**A**     Reg. No. : ⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚⬚

## Question Paper Code: U3106

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2025

Professional Elective

Electrical and Electronics  Engineering

21EEV106 – POWER QUALITY

(Regulations 2021)

Duration: Three  hours                                     Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

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

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

2.    Transients also called as                                                                      CO1- U

   (a) Surge                (b)  switching          (c) Dynamic      (d) variations

3.    ………… is the primary cause of voltage sags and interruption            CO1- U

   (a) Lightning strikes                      (b) Power plant outages

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

4.    The severity of a voltage sag due to an induction motor starting be estimated      CO1- U
   by _____.

   (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.    The source of overvoltage that occurs during capacitor switching is to      CO1- U

   (a) Voltage Surges                          (b) Electrical Noise

   (c) Electromagnetic Interference            (d) Ground Faults

6. The purpose of surge arresters in mitigating overvoltage is to      CO1- U

    (a) To eliminate the source of over voltages

    (b) To reduce the duration of over voltages

    (c) To limit the magnitude of over voltages

    (d) To increase the frequency of over voltages

7. ---------become an important issue for grounded wye systems with      CO1- U
current flowing on the neutral.

    (a) fourth harmonics                   (b) Triple harmonics

    (c) Fifth harmonics                    (d) Seventh harmonics

8. Harmonic voltage distortion at the motor terminals is translated into ------      CO1- U
within the motor

    (a) eddy current losses      (b) Harmonic fluxes      (c) Power      (d) stay losses

9. Power quality monitoring programs are often driven by the demand for      CO1-U
improving the system wide_____

    (a) power quality performance          (b) voltage quality performance

    (c) current quality performance          (d) None of the above

10. Instruments in the disturbance analyzer category have very limited.      CO1- U

    (a) Harmonic study                    (b) Harmonic injection

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

<div align="center">PART – B (5 x 2= 10 Marks)</div>

11. Explain inter harmonics are and how they differ from traditional harmonics    CO1- U
in a power system.

12. Demonstrate the sources of voltage sags and interruptions.      CO1- U

13. Show the sources of over voltages and how can they be mitigated.      CO1- U

14. Compare the difference between harmonics and transients.      CO1- U

15. Determine the role of expert system in power quality studies.      CO1- U

<div align="center">PART – C (5 x 16= 80Marks)</div>

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

<div align="center">Or</div>

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(b) Using the CBEMA and ITI curves, apply your knowledge to determine the acceptable power quality levels for sensitive equipment in a business environment, and recommend strategies to meet these standards.    CO1- U    (16)

17. (a) Describe the different sources of voltage sags and interruptions, and categorize its impact of power system performance.    CO1- U    (16)

Or

(b) (i) Inspect the working of DVR operation how will be used for sag mitigation.    CO1- U    (16)
(ii) Examine the active series compensator when voltage sag mitigation.

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.    CO4- Ana    (16)

Or

(b) Analyze the source of transient over voltages in power systems.    CO4- Ana    (16)

19. (a) Analyze the effect of harmonic distortion on power system performance, focusing on the impact on voltage and current distortion. Evaluate the implications of harmonic distortion on sensitive equipment, and recommend suitable measures to mitigate these effects.    CO4- Ana    (16)

Or

(b) Inspect the devices used for controlling harmonic distortion and explain their function.    CO4- Ana    (16)

20. (a) Construct in detail with necessary diagram the working principle and functioning of power quality analyzers.    CO5-App    (16)

Or

(b) Examine the working principle and functioning of power quality analyzers, and use relevant diagrams to demonstrate how these analyzers measure power quality issues such as voltage sags, harmonics, and flicker in an industrial or commercial setting.    CO5-App    (16)

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