



M.E DEGREE EXAMINATIONS: JUNE 2016

(Regulation 2015)

Second Semester

POWER ELECTRONICS AND DRIVES

P15PETE07: Power Quality

COURSE OUTCOMES

- CO1: To understand the various power quality issues and mitigation techniques.
 CO2: To be familiar with the conventional compensation techniques and active compensation techniques used for power factor correction and load voltage regulation.
 CO3: To know the working of various power quality meters.

Time: Three Hours

Maximum Marks: 100

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. The process sequence in a power system control is, CO2 [K₂]
 (i)Connecting the monitoring components (ii) Compare with preset value
 (iii) Decision taken (iv) Measuring the quantity
 a) (i),(ii), (iii) & (iv) b) (i),(iv),(ii) & (iii)
 c) (iv),(iii),(i) & (ii) d) (ii),(i),(iv) & (iii)
2. Interruptions is a complete loss of CO1 [K₂]
 a) Current b) Voltage
 c) Frequency d) Short circuit
3. Estimation of cost for the voltage sag events includes CO2 [K₂]
 a) Labor related losses b) Product related losses
 c) Ancillary cost d) All the above
4. Match list I with list II and choose the correct combination CO1 [K₂]

List I	List II
A. Sag	i. Arc Furnace
B. Flicker	ii. 0.1 and 0.9 p.u
C. Harmonics	iii. DVR
D. Sag mitigation	iv. IEEE standards

- a) A-ii,B-iv,C-i,D-iii b) A-i,B-ii,C-iii,D-iv
- c) A-iv,B-iii,C-ii,D-i d) A-ii,B-i,C-iv,D-iii

5. Line arresters are placed at every_____ pole. CO2 [K₂]
 a) Second b) Fifth
 c) Tenth d) Seventh
6. Harmonic indices are used to measure harmonic content of a CO2 [K₂]
 a) Waveform b) Frequency
 c) Voltage d) All the above
7. **Assertion (A):** notching is repetitive and can be characterized by its frequency CO2 [K₃]
 spectrum.
Reason(R): Notches can impose extra stress on the insulation of transformers.
 a) Both A and R are correct and R is b) Both A and R are true and R is not
 correct explanation of A correct explanation of A
 c) A is true , R is false d) A is false, R is true
8. _____ is harmonic source from commercial loads CO1 [K₁]
 a) 3 Phase Transformation b) Capacitor Switching
 c) Fluorescent Lighting d) Lightning
9. The function of DSTATCOM is, CO2 [K₂]
 (i)Voltage regulation and compensation of reactive power (ii) Reduce skin effect (iii)
 Elimination of current harmonics (iv) Power factor correction. Choose the correct
 answers
 a) (i) & (ii) b) (iii) & (iv)
 c) (i) ,(iii) & (iv) d) All the above.
10. Many power quality monitoring instruments are designed for the input voltages up to CO3 [K₂]
 _____ rms.
 a) 6000 V b) 66 V
 c) 66 kV d) 600 V

PART B (10 x 2 = 20 Marks)

11. How can Power Quality problems be detected? CO1 [K₂]
12. What are the various power quality issues? CO1 [K₁]
13. Differentiate sag with swell. CO1 [K₂]
14. What condition an interruption can occurs? List types of interruptions. CO2 [K₃]
15. What is the cause for the ferroresonance phenomena? CO2 [K₂]
16. Differentiate between under voltage and over voltage. CO1 [K₂]
17. Identify the devices to control harmonic distortion. CO2 [K₂]

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| 18. Write at least two IEEE standards related to harmonics. | CO2 | [K ₂] |
| 19. What are the monitoring considerations in power quality monitoring? | CO3 | [K ₂] |
| 20. How expert system applicable for power quality monitoring? | CO3 | [K ₂] |

PART C (6 x 5 = 30 Marks)

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| 21. Interpret the information from CBEMA curve. | CO1 | [K ₂] |
| 22. Explain the causes for sag when a motor is started. | CO1 | [K ₂] |
| 23. Explain the protection schemes used for transformers and cables from damage due to over voltage. | CO2 | [K ₃] |
| 24. Justify the utilization of PSCAD and EMTP in transient analysis. | CO2 | [K ₂] |
| 25. How to minimize harmonics by using active and passive filters. | CO1 | [K ₃] |
| 26. Explain the working of Flicker meter. | CO3 | [K ₂] |

Answer any FOUR Questions
PART D (4 x 10 = 40 Marks)

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| 27. Describe the various types of power quality problems and waveform distortion. | CO1 | [K ₂] |
| 28. What are the different voltage sag mitigation techniques? Explain in detail. | CO1 | [K ₂] |
| 29. Explain the types and causes of transient over voltages. | CO2 | [K ₂] |
| 30. Explain the causes of harmonic's due to commercial loads. | CO2 | [K ₂] |
| 31. With neat block diagram explain the power quality disturbance analyzer. | CO3 | [K ₂] |
