A **Reg. No. :** | | | | | | | | | | |

Question Paper Code: 99305

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2024

Professional Elective

Electrical and Electronics Engineering

19UEE905 – POWER QUALITY

(Regulations 2019)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Which one is not a power quality related term CO1-U

   (a) Transient (b) voltage sag (c) noise (d) string efficiency

2. Which one is not power quality standard? CO1-U

   (a) IEEE (b) IEC (c) ANSI (d) ISI

3. What is the primary cause of voltage sags and interruptions? CO2-U

   (a) Lightning strikes (b) Power plant outages

   (c) Equipment faults (d) All of the above

4. How can the severity of voltage sag due to an induction motor starting be estimated? CO2-U

   (a) By measuring the power factor of the motor

   (b) By measuring the voltage drop across the motor terminals

   (c) By measuring the inrush current of the motor

   (d) By measuring the rotational speed of the motor

5. What is the primary purpose of lightning protection measures in power systems? CO3-U

   (a) To prevent the occurrence of lightning strikes

   (b) To mitigate the damage caused by lightning strikes

   (c) To reduce the frequency of lightning strikes

(d) To eliminate the risk of over voltages caused by lightning strikes

6. What is ferro resonance? CO3-U

(a) A type of overvoltage caused by lightning strikes

(b) A type of overvoltage caused by capacitor switching

(c) A type of overvoltage caused by ground faults

(d) A type of overvoltage caused by electromagnetic interference

7. IEEE – 519 is the standard for CO4-U

(a) Voltage harmonies (b) Current harmonies

(c) spikes (d) sags

8. The devices for controlling harmonic distortions are CO4-U

(a) Line reactor (b) capacitor banks (c) zigzag t/f's (d) All the above

9. Instruments in the disturbance analyser category have very limited to CO5-U

(a) Harmonic study (b) Harmonic injection

(c) Harmonic analysis capabilities (d) any of the above

10. Voltage magnitude and transient magnitude can be measures by CO5-U

(a) Spectrum Analyze (b) Harmonic Analyzer

(c) Disturbance Analyze (d) RMS meter

PART – B (5 x 2= 10Marks)

11. Define Inter harmonic. CO1-U

12. Demonstrate the sources of voltage sags and interruptions? CO2-U

13. Show the primary purpose of shielding in lightning protection? CO3-U

14. List out the various effects on devices and loads CO4-U

15. Define power quality monitoring CO5-U

PART – C (5 x 16= 80Marks)

16. (a) Explain in detail the short duration and long duration voltage variations CO1-U (16)

Or

(b) Imagine a situation that lightning falls on one of the three phase overhead live conductor. What problem will occur? Explain in detail CO1-U (16)

17.	(a)	Compare the effectiveness of different mitigation techniques for voltage sags, including active series compensators, static transfer switches, and fast transfer switches.	CO2-App	(16)
		Or		
	(b)	(i) Inspect the working of DVR operation how will be used for sag mitigation.	CO2 -App	(8)
		(ii) Examine the active series compensator when voltage sag mitigation.	CO2 -App	(8)
18.	(a)	Analyze the capacitor switching, lightning, and ferro resonance cause over voltages, and measures can be taken to prevent or reduce the damage caused by these events?	CO3 -Ana	(16)
		Or		
	(b)	Analyze the working of the following device on over voltage	CO3- Ana	(8)
		Low pass filters.		(8)
		(i) Power conditioners.		
		(ii) Surge filters.		
19.	(a)	(i) Explain briefly how the phenomena of current distortion affects the voltage distortion under the presence of harmonics.	CO1- U	(8)
		(ii) Explain briefly about locating harmonic sources and characterization in power system	CO1- U	(8)
		Or		
	(b)	Explain the devices used for controlling harmonic distortion and explain their function	CO1- U	(16)
20.	(a)	Explain in detail with necessary diagram the working principle and functioning of power quality analyzers.	CO5- U	(16)
		Or		
	(b)	(i) Explain the various instruments used for power quality measurements.	CO5 -U	(8)
		(ii) Illustrate the factors to be considered when selecting the instruments?	CO5 -U	(8)

99305