



**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)**

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QUESTION BANK (DESCRIPTIVE)

Subject with Code: POWER QUALITY (PE- IV)) (25EE2117)

Course & Branch: M.TECH. IN POWER ELECTRONICS

Year & Sem: I-M.Tech & II-Sem

Regulation: R25

**UNIT –I
INTRODUCTION TO POWER QUALITY**

1	a	What is power quality? How to justify power quality is a voltage quality?	[L1][CO1]	[5M]
	b	Why we are concern about power quality?	[L4][CO1]	[5M]
2	a	Define crest factor, DC offset, coupling, noises, and harmonics.	[L1][CO1]	[5M]
	b	Define flicker, notching, total harmonic distortion, frequency deviation, and voltage fluctuation.	[L1][CO1]	[5M]
3	a	Classify different types of power quality issues.	[L2][CO1]	[5M]
	b	Write a short note on voltage imbalance.	[L2][CO1]	[5M]
4	a	Explain different types of short duration voltage variations.	[L2][CO1]	[5M]
	b	What is voltage sag? Explain clearly with relevant diagrams.	[L1][CO1]	[5M]
5	a	Explain voltage fluctuations in detailed?	[L2][CO1]	[5M]
	b	Define long duration voltage variation and explain different types of long duration voltage variations.	[L1][CO1]	[5M]
6		Tabulate the detailed characteristics of power quality problems in power systems.	[L1][CO1]	[10M]
7		List out various power quality standards considered in power systems.	[L1][CO1]	[10M]
8		What are the responsibilities of end users of electric power supply?	[L1][CO1]	[10M]
9		What are the responsibilities of suppliers of electric power supply?	[L1][CO1]	[10M]
10	a	What is voltage swell? Explain clearly with relevant diagrams.	[L1][CO1]	[5M]
	b	what are the various sources of different power quality disturbances?	[L1][CO1]	[5M]

UNIT –II
POWER FREQUENCY DISTURBANCE & TRANSIENTS

1	a	Write a short note on power frequency variations	[L2][CO2]	[5M]
	b	Explain the sources of impulsive transients.	[L1][CO2]	[5M]
2		What is a transient? Explain different types of transients.	[L1][CO2]	[10M]
3		Describe the characteristics of low-frequency disturbances in power systems with suitable examples.	[L2][CO2]	[10M]
4		Discuss the power system transient modeling techniques used for analyzing switching and lightning transients.	[L3][CO2]	[10M]
5	a	Draw and explain the impulsive transients.	[L1][CO2]	[5M]
	b	Draw and explain the oscillatory transients.	[L1][CO2]	[5M]
6		Explain the types and causes of transients in power systems with appropriate examples.	[L2][CO2]	[10M]
7	a	Explain the sources of oscillatory transients.	[L2][CO2]	[5M]
	b	Define low-frequency disturbances and state their typical characteristics.	[L1][CO2]	[5M]
8	a	Draw and explain the CBEMA curve.	[L1][CO2]	[5M]
	b	Draw and explain ITI curve.	[L1][CO2]	[5M]
9	a	What is meant by voltage tolerance criteria in power quality analysis?	[L1][CO2]	[5M]
	b	List the common power frequency disturbances occurring in electrical power systems	[L1][CO2]	[5M]
10		Illustrate and explain different transient waveforms observed in power systems and discuss their effects on power quality.	[L4][CO2]	[10M]

UNIT –III
HARMONICS & ELECTROMAGNETIC INTERFERENCE (EMI)

1	a	What is harmonic distortion? Explain clearly.	[L1][CO3]	[5M]
	b	Discuss about the voltage versus current distortion.	[L2][CO3]	[5M]
2	a	Explain the comparison between harmonics versus transients.	[L2][CO3]	[5M]
	b	What are effects of harmonics? Explain clearly.	[L1][CO3]	[5M]
3	a	What are the commonly used harmonic indices? Explain total demand distortion.	[L1][CO3]	[5M]
	b	Briefly explain about total harmonic distortion	[L1][CO3]	[5M]
4	a	Explain in detail about interharmonics.	[L2][CO3]	[5M]
	b	Explain the harmonic impact on capacitors and transformers.	[L2][CO3]	[5M]
5	a	Explain in detail about single-phase switch-mode power supply as a harmonics source.	[L2][CO3]	[5M]
	b	Explain the harmonic impact on motors, telecommunication systems and energy meters.	[L2][CO3]	[5M]
6	a	What are the various devices for the controlling of harmonics distortion?	[L2][CO4]	[5M]
	b	Explain harmonic evaluations for end-user facilities.	[L2][CO4]	[5M]
7	a	Explain various Passive filters for the controlling of harmonics distortion.	[L2][CO4]	[5M]
	b	Explain Active filters for the controlling of harmonics distortion.	[L2][CO4]	[5M]
8	a	Explain various power system qualities under non-sinusoidal conditions.	[L2][CO4]	[5M]
	b	Explain any two harmonics sources from commercial loads.	[L2][CO4]	[5M]
9	a	What are the harmonics sources from industrial loads? Explain clearly.	[L2][CO4]	[5M]
	b	Explain harmonic evaluations on the utility system.	[L2][CO4]	[5M]
10		Explain Electromagnetic Interference (EMI) and discuss the frequency classification, electrical fields, magnetic fields, and important EMI terminology used in power systems.	[L2][CO4]	[10M]

