

Register Number (.....)

**B.E. DEGREE EXAMINATIONS NOV/DEC 2012**

**VII SEMESTER**

**EEE 352 POWER QUALITY**

**Time: Three Hours**

**Maximum Marks: 100**

**Answer ALL Questions**

**PART A (10X 1 = 10 Marks)**

1. A harmonic component is one which is
  - a) Periodic distortion of the sine wave.
  - b) A Resonant component
  - c) Of order greater than 1 of the Fourier series.
  - d) An interruption
2. Voltage sag is generally a
  - a) Long duration increase in RMS voltage
  - b) Short duration reduction in RMS voltage
  - c) Sustained interruption
  - d) Temporary fault.
3. Ferroresonance is a special kind of resonance which involves
  - a) Only the resistance of the system
  - b) Capacitance and iron core inductance
  - c) Only the capacitance
  - d) Resistance and inductance
4. Crowbar and clamping devices are devices for
  - a) lightning protection
  - b) overvoltage protection
  - c) capacitor switching transients protection
  - d) Cable protection.
5. Triplen harmonics are
  - a) Even multiples of a harmonic component.
  - b) Odd multiples of a harmonic component.
  - c) Odd multiples of third harmonics.
  - d) Even multiples of third harmonics.
6. Total Harmonic Distortion is a measure of
  - a) Flow of harmonic current.
  - b) Effective value of harmonic component of a distorted waveform.
  - c) Average value of a pure sine wave.

- d) Peak value of a pure sine wave.
- 7. Filters which are independent of system impedance characteristics are
  - a) Shunt filters
  - b) passive filters
  - c) Active filters
  - d) C filters.
- 8. A method of grounding in which the reinforced steel serves as the grounding electrode is
  - a) Isolated ground
  - b) Ufer ground
  - c) Resistance ground
  - d) Inductance ground
- 9. Oscilloscopes are best suited for
  - a) Identifying the locations of flashovers.
  - b) Analyzing the current and voltage waveforms of real time tests.
  - c) Detecting the isolated ground
  - d) Measuring harmonics.
- 10. The expert system module to estimate the distance to fault location is
  - a) Capacitor switching direction module
  - b) Voltage sag direction module
  - c) Radial fault locator module
  - d) Lightning correlation module.

**Answer ALL Questions**

**PART B (10 X 2=20 Marks)**

- 11. Define Sag.
- 12. What is the difference between CBEMA curve and ITI curve?
- 13. How does a capacitor switching leads to an overvoltage?
- 14. What is meant by ferroresonance?
- 15. What is harmonic distortion?
- 16. What are the sources of harmonics from the commercial loads and industrial loads?
- 17. What is Point of Common Coupling (PCC)?
- 18. What do you understand by isolated ground?
- 19. What are the different types of instruments available for measuring the power quality disturbances?
- 20. What are the flicker standards?

**PART C (5 X 14=70 Marks)**

21 (a). With relevant waveforms, explain the following terms:

- i. Voltage sag.
- ii. Voltage interruptions.
- iii. Voltage swell.
- iv. Sag with harmonics.

**(OR)**

21 (b). (i) Describe the procedure for estimating the motor starting voltage sag.(7)

(ii) Explain in detail the operation of fast transfer switches for voltage sag interruptions.(7)

22(a). Explain about the various sources of transient over voltages.

**(OR)**

22(b). Describe about the utility system protection against lightning.

23 (a). Discuss about the sources of harmonics from the commercial loads and industrial loads.

**(OR)**

23 (b) . (i) How does resonance lead to harmonic distortion? Explain in detail.

(ii) How is THD calculated?

24 (a) . Explain about the devices used for controlling harmonic distortion.

**(OR)**

24 (b). What are the reasons for grounding? Also write about the typical wiring and grounding problems.

25 (a). With relevant diagrams explain the operation of power quality disturbance analyzer and Spectrum and harmonic analyzer.

**(OR)**

25(b). Discuss about the basic design of an expert system for monitoring applications.