Reg. No.															

B.Tech. DEGREE EXAMINATION, NOVEMBER 2023

Sixth Semester

18EEE314T – POWER QUALITY

(For the candidates admitted from the academic year 2020-2021 to 2021-2022)

Note:

(i) **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.

(ii) **Part - B & Part - C** should be answered in answer booklet.

Time: 3 hours | Max. Marks: 100

PART – A (20 × 1 = 20 Marks)

Answer **ALL** Questions

	Marks	BL	CO	PO
1. The variation in RMS voltage greater than 0.5 cycles, but less than 60 seconds is called (A) Sag (B) Swell (C) Short duration variation (D) Long duration variation	1	1	1	1
2. _____ refers to the instruction between electric and magnetic fields and sensitive electronic circuits and devices. (A) Radio frequency interference (B) Power frequency disturbances (C) Electromagnetic interference (D) Power system harmonics	1	1	1	1
3. Types of electrical transients that occur in power system are _____ and _____. (A) Impulsive, non – impulsive transients (B) Oscillatory, peak transients (C) Impulsive oscillatory (D) Sine, cosine	1	1	1	1
4. DSTATCOM is a _____ connected device designed to regulate the _____ either by generating or absorbing the reactive power. (A) Series, voltage (B) Shunt, voltage (C) Series, current (D) Shunt, current	1	1	1	1
5. The DVR is a _____ connected power electric device used to inject _____ of required magnitude and frequency. (A) Series, voltage (B) Series, current (C) Shunt, voltage (D) Shunt, current	1	1	2	2
6. Which of the following equipment has low immunity index? (A) Electronic medical equipment (B) Adjustable speed derives (C) Transformers (D) Electro mechanical relays	1	1	2	2
7. Area of vulnerability is also called as (A) Equipment voltage sag immunity and equipment voltage sag susceptibility limit (B) Equipment voltage lag immunity and equipment voltage lag susceptibility limit (C) Equipment current lag immunity and equipment current lag susceptibility limit (D) Equipment current sag immunity and equipment current sag susceptibility limit	1	1	2	2

8. During normal operation, the UPS takes its power from the supply rectifies the AC voltage to DC and inverts it again to AC with the 1 1 2 2
   (A) Same frequency and RMS value
   (B) Different frequency and RMS value
   (C) Same frequency and different RMS value
   (D) Different frequency and same RMS value

9. Which of the following describe the effects of harmonics to industrial power systems? 1 1 3 2
   (A) Disturbance to electric and electronic devices
   (B) Extra fault current
   (C) Lower losses
   (D) Increased costs from downtime

10. Symmetrical waveforms will contain only _____ numbered harmonic. 1 1 3 2
   (A) Odd only
   (B) Even only
   (C) Both odd and even
   (D) Negative harmonics

11. The primary source of voltage imbalance is 1 1 3 3
   (A) Unbalanced load
   (B) Balanced load
   (C) Single phase load
   (D) Tap changing transformer

12. When electrical transformer is energized, which of the following harmonic compound is predominate. 1 1 3 1
   (A) Third harmonic
   (B) Seventh harmonic
   (C) Second harmonic
   (D) Fifth harmonic

13. Which of the following is not present in the spectrum analyser? 1 1 3 2
   (A) Swept local oscillator
   (B) RF amplifier
   (C) Sweep voltage generator
   (D) Slotted line

14. The monitoring objectives determines choice of 1 1 4 1
   (A) Triggering thresholds
   (B) Monitoring equipments
   (C) Quality of servile
   (D) Compensation devices

15. _____ have sampling rates for higher than transient-disturbance analysers. 1 1 4 1
   (A) Multimeters
   (B) Harmonic analyzers
   (C) Oscilloscopes
   (D) Spectrum analyzers

16. Low frequency analyzers are sometimes called as _____. 1 1 5 2
   (A) Harmonic analyzer
   (B) Distribution analyzer
   (C) Power frequency disturbance analyzer
   (D) Spectrum analyzer

17. The usage of _____ is mandatory for power regulation in DG technologies. 1 1 5 2
   (A) Voltage regulator
   (B) Cycloconverter
   (C) Inverter
   (D) Flicker meter

18. _____ distribution generation technology is the least expensive mature and readily available. 1 1 6 2
   (A) Combustion turbine
   (B) Wind turbine
   (C) Reciprocating gas
   (D) Fuel gas

19. _____ are advanced data acquisition devices for capturing storing and presenting short duration, subcycle power system disturbances. 1 1 4 2

(A) Transient – distribution analyzers
(B) Spectrum analyzers
(C) Harmonic analyzers
(D) Oscilloscopes

20. _____ systems are packaged as individual autonomous expert system modules where each module perform specific function. 1 1 4 2

(A) Fault tolerant systems
(B) Power monitoring systems
(C) Intelligent systems
(D) Industrial power quality monitoring

PART – B (5 × 4 = 20 Marks)

Answer **ANY FIVE** Questions

	Marks	BL	CO	PO
21. Define the power quality as per IEEE standards.	4	1	1	1
22. What are the reasons for voltage imbalance?	4	1	1	1
23. Name the different motor starting methods.	4	1	2	2
24. Describe the importance of voltage estimation.	4	1	2	2
25. Explain how harmonics are generated through industrial loads.	4	1	3	3
26. What are the factors which impacts the selection of instruments for power quality monitoring?	4	1	4	2
27. What are the various types of power quality issues affected by distributed generation?	4	1	5	2

PART – C (5 × 12 = 60 Marks)

Answer **ALL** Questions

	Marks	BL	CO	PO
28. a. Explain briefly about international standard of power quality.	12	2	1	1
(OR)				
b. Discuss about the computer business equipment manufacturers association curve. Explain the events described in the curve.	12	4	1	1
29. a. Explain the sources of sags in power system. Discuss some of the solutions for voltage sag and interruption.	12	3	2	3
(OR)				
b. Explain the operation of distribution static compensator used for sag mitigation.	12	4	2	2
30. a. Explain how commercial and industrial loads are responsible for harmonic distortion.	12	4	3	3
(OR)				
b. Explain any two harmonic mitigation methods in power system.	12	2	3	3

31. a.	Bring out the significance of power quality monitoring. What are the important power quality monitoring objectives?	12	2	4	2
	(OR)				
b.	Explain in detail about (i) Spectrum analyzer (ii) Flicker meter	12	2	4	2
32. a.	Discuss about the major power quality issues affected by distributed generation.	12	1	5	2
	(OR)				
b.	Explain about distributed generation technologies.	12	2	6	3

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