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

## Question Paper Code: 59318

B.E. / B.Tech. DEGREE EXAMINATION, NOV 2022

Elective

Electrical and Electronics Engineering

15UEE918 – POWER QUALITY

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. Which one of the following is not a type of Harmonic Distortion ? CO1- R

   (a) Overvoltage (b)Harmonics (c) DC Offset (d) Noise

2. The long-duration voltage variation is considered a sustained interruption, when the supply voltage has been zero for a period of time in excess of CO1- U

   (a) 2 minute (b) 1 minute (c) 3 minute (d) 10 minute

3. What is the transfer rate of fast transfer switch? CO2-R

   (a) 1 electrical cycles (b) 2 electrical cycles

   (c) 3 electrical cycles (d) 4 electrical cycles

4. Which Equipment is sensitive to both the magnitude and duration of a voltage sag? CO2- U

   (a) Under voltage relays (b) Motor drive controls

   (c) Automated machines (d) None of the options

5. Common indicators of ferroresonance are CO3- U

   (a) Audible noise (b) Overheating (c) Flicker (d) All of the above

6. Shunt Capacitors supply_____at the bus to which they are connected. CO3- U

(a) Active power (b) Reactive power (c) Apparent power (d) None of the above

7. Harmonics of order h= 5, 11, 17,… are generally CO4- U

(a) Positive sequence (b) Negative sequence

(c) Zero sequence (d) None of the options

8. Which standard governs harmonic limits? CO4- R

(a) IEEE 519-1992 (b) IEEE 819-1998 (c) IEEE 519-1998 (d) IEEE 819-1992

9. Which equipment is used to measure power quality? CO5- U

(a) Disturbance analyzers (b) Flicker meters

(c) Energy monitors (d) All of the above

10. Power interruptions remote from the monitoring location will result in CO5- U

(a) Very abrupt change in the voltage (b) Decaying voltage

(c) No change in the voltage (d) All the options are correct.

PART – B (5 x 2= 10 Marks)

11. Compare Overvoltage and Under voltage. CO1- U

12. List the causes of Voltage Sag. CO2- R

13. Identify the Power quality problems associated with lightning. CO3 -App

14. How harmonic sources are located? CO4 -App

15. Classify the instruments used for Power quality measurement. CO5 -Ana

PART – C (5 x 16= 80Marks)

16. (a) Explain in detail about CO1- U (8)
(i) Long-Duration Voltage Variations.

(ii) Short-Duration Voltage Variations. CO1- U (8)

Or

(b) Explain in detail about the types of waveform distortion. CO1- U (16)

| | | | | |
|---|---|---|---|---|
| 17. | (a) | Explain the methodology of estimating Voltage sag performance. | CO2- Ana | (16) |
| | | Or | | |
| | (b) | Explain in detail about a device that can boost the voltage by injecting a voltage in series with the remaining voltage during a voltage sag condition. | CO2- Ana | (16) |
| 18. | (a) | Explain in detail about the devices used for Overvoltage Protection. | CO3- U | (16) |
| | | Or | | |
| | (b) | Explain in detail about the computer tools used for transient analysis. | CO3- U | (16) |
| 19. | (a) | Explain how Commercial and Industrial loads are responsible for harmonic distortion. | CO4- U | (16) |
| | | Or | | |
| | (b) | Explain in detail about the devices used for controlling harmonic distortion. | CO4- U | (16) |
| 20. | (a) | Analyse the role of Expert systems in Power quality Monitoring. | CO5- Ana | (16) |
| | | Or | | |
| | (b) | Explain the working of flicker meter with necessary diagrams. | CO5- Ana | (16) |