M.E. Second Semester (Electrical Engineering (Electrical Power System))

13576 : Power Quality Improvement Techniques : EP 2203

P. Pages : 2 | **AW - 3867**

Time : Three Hours | Max. Marks : 80

Notes : 1. Answer **three** question from Section A and **three** question from Section B.
2. Assume suitable data wherever necessary.
3. Illustrate your answer necessary with the help of neat sketches.
4. Use of pen Blue/Black ink/refill only for writing the answer book.

SECTION – A

1. a) What is power quality? Discuss the major concerns about power quality. **7**

b) Discuss power frequency variations in context to power quality. **6**

OR

2. a) What are inter harmonics? Discuss their causes and effects. **7**

b) Define voltage sag. Also discuss its types and causes. **6**

3. a) Explain the following harmonic indices in detail. **7**
i) Total Harmonic Distortion.
ii) Total Demand Distortion.

b) Discuss in detail the IEEE limits of current harmonic distortion. **6**

OR

4. a) What are harmonics? Explain how voltage distorts at PCC. **6**

b) Discuss in brief IEEE and IEC standards for harmonics. **7**

5. a) Explain 6 – pulse configuration of converter. Also Explain its input current waveforms and harmonic spectrum. **7**

b) What is integral cycle control? Explain how it causes harmonics. **7**

OR

6. a) Explain single phase AC voltage regulator as a source of harmonics. **7**

b) Explain the operation of ARC furnace as harmonic producing load. **7**

SECTION – B

7. Discuss the effect of harmonics on the following. **14**
i) Transformer.
ii) Capacitor Banks.
iii) Power system protection.

OR

8.	a)	Explain how power measurement is affected because of harmonics.	**7**
	b)	Discuss the phenomenon of parallel resonance in presence of harmonics.	**7**
9.	a)	Discuss in detail how high power factor converter can eliminate harmonics.	**7**
	b)	Explain the criterion for filter design.	**6**

OR

10.	a)	Explain how harmonics can be mitigated using series and shunt passive filter.	**7**
	b)	Explain how transformer connection can be helpful to eliminate harmonics.	**6**
11.		Discuss in detail the classification of active power filters on the basis of system configuration and power circuit.	**13**

OR

12.	a)	Explain with the help of block diagram the operation of shunt active power filter.	**7**
	b)	Explain constant tolerance band control technique for active power filter.	**6**

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