Roll No										

PRESIDENCY UNIVERSITY
BENGALURU

SET A

SCHOOL OF ENGINEERING
END TERM EXAMINATION - JAN 2024

Semester : Semester V - 2021
Course Code : EEE2020
Course Name : Electrical Distribution Systems
Program : B.Tech.

Date : 11-JAN-2024
Time : 9:30AM - 12:30 PM
Max Marks : 100
Weightage : 50%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.
(iv) Do not write any information on the question paper other than Roll Number.

PART A

ANSWER ALL THE QUESTIONS **5 X 2M = 10M**

1. Define the term Load forecasting and its importance.
(CO1) [Knowledge]
2. Define the term grounding and list the importance of grounding.
(CO2) [Knowledge]
3. A considerable amount of effort is necessary to maintain an electric power supply within the requirements of various types of consumers. List out the requirements of a good distribution system.
(CO3) [Knowledge]
4. Define the term SCADA. List out the major components in SCADA system.
(CO4) [Knowledge]
5. Define Communication System. List out the fundamental requirements of communication infrastructure.
(CO4) [Knowledge]

PART B

ANSWER ALL THE QUESTIONS **5 X 10M = 50M**

6. As residential and commercial areas expand due to population growth and new areas being developed, it becomes essential to consider the increased power demand and the diversity between various types of loads. This helps optimize the additional capacity required. To achieve this, variations in peak loads for different types of equipment are analyzed. Actual connected loads are detailed in a table, and it's evident that certain loads, such as lighting, fans, domestic appliances, and home heating and cooling, exhibit significant fluctuations throughout the day. To ensure an efficient power supply system, it's crucial to account for diversified maximum demands based on customers and their connected loads when selecting the appropriate transformer rating. As electrical engineers, let's briefly discuss the processes involved in choosing transformers to meet the power demands of 500 residential flats connected to a feeder line. Each distribution transformer serves 10 flats, operating at 11 kV/415 V in a 3-phase system, and this choice is informed by a load survey that identifies maximum diversified demands per customer.

Load in kW	Appliance	Coincidence Factor
1.5 kW/ flat	Washing machine & drier	0.8
0.2 kW/ flat	Refrigerator	0.65
0.9 kW/ flat	Lighting & Fans	0.9
0.5 kW/ flat	Electronic gadgets	0.7
0.6 kW/ flat	Other appliances & loads	0.5

(CO1) [Comprehension]

7. The generation, transmission, and distribution of electricity all depend on facilities known as substations. Many essential tasks can be accomplished by substations, including the transformation of high voltage to low voltage and vice versa. Multiple substations at varying voltages may be in use between the power plant and the end user. At the point of interconnection between two distinct transmission voltages, or between high transmission voltages and lower distribution voltages, transformers may be present in a substation. Discuss the differences and similarities between outdoor and indoor substations, as well as the many different types of substations that can be built depending on the construction and service needs of the facility.

(CO2) [Comprehension]

8. It's general knowledge that alternating current (A.C.) is used nearly entirely in the production, transmission, and distribution of electricity. Certain users, however, require a D.C. power source. Example uses for direct current (D. C.) power include running DC motors, doing electrochemical work, and providing backup power in high-density urban settings. This is accomplished by using substation equipment, including mercury arc rectifiers, rotary converters, and motor generator sets, to transform alternating current (A. C.) into direct current (D. C.). Describe the different approaches to acquiring the DC substation, which should be discussed together with the relevant diagrams.

(CO3) [Comprehension]

9. Summarize the implementation of Automatic Meter Reading (AMR) not only revolutionize the traditional process of meter data collection but also contribute to more efficient energy management, cost savings, and improved customer services in utility systems?

(CO4) [Comprehension]

10. If the system is well protected against potential damage and burning, its basic criteria can be met at a reasonable cost and with sufficient flexibility. The defect must be fixed and the system returned to normal functioning as quickly as feasible, with as little interruption to regular service as possible. Give a short summary of the value of protection systems and more information about the different safety devices in the distribution network.

(CO4) [Comprehension]

PART C

ANSWER ALL THE QUESTIONS **2 X 20M = 40M**

11. A. The following illustrates the load curves for two distinct classes of loads in addition to the system's peak load. Determine the system's diversity factor as well as its coincidence factor.
Peak load for industrial load 2000 kW
Peak load for Residential load =2000 kW
System peak load Dg = 3000 kW
B. A feeder supplies 2 MW to an area. The total losses at peak load are 100 kW and units supplied to that area during a year are 5.61 million. Calculate the loss factor & Average Loss factor

(CO1) [Application]

12. Three hundred metres of single-phase alternating current (A. C.) distribution line AB receives power at terminal A and is loaded as follows: 100 amperes (A) at 0707 p.f. lagged 200 metres from terminal A. Backtrack 200 A at 0 p.f. and 300 m to get from point A to point B. Distributor load resistance is 0.2 ohms, and reactance is 0.1 ohm/kilometre. Find and calculate the unknown parameters that can be derived from the available data.

(CO3) [Application]