

Total number of printed pages – 4

B. Tech
PEEE 5405

Eighth Semester Examination – 2008

ELECTRICAL POWER QUALITY

Full Marks – 70

Time : 3 Hours

Answer Question No. 1 which is compulsory
and any **five** from the rest.

The figures in the right-hand margin
indicate marks.



1. Answer the following questions : 2 × 10
- (a) Define total harmonic distortion.
 - (b) Differentiate between harmonics and transients.
 - (c) What are interharmonics ?
 - (d) Why shielding is used ?

- (e) What is a magnetic synthesizers ?
- (f) Express power factor when the signals are non-sinusoidal.
- (g) What harmonics are present in signal if it is half-wave symmetry ?
- (h) Why CT and Pt are used ?
- (i) What are the advantages of artificial neural network ?
- (j) What are power quality indices and standard ?

2. (a) What is power quality and why are we concerned about it ? 4
- (b) What is a transient disturbance ? Broadly how many categories of transients are present ? Discuss each giving examples. 6

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Contd.

3. (a) What are the advantages and disadvantages of using capacitors in a power system. With neat diagrams explain the capacitor switching operation. 5
- (b) Explain the phenomenon of voltage magnification at customer capacitor due to energizing capacitor on utility system and discuss the remedy. 5
4. (a) What are the causes of voltage sags and interruptions ? Give an example of an electric utility power system with single-line-to-ground fault resulting in voltage sags and explain. 5
- (b) How ferroresonant transformer can be used to handle voltage sag conditions. Explain in details. 5
5. (a) Describe the effect of d.c. drives and a.c. drives with converters in a power systems in terms of harmonics. 5
- (b) Describe the effect of harmonics on transformers and motors. 5
6. (a) Discuss the basic features and explain the operation of passive and active filters with diagram. 5
- (b) What types of instruments are used for monitoring power quality ? Describe the applications of oscilloscope and spectrum analyzer for power quality monitoring. 5
7. (a) Describe the method of Fourier analysis and Fourier transform method of waveform processing techniques giving examples. 5
- (b) Explain the principle of Kalman filters for harmonics elimination. What are the disadvantages of Kalman filter ? 5
8. Write short notes on : 5x2
- (a) Hybrid filters
- (b) Protection against voltage sags and swells by superconducting magnetic storage devices.