

(Set-L)

M.Tech-1st
Distribution System Engineering

Full Marks : 70

Time : 3 hours

Q. No. 1 is compulsory. Answer any five from the rest
The figures in the right-hand margin indicate marks
All parts of a question should be answered at one place

1. Answer all the following : 2 × 10
- (a) Define the term "Distribution Automation".
- (b) What you meant by Microgrid ?
- (c) Define the term "Trouble Call Analysis" and construct its corresponding sequence diagram.
- (d) What criteria are to be satisfied for breaker implementation and operation within a network ?
- (e) Tabulate the overloading capacity of Step-up Feeder regulators as per ANSI standard.

(f) Define the terms 'Reliability and Quality' involved in distribution automation and control.

(g) What are the main features of the distribution system ?

(h) Draw the Single Diode Model of Equivalent circuit of Photo Voltaic (PV) array with all parameters. <http://www.odishastudy.com>

(i) Define the term 'function/payback correlation'.

(j) Name the types of billing technologies in current use for all distribution systems engineering and management.

2. (a) Explain sub-transmission and substation design. 5
- (b) What are the substation bus schemes ? Explain in detail. 5
3. (a) List the major advantages and disadvantages of ring, mesh, and combined distribution system topology. 5

(Turn Over)

- (b) Construct a diagram representing the Distribution Automation structure showing what each part of the structure entails. 5
4. (a) What are the important functions and regulatory requirements for power systems operating in an unbalanced state in the new competitive environment? 5
- (b) Discuss the advantages and disadvantages of overhead and underground distribution. 5
5. (a) Explain the DG technology and discuss its applications. 5
- (b) Derive the equation for voltage drop calculation for distribution system. 5
6. (a) A Y-connected 400 HP (*metric*), 2000 V, 50 Hz motor works at a power factor of 0.7 lagging. A bank of mesh connected condensers are used to raise the power factor to 0.93 lagging. Calculate the capacitance of each unit and total number of units required, if each is rated 500 V, 50 Hz. The motor efficiency is 85%. 5

- (b) If, in the above case, the capacitor bank is connected in Y across the line (*each phase having four units*), determine the new power factor. 5
7. (a) Explain the concept of Line Drop Compensation (LDC) of a Voltage regulator with diagram. 5
- (b) Formulate steps for calculating the benefits that occur when a Distribution Management Systems (DMS) function allows a procedure to be modified. 5
8. Develop a brief review of commonly used Distributed Generation (DG) technologies that include Renewable and Non-Renewable Energy Sources. Also discuss comparatively pertinent features of each type energy options based in capacity, efficiency, generation cost, environmental impacts, reliability and stability interconnection issues, and portability of the technology. 10