

Enrollment No.....



Faculty of Engineering  
End Sem (Odd) Examination Dec-2022  
EE3EW03 / EX3EW03 Electrical Distribution Systems  
Programme: B.Tech. Branch/Specialisation: EE/EX

**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.

- Q.1 i. The common voltage adopted for low voltage electrical distribution is- 1  
 (a) 400 V, 3-ph, 3-wire (b) 220V, DC  
 (c) 230V, 1-ph, AC (d) 400V, 3-ph, 4-wire
- ii. Load forecasting is done using- 1  
 (a) Power law  
 (b) Regression analysis  
 (c) Time series analysis  
 (d) Power law and Regression analysis
- iii. Example of a nearly equivalent uniformly distributed load on feeders is- 1  
 (a) Street light loading on a 1-ph line  
 (b) Domestic load on a 3-ph line  
 (c) Electric traction or tram car load  
 (d) Motor load connected in a workshop or factory
- iv. The main power quality issues affected by distributed generation is/are- 1  
 (a) Voltage regulation (b) Voltage sag  
 (c) Harmonics (d) All of these
- v. Factors which affect the substation site is/are- 1  
 (a) Load forecasting (b) Land availability  
 (c) Land use regulation (d) All of these
- vi. When the load is connected at the end of the main as lumped sum, the effective feeder length is- 1  
 (a) 1 unit length (b) 0.5 l unit length  
 (c) 0.67 l unit length (d) None of these

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vii.	Lighting loads such as fluorescent lamps have a power factor of-	1
	(a) 0.2 (b) 1.0	
	(c) 0.5 to 0.6 (d) 0.8 to 0.9	
viii.	A 37.5 KW induction motor has a power factor of 0.707 and is to be improved to 0.90. The kVAR of capacitor bank needed is-	1
	(a) 33.75 (b) 19.3 (c) 7.50 (d) 26.5	
ix.	The present electronic meters read-	1
	(a) Power, p.f, KVA	
	(b) Power, KVA, & historical record	
	(c) KWh, KVAh, RKVAh, MD & past data for about 12 month	
	(d) None of these	
x.	DATA acquisition from substation requires-	1
	(a) Host equipment	
	(b) Communication network & infrastructure	
	(c) Field devices	
	(d) All of these	
Q.2	i. Find the annual load factor and average demand, given that peak load is 3.5 MW and energy supplied is $10^7$ kWh. Peak demand was recorded during April – June.	2
	ii. Mentioned the standard voltages and systems adopted in India for distribution systems. Why is the 3-ph, 4-wire system preferred?	3
	iii. What is load curve and load duration curve? Explain their importance in distribution networks.	5
OR	iv. Explain how load growth in distribution system can be determined and estimated.	5
Q.3	i. Draw the single line diagram of a typical sub-transmission and distributors.	2
	ii. Compare the % voltage drop of the feeders with square-type service area and hexagonal-type service area.	8
OR	iii. What is distributed generation? What are the various technology used in the distributed generation? Explain any one of them with suitable diagram.	8
Q.4	i. Enlist points to select an ideal location for a substation.	3
	ii. Explain load catering capability of primary feeders.	7

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OR	iii.	Write short note on economics of sub transmission and distribution system.	7
Q.5	i.	Explain how reduction in line current and hence power losses are obtained with power factor improvement?	4
	ii.	What are the different locations for power factor improvement capacitors? Discuss their relative advantages and disadvantages.	6
OR	iii.	Compare and explain role of shunt and series capacitors in power factor correction.	6
Q.6		Attempt any two:	
	i.	Write short note on testing of LT & HT meters.	5
	ii.	What is SCADA? Explain basics of SCADA.	5
	iii.	Explain advanced meter infrastructure system (AMI).	5

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## Marking Scheme

### EE-EX3EW03 Electrical Distribution Systems

Q.1	i)	(d) 400V, 3-ph, 4-wire	1
	ii)	(d) Power law & Regression analysis	1
	iii)	(a) Street light loading on a 1-ph line	1
	iv)	(d) All	1
	v)	(d) All	1
	vi)	(a) 1 unit length	1
	vii)	(c) 0.5 to 0.6	1
	viii)	(b) 19.3	1
	ix)	(c) KWh, KVAh, RKVAh, MD & past data for about 12 monts	1
	x)	(d) all the three in a, b, & c	1
Q.2	i.	1 mark each. Avg demand = 1141 kW and Annual load factor = 0.326.	2
	ii.	2 marks for first part of the question and 1 mark for the second part of the question.	3
	iii.	1 mark each in first part of the question and 3 mark for the second part of the question.	5
OR	iv.	2.5 marks for each.	5
Q.3	i.	2 marks for correct diagram.	2
	ii.	4 marks for each method	8
OR	iii.	1 + 2 + 5	8
Q.4	i.	Full 3 marks for at least for six points	3
	ii.	2 + 5	7
OR	iii.	3.5 + 3.5	7
Q.5	i.	2 + 2	4
	ii.	2 + 2 + 2	6
OR	iii.	3 + 3	6
Q.6			
	i.	2.5 + 2.5	5
	ii.	1 + 4	5
	iii.	For block diagram 2 marks and for explanation 3 marks.	5

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