U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

January 2024 Semester End Main Examinations

Programme: B.E. **Semester: VII**
Branch: ES – Cluster Elective **Duration: 3 hrs.**
Course Code: 19EE7CE2PQ **Max Marks: 100**
Course: Electrical Power Quality

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

			UNIT - I	*CO*	*PO*	Marks
1	a)		Define power quality and what is the need of power quality in modern day power systems?	*CO1*	*PO1*	**06**
	b)		Explain the overview of various power quality IEC standards.	*CO1*	*PO1*	**06**
	c)		Briefly discuss the power quality monitoring through ITIC and CBEMA curves.	*CO1*	*PO1*	**08**
			UNIT - II			
2	a)		Write short notes on the following 1. Power Balance 2. Power–Frequency Control 3. Spinning Reserve 4. Time deviation of clocks	*CO2*	*PO2*	**10**
	b)		Explain in detail various the consequences of under frequency tripping.	*CO2*	*PO2*	**10**
			UNIT - III			
3	a)		Write short notes on the following power quality issues with necessary waveforms. 1. Transients 2. Voltage imbalance	*CO2*	*PO2*	**10**
	b)		Write short notes on the following power quality issues with necessary waveforms. 1. Harmonics versus transients 2. Voltage versus current distortion	*CO2*	*PO2*	**10**
			OR			
4	a)		Explain the following power system quantities under non sinusoidal operating conditions. 1. Active, reactive, and apparent power 2. Displacement and true power factor 3. Harmonic phase sequences	*CO2*	*PO2*	**10**

		b)	Write briefly on the two most commonly used indices for measuring the harmonic content of a waveform.	*CO2*	*PO2*	**10**
			UNIT - IV			
	5	a)	Discuss briefly the effects of harmonic distortion on the following three systems. 1. Effect on capacitors 2. Effect on transformers	*CO2*	*PO2*	**10**
		b)	With necessary diagram, explain the sources of harmonics originated from commercial loads.	*CO2*	*PO2*	**10**
			OR			
	6	a)	Define grounding and why grounding is required for a system	*CO2*	*PO2*	**10**
		b)	Briefly describe the typical wiring and grounding problems in the electrical systems.	*CO2*	*PO2*	**10**
			UNIT - V			
	7	a)	Explain how the power quality is measured through 1. Harmonic analyzer and spectrum analyzer. 2. Disturbance analyzer.	*CO2*	*PO2*	**10**
		b)	Explain the following types of nonlinear loads with necessary circuit diagram. 1. Converter-Based Nonlinear Loads 2. Nature-Based Classification	*CO2*	*PO2*	**10**

****