Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 50510

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2023.

Sixth Semester

Electrical and Electronics Engineering

EE 8006 – POWER QUALITY

(Regulations 2017)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define voltage imbalance.

2. Draw the CBEMA curve for power quality standard.

3. List the various factors affecting the sag magnitude.

4. What is static transfer switch?

5. Distinguish between harmonics and transients.

6. Differentiate THD from TDD.

7. What are the limitations of passive filters?

8. List the types of shunt compensators.

9. Why DVR is called as series compensation device?

10. What is the need of UPQC?

PART B — (5 × 13 = 65 marks)

11. (a) Discuss on the sources and causes of voltage transients. (13)

Or

(b) Explain the various indices used in industries to analyze voltage outage. (13)

12. (a) With neat diagram explain any one method of estimating voltage sag performance. (13)

Or

(b) Discuss on various protection techniques for the capacitor switching transients. (13)

13. (a) Discuss the impacts of harmonics on the performance of industrial loads. (13)

Or

(b) Explain any one methods of harmonic distortion evaluation and also its mitigation methods. (13)

14. (a) Explain the principle of operation of passive shunt and series compensators. (13)

Or

(b) Explain the parallel resonance of passive filters with the supply system and its mitigation. (13)

15. (a) Discuss on power quality monitoring and diagnostic techniques for PQ problems. (13)

Or

(b) Describe the importance of maintaining DC voltage across input capacitor in STATCOM. (13)

PART C — (1 × 15 = 15 marks)

16. (a) A 1 MVA supply transformer used in a paper industry has the following current pattern. Find the K-factor, THD and individual harmonic distortion. (15)

Fundemental = 400 A

5^{th} order harmonics = 40% of fundemental

7th order harmonics = 25% of fundemental

9th order harmonics = 5% of fundemental

11th order harmonics = 20% of fundemental

13th order harmonics = 10% of fundemental

Or

(b) The angle between the fundamental voltage and fundamental current phasor of a variable speed drive is 9 degrees and the voltage leads the current. The THD of the current is 33%. The THD of the voltage is negligible. For this drive calculate (15)

(i) displacement power factor

(ii) true power factor.