

Reg. No. :

Question Paper Code : 20490

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY 2022.

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. Distinguish between power interruption and power outage.
2. What are the effects of unbalanced loads on power system?
3. List the various factors affecting the sag magnitude.
4. Define voltage flicker.
5. Compare harmonics and transients.
6. Define THD and TDD.
7. What is meant by passive filter?
8. List any two limitations of passive filters.
9. Write the applications of DVR.
10. What is the role of PQ theory in STATCOM?

PART B — (5 × 13 = 65 marks)

11. (a) Explain the commercial impacts of power quality problems. (13)
Or
- (b) (i) Discuss on power frequency variations. (7)
- (ii) Draw and explain CBEMA curve related to PQ standard. (6)

12. (a) Analyze the various reasons for voltage sag. (13)

Or

(b) (i) Explain about transient due to ferroresonance. (7)

(ii) Discuss about various protection techniques for the capacitor switching transients. (6)

13. (a) What are the various classifications of harmonic sources and what is the effect of harmonics on transformer? (13)

Or

(b) (i) A waveform contains 50 Hz fundamental, plus 5th, 9th, 11th, 13th harmonics with their magnitudes 0.4, 0.2, 0.1 and 0.05 respectively. Find THD. (7)

(ii) A highly inductive non linear load consumes 400 kW and 192 kVAR. The current THD is 27%. Find the true power factor. (6)

14. (a) A distribution system is connected with unbalanced loads non-linear loads which highly affects the current quality of the system. Identify suitable compensation device and explain how the issues related to current quality are mitigated. (13)

Or

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

15. (a) Discuss the significance of power quality monitoring system. (13)

Or

(b) (i) What are the various instruments used for power quality measurement? (7)

(ii) List the factors to be considered when selecting the instruments. (6)

PART C — (1 × 15 = 15 marks)

16. (a) Determine the k rating of transformer required to carry a load consisting of 1000 A of fundamental, 120 A of third harmonics, 80 A of fifth harmonics, and 40 A of seventh harmonics. (15)

Or

(b) Calculate the following from the data given below: (15)

(i) Kvar required to improve PF to 0.95 lag.

(ii) Cost of additional capacitor.

(iii) Reduction in kVA demand.

Rating of transformer = 2000 kVA

Average of loading on the transformer = 1200 kVA

Present power factor (old pf) = 0.7 (lag)

Unit cost of Capacitor/Kvar = Rs.300.