

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: 80034**

M.E. / M.Tech. DEGREE END-SEMESTER EXAMINATIONS – FEB. 2025

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 power quality as per IEEE standards.	2	K1	CO1
2.	What are the common causes of voltage fluctuations?	2	K1	CO1
3.	What is a voltage sag, and how does it differ from a short interruption?	2	K2	CO2
4.	Mention two sources of flicker in electrical circuits.	2	K1	CO2
5.	Explain the origin of capacitor switching transients.	2	K2	CO3
6.	What is the impact of load switching on power quality?	2	K2	CO3
7.	Define harmonics and state two sources of harmonic distortion.	2	K1	CO4
8.	How are passive filters used to mitigate harmonics?	2	K2	CO4
9.	What is a D-STATCOM, and where is it applied?	2	K1	CO5
10.	Explain the role of Unified Power Quality Conditioner (UPQC) in improving power quality.	2	K2	CO5

**PART – B**

(5 x 13 = 65 Marks)

Q.No.	Questions	Marks	KL	CO
11. a)	Explain the different types of power quality disturbances. Discuss their impacts on electrical systems.	13	K3	CO1

(OR)

- b) Analyze how transients and waveform distortion affect sensitive loads. What are the key standards that guide power quality management? 13 K4 CO1
12. a) Discuss the causes and consequences of voltage sags in industrial environments. Provide examples of mitigation techniques. 13 K3 CO2

(OR)

- b) Compare and contrast the different types of longer duration voltage variations. How can sensitive circuits be protected against these variations? 13 K4 CO2
13. a) Explain the origin and classification of transients in power systems. Illustrate the effect of lightning-induced transients on system performance. 13 K3 CO3

(OR)

- b) Describe the protective measures employed to mitigate transients caused by load switching with examples. 13 K4 CO3
14. a) Define harmonic power flow and explain the calculation methods used for harmonic analysis. 13 K3 CO4

(OR)

- b) Evaluate the effectiveness of active filters in harmonic mitigation. What are the differences between passive and active filtering techniques? 13 K5 CO4
15. a) With a case study, explain the working of Dynamic Voltage Restorer (DVR) in maintaining power quality during voltage sags. 13 K3 CO5

(OR)

- b) Analyze the application of series compensators for power quality improvement. Discuss with relevant examples. 13 K4 CO5

### PART – C

(1 x 15 = 15 Marks)

- | Q.No.  | Questions  | Marks | KL | CO       |
|--------|--|-------|----|----------|
| 16. a) | A manufacturing facility is experiencing frequent voltage sags and harmonic distortions due to its load configuration. Propose a comprehensive power quality improvement plan involving conditioners like D-STATCOM and DVR. Include economic and technical considerations in your analysis. | 15    | K6 | CO3, CO5 |

(OR)

- b) A commercial building faces power quality issues due to transient disturbances and flicker. As a consultant, provide a detailed evaluation of the problem and recommend mitigation strategies using harmonic filters and compensators. 15 K5 CO1, CO2, CO4
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