

**R18**

Code No: 158AV

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech IV Year II Semester Examinations, July/August - 2022

**ELECTRICAL DISTRIBUTION SYSTEMS**

(Electrical and Electronics Engineering)

Time: 3 Hours

Max.Marks:75

Answer any five questions  
All questions carry equal marks

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- 1.a) Explain the various factors affecting the distribution system planning.  
b) Assume that a load of 120 kW is connected at the Riverside substation. The 15-min weekly maximum demand is given by 70 kW, and the weekly energy consumption is 4100 kWh. Assuming a week is 7 days; determine the demand factor and the 15-min weekly load factor of the substation. [8+7]
- 2.a) Given the A, B, C, D constant of a radial feeder, illustrate how the receiving end voltage can be computed, for a specified load.  
b) Explain the various factors that are to be considered in selecting primary feeder rating? Give a neat sketch of typical primary distribution feeder. [8+7]
- 3.a) How do you fix the rating of a distribution sub-station? Explain.  
b) Explain the optimal location of sub-stations by perpendicular bisector rule. [7+8]
- 4.a) Derive the expression for the total series voltage drop and total copper loss per phase of a uniformly distributed load. Give the assumption made, if any.  
b) Explain the method to analyze distribution feeder cost. [8+7]
- 5.a) What are the objectives of distribution system protection? Discuss.  
b) Describe the principle of operation of fuse with nest diagram? List out its merits and demerits. [7+8]
- 6.a) Explain the general coordination procedure of protective devices.  
b) Explain the protection coordination of fuse-fuse. [8+7]
- 7.a) Illustrate the economic justification of shunt capacitors for distribution systems.  
b) A sub-station supplies power to the following, lighting load 100-kW, a 3-phase induction motor 400 h.p. (298.4 kW), power factor 0.8, efficiency 0.92, a 3-phase synchronous motor giving 100 A at 500 V at an efficiency of 0.94. What must be the power factor of the synchronous motor in order that the power factor of the supply station may be unity?[8+7]
- 8.a) Explain the importance of voltage control for distribution systems.  
b) Describe the effect of series capacitors on voltage control for distribution systems. [7+8]

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