Reg.No.:												

VIVEKANANDHA COLLEGE OF ENGINEERING FOR WOMEN
[AUTONOMOUS INSTITUTION AFFILIATED TO ANNA UNIVERSITY, CHENNAI]
Elayampalayam – 637 205, Tiruchengode, Namakkal Dt., Tamil Nadu.

Question Paper Code: 80032

M.E. / M.Tech. DEGREE END-SEMESTER EXAMINATIONS – JAN. / FEB. 2026
First Semester
Power Systems Engineering
P23PSE01 – POWER QUALITY
(Regulation 2023)

Time: Three Hours Maximum: 100 Marks

Answer ALL the questions

Knowledge Levels (KL)	K1 – Remembering	K3 – Applying	K5 - Evaluating
	K2 – Understanding	K4 – Analyzing	K6 - Creating

PART – A

(10 x 2 = 20 Marks)

Q.No.	Questions	Marks	KL	CO
1.	Define the term 'Power Quality', as per IEC and IEEE Standards.	2	K1	CO1
2.	What are the effects of waveform distortion in power systems?	2	K1	CO1
3.	Identify any two major causes of long duration voltage variations.	2	K2	CO2
4.	State any two international standards related to voltage variations.	2	K1	CO2
5.	Give any two effects of lightning transients on power system equipment.	2	K2	CO3
6.	Differentiate between lightning transients and load switching transients in power systems.	2	K2	CO3
7.	What is Total Harmonic Distortion?	2	K1	CO4
8.	List the nonlinear loads contribute to harmonic generation in electrical networks.	2	K2	CO4
9.	Define the principal of operation of Dynamic Voltage Restorer (DVR).	2	K1	CO5
10.	Mention the functional role of shunt and series compensators in voltage and power flow control.	2	K2	CO5

PART – B

(5 x 13 = 65 Marks)

Q.No.		Questions	Marks	KL	CO
11.	a)	Differentiate between voltage transients and waveform distortions in power systems and analyze their impacts.	13	K2	CO1

		(OR)			
	b)	Discuss the electric power quality phenomena as defined by IEC and IEEE, types of disturbances, and their mitigation strategies.	13	K2	CO1
12.	a)	A distribution feeder is encountering frequent short term interruptions. Identify the possible causes of the event and suggest methods to minimize them.	13	K3	CO2
		(OR)			
	b)	Compare the characteristics of voltage sags, flicker, and long-duration variations in terms of duration, causes and impacts.	13	K3	CO2
13.	a)	Provide a comparative analysis of the capacitor switching and lightening transients in terms of their origins, waveforms, and durations.	13	K3	CO3
		(OR)			
	b)	Describe the mechanism of load switching transients in low-voltage and high-voltage systems. Analyze their impact on power system performance	13	K2	CO3
14.	a)	Using harmonic analysis techniques, evaluate the Total Harmonic Distortion in a distribution system supplying nonlinear loads. Discuss how harmonic orders influence the distortion levels.	13	K3	CO4
		(OR)			
	b)	Analyze the effects of harmonic components on transformer core saturation and thermal performance.	13	K4	CO4
15.	a)	Explain the operating principle of D-STATCOM to improve voltage stability in a distribution feeder.	13	K2	CO5
		(OR)			
	b)	Explain the working principle of Unified Power Quality Conditioner (UPQC) in modern power systems.	13	K2	CO5

PART – C

(1 x 15 = 15 Marks)

Q.No.		Questions	Marks	KL	CO
16.	a)	Discuss a systematic harmonic monitoring, analysis, and mitigation strategies in an electrical network. Support your answer with case study.	15	K3	CO4
		(OR)			
	b)	Discuss the performance of power electronic based conditioners in maintaining power quality as per professional standards in a renewable based system. Support your answer with case study.	15	K3	CO5