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Q.6	Attempt any two:					
i.	Discuss the economic justification for capacitor allocation in improving power factor. Provide a systematic approach for determining the best location for capacitors.	5	02	01	01	01
ii.	Describe the role of voltage control equipment in distribution systems and analyze the effect of series capacitors on the system.	5	02	01	01	01
iii.	Explain the effect of shunt capacitor on power factor correction.	5	03	01	02	01

Total No. of Questions: 6

Total No. of Printed Pages:4

Enrollment No.....



Faculty of Engineering
End Sem Examination Dec 2024
EE3EL17 Electrical Power Distribution

Programme: B.Tech.

Branch/Specialisation: EE

Duration: 3 Hrs.

Maximum Marks: 60

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

		Marks	BL	PO	CO	PSO
Q.1 i.	What is the primary purpose of a distribution system?	1	01	01	01	
	(a) Power generation					
	(b) Power transmission					
	(c) Power distribution to consumers					
	(d) None of these					
ii.	The load factor is defined as the ratio of-	1	01	01	01	01
	(a) Average load to maximum load					
	(b) Maximum load to average load					
	(c) Total energy consumed to energy supplied					
	(d) None of these					
iii.	Which of the following is typically a characteristic of commercial loads?	1	01	01	01	01
	(a) Constant usage throughout the day					
	(b) High startup currents					
	(c) Large energy requirements during peak hours					
	(d) None of these					
iv.	A coincidence factor less than 1 indicates that-	1	01	01	01	01
	(a) Loads are always at maximum together					
	(b) Loads operate at maximum simultaneously only part of the time					
	(c) Loads are independent of each other					
	(d) None of these					

P.T.O.

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v.	The major design considerations for distribution feeders include-	1	01	01	01	01
	(a) Voltage drop and load distribution					
	(b) Capital investment only					
	(c) Aesthetics of the distribution system					
	(d) None of these					
vi.	For a radial feeder, the primary purpose is to-	1	01	01	01	01
	(a) Provide redundancy in supply					
	(b) Distribute power from a single source					
	(c) Supply power to multiple sources					
	(d) None of these					
vii.	The primary function of protective devices in a distribution system is to-	1	01	01	01	01
	(a) Regulate voltage					
	(b) Maintain power factor					
	(c) Protect equipment from faults					
	(d) Increase load capacity					
viii.	Which of the following is a common fault in distribution systems?	1	01	01	01	01
	(a) Phase shift					
	(b) Overloading					
	(c) Ground fault					
	(d) All of these					
ix.	Capacitive compensation improves the power factor primarily by-	1	01	01	01	01
	(a) Decreasing the load current					
	(b) Canceling out inductive reactance					
	(c) Reducing line losses					
	(d) Stabilizing voltage levels					
x.	The term 'AVR' stands for-	1	01	01	01	01
	(a) Automatic Voltage Regulator					
	(b) Automated Voltage Relay					
	(c) Average Voltage Regulation					
	(d) None of these					
Q.2 i.	Define and differentiate between the coincidence factor and contribution factor in the context of load classification.	4	03	01	01	01

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	ii.	Discuss the classification of loads into residential, commercial, agricultural, and industrial categories, and provide examples of their characteristics.	6	02	01	01	01
OR	iii.	Describe the relationship between the load factor and loss factor in distribution systems, along with its implications for system design.	6	02	01	01	01
Q.3	i.	Explain the basic principles behind the location and rating of distribution substations.	4	02	01	01	01
	ii.	Discuss the benefits and methods of the optimal location of substations in distribution systems.	6	02	01	01	01
OR	iii.	What are the design considerations for radial and loop types of primary feeders? Discuss their advantages and disadvantages.	6	02	01	01	01
Q.4	i.	Derive the expression for voltage drop in uniformly distributed loads and provide a numerical example.	4	02	01	01	01
	ii.	Explain how to calculate power losses in distribution lines for both uniformly and non-uniformly distributed loads. Provide relevant formulas and examples.	6	02	01	01	01
OR	iii.	Discuss the significance of three-phase balanced primary lines in the context of voltage drop and power loss calculations.	6	02	01	01	01
Q.5	i.	Briefly describe the objectives of distribution system protection and common types of faults it experiences.	4	02	01	01	01
	ii.	Explain the working principle of circuit reclosures and line sectionalizers. Also write its importance in a distribution system.	6	02	01	01	01
OR	iii.	Discuss various types of coordinated operation of protective devices, including the role of residual current circuit breaker.	6	02	01	01	01

Marking Scheme
EE3EL17 (T) Electrical Power Distribution (T)

Q.1	i)	(c) Power distribution to consumers	1	OR	ii.	Benefits of optimal location (3 marks) Methods for determining optimal location (3 marks)	6
	ii)	(a) Average load to maximum load**	1		iii.	Design considerations for radial feeders (2 marks) Design considerations for loop feeders (2 marks) Advantages and disadvantages of each type (2 marks)	6
	iii)	(C) Large energy requirements during peak hours	1				
	iv)	(b) Loads operate at maximum simultaneously only part of the time	1	Q.4	i.	Derivation of voltage drop expression (3 marks) Numerical example (1 mark)	4
	v)	(a) Voltage drops and load distribution	1		ii.	Explanation for uniformly distributed loads (3 marks) Explanation for non-uniformly distributed loads (3 marks)	6
	vi)	(b) Distribute power from a single source**	1	OR	iii.	Significance of three-phase balanced lines (3 marks) - Implications for voltage drop and power loss (3 marks)	6
	vii)	(c) Protect equipment from faults	1				
	viii)	(c) Ground fault	1	Q.5	i.	Objectives of system protection (2 marks) Common types of faults (2 marks)	4
	ix)	(b) Cancelling out inductive reactance	1		ii.	Working principles explained (3 marks) Importance in distribution systems (3 marks)	6
Q.2	i.	Definition of coincidence factor (2 marks) Definition of contribution factor (2 marks)	4	OR	iii.	Various types of coordinated operations (3 marks) Role of Residual Current Circuit Breaker (3 marks)	6
	ii.	Explanation of residential loads (1 mark) Explanation of commercial loads (1 mark) Explanation of agricultural loads (1 mark) Explanation of industrial loads (1 mark) Examples highlighting characteristics (2 marks)	6				
OR	iii.	Definition of load factor (1 mark) Definition of loss factor (1 mark) Explanation of their relationship (2 marks) Implications for system design (2 marks)	6	Q.6			
Q.3	i.	Basic principles of location (2 marks) Basic principles of rating (2 marks)	4		i.	Explanation of economic benefits (3 marks) Systematic approach for determination (2 marks)	5
					ii.	Role of voltage control equipment (3 marks) Effects of series capacitors on the system (2 marks)	5
					iii.	Clearly stated assumptions (1 mark) Step-by-step calculations (4 marks)	5

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