Explain the power factor correction by installing the shunt capacitor bank. [5]
    b) An industrial plant has 300 HP induction motor load that runs at 0.8 p.f lagging [9]
       and efficiency 0.85. A synchronous motor of 150 HP and an average efficiency
       85% is available. If the motor is run on no load with same losses, determine the
       p.f of the motor, to make the overall p.f of the plant to 0.9. Can the p.f of the
       plant be raised to u.p.f.? If so what will the KVA intake of synchronous motors

7. a) Why we need to control the voltage of distribution system. What are the methods [7]
       used for it.
    b) Describe the effect of AVB for voltage control on distribution feeders?   [7]

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