UNIT –IV
GROUNDING AND BONDING

1	a	Explain the concept of grounding and bonding in electrical systems.	[L2][CO5]	[5M]
	b	Discuss electrical grounding and bonding importance in ensuring safety and system reliability.	[L2][CO5]	[5M]
2	a	Explain different methods used for measuring earth resistance.	[L3][CO5]	[5M]
	b	Describe the procedure for conducting earth resistance tests.	[L2][CO5]	[5M]
3	a	Differentiate between Power Ground System and Signal Reference Ground (SRG).	[L4][CO5]	[5M]
	b	Explain the essential features of a properly grounded electrical system.	[L2][CO5]	[5M]
4		Describe the shock and fire hazards that can occur due to improper grounding in electrical installations.	[L2][CO5]	[10M]
5	a	List different types of ground electrodes used in electrical installations and briefly explain any two.	[L2][CO5]	[5M]
	b	What is a ground grid system? Explain its importance in substations.	[L2][CO5]	[5M]
6	a	State the main objectives of grounding according to NEC grounding requirements.	[L1][CO5]	[5M]
	b	Define Signal Reference Ground (SRG) and explain its significance in electronic systems.	[L2][CO5]	[5M]
7		Describe the major shock and fire hazards associated with improper grounding in electrical systems and explain how grounding helps in minimizing these hazards.	[L2][CO5]	[10M]
8		Describe different types of ground electrodes used in electrical installations.	[L2][CO5]	[10M]
9	a	Explain single-point grounding and multipoint grounding techniques.	[L4][CO5]	[5M]
	b	What are ground loops? Explain their causes and effects in grounding systems.	[L4][CO5]	[5M]
10		Discuss the causes and effects of ground loops and electrochemical reactions in grounding systems.	[L5][CO45]	[10M]

UNIT –V
MEASURING AND SOLVING POWER QUALITY PROBLEMS

1	a	Explain about the historical perspective of power quality measuring instruments.	[L2][CO6]	[5M]
	b	What are the important factors that should be considered when selecting the power quality measuring instruments?	[L1][CO6]	[5M]
2	a	What are the basic categories of power quality measuring instruments?	[L1][CO6]	[5M]
	b	Explain in detailed about disturbance analyzers and oscilloscopes	[L2][CO6]	[5M]
3	a	Explain in detailed about harmonic analyzers and flicker meters.	[L2][CO6]	[5M]
	b	Draw and explain the schematic diagram of solid-state current limiter	[L1][CO6]	[5M]
4	a	Explain the operating principle of solid-state transfer switch (SSTC).	[L2][CO6]	[5M]
	b	Explain the operating principle of solid-state breaker (SSB).	[L2][CO6]	[5M]
5	a	Write a short note on network reconfiguring custom power device.	[L2][CO6]	[5M]
	b	Draw and explain the schematic diagram of solid-state transfer switch.	[L2][CO6]	[5M]
6		Draw and explain the operating modes of DSTATCOM.	[L2][CO6]	[10M]
7		Draw and explain the operating modes of dynamic voltage restorer (DVR)	[L2][CO6]	[10M]
8		What is UPQC? Explain the power flow circuit of UPQC in steady state.	[L1][CO6]	[10M]
9		Explain the different operating modes of unified power quality conditioner.	[L2][CO6]	[10M]
10	a	What is DVR? Explain the basic equivalent structure of DVR.	[L1][CO6]	[5M]
	b	Explain the schematic diagram of unified power quality conditioner	[L2][CO6]	[5M]

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