GANDHI INSTITUTE OF ENGINEERING AND TECHNOLOGY UNIVERSITY, ODISHA, GUNUPUR
(GIET UNIVERSITY)
M.Tech. (First Semester) Regular Examinations, February – 2025
24MPEPE11011 – Power Quality
(Power Electronics)

Time: 3 hrs
Maximum: 60 Marks

Answer ALL questions
(The figures in the right hand margin indicate marks)

PART – A
(2 x 5 = 10 Marks)

Q.1. Answer *ALL* questions

		CO #	Blooms Level
a.	Write the fundamental issues related to power quality. Define and explain their significance.	CO2	K1
b.	What is total demand distortion (TDD), and how does it impact power quality?	CO3	K2
c.	Define voltage sag and voltage dip. How do they affect electrical systems?	CO1	K1
d.	List four key IEC standards that define and regulate power quality.	CO4	K2
e.	How do shunt capacitors contribute to voltage stability improvement in transmission networks?	CO3	K2

PART – B
(10 x 5 = 50 Marks)

Answer *ALL* the questions

		Marks	CO #	Blooms Level
2. a.	Discuss the significance and working of a harmonic analyzer and disturbance analyzer in power quality assessment.	5	CO1	K4
b.	Draw and explain the functional structure of an expert system used for power quality monitoring.	5	CO1	K3
	(OR)			
c.	What are the major power quality issues? Analyze their causes and effects on electrical networks.	5	CO1	K2
d.	Explain the role of a harmonic analyzer and disturbance analyzer in assessing power quality.	5	CO1	K4
3.a.	How do modern power quality monitors function? Discuss their significance in identifying power disturbances.	5	CO2	K2
b.	Define waveform distortion and explain its various categories in power systems.	5	CO2	K3
	(OR)			
c.	What are the different power quality disturbances, and how do they impact electrical equipment?	5	CO2	K2
d.	Explain the characteristics of power quality events, focusing on short-duration and long-duration variations.	5	CO2	K3
4.a.	Discuss the selection criteria for power quality monitoring sites and their importance in electrical systems.	5	CO3	K4
b.	Explain the principles of operation of a shunt active power filter and illustrate with a neat schematic diagram.	5	CO3	K3
	(OR)			
c.	How is power quality monitoring performed? What crucial information can be obtained from monitoring site surveys?	5	CO3	K3

d.	Compare active and passive harmonic filters. How do they contribute to improving power quality?	5	CO3 K3
5.a.	Draw and explain the block diagram of an advanced power quality monitoring system.	5	CO4 K
b.	Discuss the steps involved in modeling electrical networks and components under non-sinusoidal conditions.	5	CO4 K3

<div align="center">(OR)</div>

c.	What are the various devices used for controlling harmonic distortion? Briefly explain their working principles.	5	CO4 K2
d.	Explain the purpose and working of a Flicker meter in power quality assessment.	5	CO4 K2

6.a.	Define and explain the following IEEE standard-related terms:
	    1. Load current
	    2. Short circuit current
	    3. Total harmonic distortion
	    4. Total demand distortion
		5	CO2 K3

<div align="center">(OR)</div>

b.	Explain the characteristics of voltage fluctuations, including voltage imbalance, under-voltage, over-voltage, and frequency variations.	5	CO3 K3

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