

P.E.S. COLLEGE OF ENGINEERING (AN AUTONOMOUS INSTITUTE) CHH. SAMBAJINAGAR-431002 Summer Examination – 2026 Course: F.Y.M.Tech. Branch : Electrical Power Systems Semester : II Subject Code & Name: MTPSEPS204TA & Power Quality Assessment & Mitigation Max Marks: 60 Date: 06/07/2026 Duration: 3 Hr.			
Instructions to the Students: 1. All the questions are compulsory. 2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in () in front of the question. 3. Use of non-programmable scientific calculators is allowed. 4. Assume suitable data wherever necessary and mention it clearly.			
		Level / CO	Marks
Q. 1	Solve Any one of the following.		[12]
	Explain following power quality terms as per IEEE standard 1159. 1. Transients 2. Interruptions 3. Short duration voltage variation 4. Voltage imbalance 5. Voltage fluctuations 6. Flicker Marking Scheme Transients 2 A) Short duration voltage variation 2 Voltage fluctuations 2 Interruptions 2 Voltage imbalance 2 Flicker 2	(K2 / CO1)	12
	Discuss the symptoms associated with poor power quality in an industrial setup. Explain the characteristics of a good grounding practice and highlight the major operational problems that arise due to poor grounding. Marking Scheme Symptoms of poor power quality in industries 4 Characteristics of good grounding practice 4 Problems due to poor grounding 4	(K2 / CO1)	12
Q. 2	Solve Any one of the following.		[12]
	Explain how reactive power management devices are utilized to regulate voltage profile in power systems. Marking Scheme Concept of reactive power management 2 A) Capacitor banks 2 SVC/STATCOM 3 Synchronous condenser 2 Voltage regulation explanation with diagram/application 3	(K2 / CO1)	12
	Enlist the primary causes and consequences of short-term and long-term voltage flickers. Also, analyze the impact of surge impedance and line termination on transient over-voltages, and suggest modern mitigation methods to control them. Marking Scheme	(K2 / CO1)	12

	Causes of short-term flickers 2 Causes of long-term flickers 2 Consequences/effects 2 Surge impedance effect 2 Line termination effect 2 Mitigation methods 2		
Q. 3	Solve Any one of the following.		[12]
A)	Differentiate voltage sags and short interruptions. Analyze how the specific fault location and fault levels influence the "area of vulnerability" within an industrial distribution system. Marking Scheme Difference between voltage sag and interruption 4 Fault location influence 3 Fault level influence 3 Area of vulnerability explanation 2	(K3 / CO3)	12
B)	Explain how voltage sags affect modern computer networks? Suggest suitable protection devices like UPS, DVR, and CVT.” Marking Scheme Effects of voltage sag on computer networks 4 UPS explanation 2 DVR explanation 2 CVT explanation 2 Suitability/recommendation 2	(K3 / CO3)	12
Q. 4	Solve Any one of the following.		[12]
A)	Examine the primary causes and economic effects of harmonic waveform distortions in non-sinusoidal AC systems. Explain the phenomenon of parallel and series harmonic resonance and its catastrophic consequences on system equipment. Marking Scheme Causes of harmonic distortion 3 Economic effects 3 Parallel resonance 2 Series resonance 2 Consequences on equipment 2	(K4 / CO4)	12
B)	Detail out a comprehensive harmonic study procedure for an industrial facility. Contrast the operation, benefits, and limitations of using Passive Filters versus Active Filters to control harmonic currents in modern non-linear loads. Marking Scheme Harmonic study procedure 4 Passive filter operation/benefits/limitations 4 Active filter operation/benefits/limitations 4	(K4 / CO4)	12
Q. 5	Solve Any one of the following.		[12]
A)	Discuss various instruments and techniques used in power quality monitoring including harmonic, transient and flicker monitoring. Marking Scheme Harmonic monitoring 4	(K2 / CO5)	12

	Transient monitoring 4 Flicker monitoring 2 Instruments/techniques explanation 2		
B)	Discuss power quality state estimation and mitigation techniques used in different environments. Marking Scheme State estimation concept 4 Mitigation techniques in industries 3 Mitigation in commercial systems 3 Mitigation in utility environment 2	(K5 / CO5)	12
	*** End ***		