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Question Paper Code: 99305

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 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. Long duration voltage variations are CO1 U
(a) Over voltage (b) Under voltage (c) Sustained interruptions (d) All the above
2. Which one is called Power acceptability curve? CO1 U
(a) Slip Torque curve (b) V-I curve (c) CBEMA curve (d) P-V curve
3. How can the severity of a 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
4. What is the purpose of active series compensators in mitigating voltage sags? CO2 U
(a) To store energy for use during sags
(b) To inject a compensating voltage into the system
(c) To disconnect the affected equipment during sags
(d) To increase the voltage of the power source

5. What is the source of overvoltage that occurs during capacitor switching? CO3 U
- (a) Voltage Surges (b) Electrical Noise
(c) Electromagnetic Interference (d) Ground Faults
6. Which of the following is a type of low-pass filter used to mitigate over voltages? CO3 U
- (a) Butter worth filter (b) Chebyshev filter
(c).Band-pass filter (d) Elliptic filter
7. -----become an important issue for grounded wye systems with current flowing on the neutral. CO4 U
- (a) fourth harmonics (b)Triple harmonics (c) Fifth harmonics (d)Seventh harmonics
8. Harmonic voltage distortion at the motor terminals is translated into -----within the motor CO4 U
- (a) eddy current losses (b) Harmonic fluxes (c) Power (d)stay losses
9. Instruments in the disturbance analyser category have very limited. 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 Notching and explain how it occurs. CO1 U
12. Define a fast transfer switch? CO2 U
13. Demonstrate surge arresters limit the magnitude of overvoltage caused by lightning strikes? CO3 U
14. Why even harmonics are normally absent in the power converters? CO4U
15. Prepare the online power quality monitoring merits? CO5U

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) Describe the different sources of voltage sags and interruptions, and categorize its impact of power system performance. CO2 App (16)
Or
- (b) Inspect the voltage sag performance is estimated in power systems, and discuss the importance of setting appropriate performance standards. CO2 App (16)
18. (a) Examine the computer analysis tools such as PSCAD and EMTP aid in the analysis and management of transients, and explain the key advantages of using these tools over traditional methods of analysis and management? CO3 Ana (16)
Or
- (b) (i)Analyze the need for protection against over voltages? What are the basic principles of over voltages protection of load equipment's? CO3 Ana (16)
(ii)Explain in detail about various methods to mitigate voltage swells.
19. (a) (i) Explain the fundamentals of harmonics generation and waveform distortion. CO4 U (8)
(ii) Explain the following terms: Current distortion and Voltage distortion (8)
Or
- (b) Explain how commercial and industrial loads are responsible for harmonic distortion. CO4 U (16)
20. (a) Briefly discuss the common objectives of power quality monitoring. 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? (8)

