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**GIET UNIVERSITY, GUNUPUR - 765022**  
**M. Tech (First Semester) Examinations, January - 2024**  
**MPEPE1033 - Power Quality**  
**(Power Electronics)**

Time: 3 hrs

Maximum: 70 Marks

(The figures in the right hand margin indicate marks.)

**PART – A****(2 x 10 = 20 Marks)**

Q1 Answer all the questions	CO#	Blooms Level
a. What is the effect of shunt capacitors on voltage stability enhancement of transmission networks?	CO1	K1
b. Define overvoltage.	CO1	K2
c. What is the harmonic distortion of fluorescent lamps?	CO1	K2
d. Define voltage dip.	CO2	K1
e. What is the significant harmonic introduced in SMPS?	CO3	K2
f. Define power frequency variations.	CO2	K1
g. What are triplex harmonics, and what is the expression for the RMS value of a harmonic waveform?	CO1	K3
h. Define total demand distortion.	CO4	K1
i. Name four IEC standards that define power quality.	CO3	K3
j. Write the advantages of the Hamilton-Jacobi-Bellman equation.	CO1	K1

**PART – B****(10 x 5 = 50 Marks)**Answer **ANY FIVE** questions

	Marks	CO#	Blooms Level
2. a. Explain PFC based on bilateral single-phase and three-phase converters.	5	CO1	K2
b. Discuss the detailed selection process of power quality monitoring sites.	5	CO1	K3
3.a. Define the following terms related to IEEE standards: (i) SCR (ii) Load current, (iii) Short circuit current (iv) Total harmonic distortion (v) Total demand distortion (vi) PCC.	5	CO2	K2
b. Explain in detail the principles of operation of shunt active power filters with a neat schematic.	5	CO2	K4
4. a. Describe the harmonic analyzer and disturbance analyzer.	5	CO3	K2
b. Develop an application of an expert system for power quality monitoring.	5	CO3	K2
5.a. Discuss transients in detail.	5	CO4	K1

b.	Explain the following concepts related to power quality: (i) Voltage imbalance, (ii) Undervoltage, (iii) Overvoltage, (iv) Frequency variation.	5	CO4	K2
6. a.	Explain modern power quality monitors.	5	CO2	K3
b.	Draw the block diagram of advanced power quality monitoring systems and explain it.	5	CO3	K2
7.a.	Discuss the instruments used for analyzing non-sinusoidal voltages and currents in detail.	5	CO2	K4
b.	Analyze various major power quality issues in detail.	5	CO2	K2
8. a.	Explain the Modeling of networks and components under non-sinusoidal condition.	5	CO1	K3
b.	What are the various devices for controlling harmonic distortion? Explain briefly about it.	5	CO2	K2

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