

EE8006 POWER QUALITY

IMPORTANT QUESTIONS AND QUESTION BANK

UNIT I - INTRODUCTION TO POWER QUALITY

2-Marks

1. Define Dc offset. Mention its sources in power system?
2. Define the power quality as per IEEE?
3. What are the main components of power quality standards?
4. Define momentary interruption and components of waveform distortion?
5. Comment" harmonics affect the electrical system"?
6. Differentiate inter harmonic and sub harmonics?
7. Differentiate between voltage sag and voltage swell?
8. Classify the types of power quality solutions available on the market today?
9. How are the power quality problems detected?
10. What do you mean by power frequency variations in power quality?

Part-B

1. Discuss about any four power quality issues, indicating more attention in power system?
2. Discuss the following characteristics of power quality?
3. Explain power quality and explain the reasons for increased concern in power quality?
4. Explain the sources of power quality problems and mention the international standards used for monitoring?
5. Explain the various types of power quality disturbances in power system and also explain the characteristics of each disturbance?
6. Summarize the impact of poor power quality on utility and consumers? Discriminate on over voltage and under voltage in power quality issue?
7. Describe the objective of power quality standards and Discuss about IEEE and IEC Standards used for power quality issues?
8. Explain total harmonic distortion and total demand distortion? Discuss the standards of power quality?
9. Demonstrate the major reasons for the growing concern about the quality of electric power by both electric utilities and end users?
10. Illustrate the principle phenomenon causing electric magnetic disturbance classified by International Electro technical commission?
11. Draw the CBEMA curve and explain the significance of the term used in it?
12. Explain briefly about international standard of power quality?

13. Explain the various types of power quality disturbances?
14. Discuss about the Computer Business Equipment Manufacturers Associations (CBEMA) curve. Explain the events described in the curve?
15. Differentiate between power quality, voltage quality and current quality?

UNIT II - VOLTAGE SAGS AND SWELL

2-Marks

1. When sag leads to interruption?
2. List out the causes of sag?
3. List out the three levels of possible solutions to voltage sag and momentary interruption problems?
4. List some industry standards associated with voltage sags?
5. What are the various factor affecting the sag magnitude due to faults at a certain point in the system?
6. Classify different types of voltage sag?
7. Name the different motor starting methods?
8. How to estimate voltage sag performance?
9. Demonstrate the causes for voltage sags due to transformer?
10. Design the active low pass filter to mitigate the voltage swell?

Part-B

1. Describe in detail about the sag performance evaluation indices?
2. Describe the methodology of estimating voltage sag performance?
3. Explain the following causes of sag a) Voltage sag to motor b) Voltage sag due to single line to line fault?
4. Explain various indexes used to estimate voltage sag? Discuss some of the solutions for voltage sag and interruption?
5. Explain the causes of long interruptions and the principle of regulating the voltage?
6. Analysis and calculation of power quality due various faulted condition?
7. Explain performance voltage sag due to starting of large induction motor in distribution level?
8. How does the load influence on voltage sag adjustable speed drives?
9. Explain how voltage sag performance is estimated in power system network?
10. Explain active series compensator to compensate the voltage sag occurs in power system?
11. What are the different voltage sag mitigation techniques? Explain the principle of operation of DVR used for sag mitigation?

12. Explain any two voltage sag mitigation Techniques with necessary circuit diagram and waveform?
13. Describe the procedure for estimating motor switching voltage sag?
14. Discuss the effects of voltage sag and interruption on various electrical equipment?
15. What are the different voltage sag mitigation sag techniques? Explain in detail?

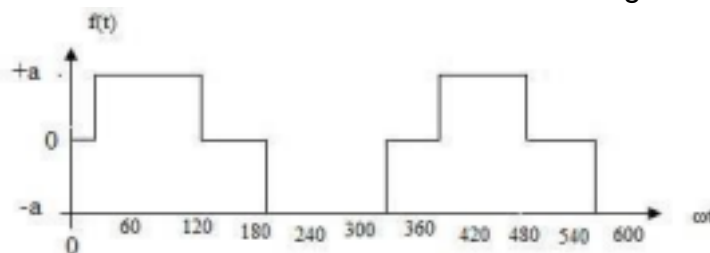
UNIT III- HARMONICS

2-Marks

1. State the different between harmonics and transients?
2. Mention the harmonic effects on devices and loads?
3. Analyze the objectives of IEEE and IEC standards?
4. Define harmonics?
5. What are the sources of harmonic distortion?
6. Summarize the advantage of three phase converter?
7. Distinguish between active filter and passive filter?
8. Differentiate between linear loads and nonlinear loads?
9. Infer voltage and current distortion?
10. What are the applications of active filters?

Part-B

1. Explain the methods to evaluate harmonic distortion and devices to control?
2. Determine the RMS and THD of the following waveform



3. Write the principle of controlling harmonics and explain the devices used for it.?
4. Explain the waveform distortion due to different types of nonlinear loads?
5. Write short notes on THD and TDD(ii) Discuss the effects of harmonic distortion on transformers and motors?
6. Discuss the effects of harmonic distortion on transformers and motors?
7. What is meant by point of common coupling? Generalize the IEEE 519 standard and IEC 61000-3-2 standard with respect to harmonics?

8. Explain briefly about the phenomena of how current distortion affects the voltage distortion under the presence of harmonics?
9. Explain the function of active filters and how it overcomes and drawbacks of passive filter in controlling harmonic?
10. Explain briefly about the harmonic distortion and conduct an evaluation of study?
11. What are the devices used for controlling harmonic distortion and explain their function?
12. Design the detail operation of shunt active filter?
13. Explain the power system response characteristics under the presence of harmonics?
14. Prepare the IEEE standard for harmonic level in distribution system?

UNIT IV - PASSIVE POWER COMPENSATORS

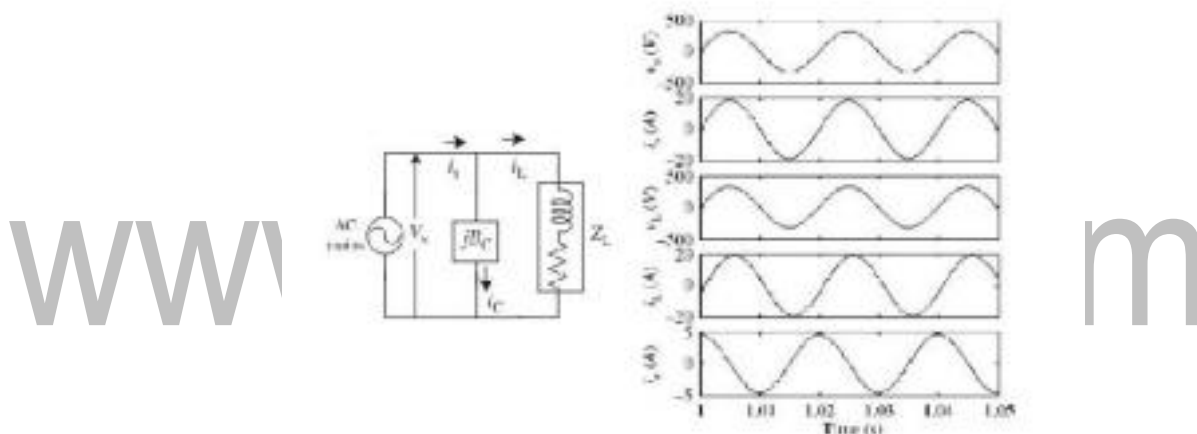
2-Marks

1. Describe the Reactive power in the transmission Network?
2. Define Shunt Passive Compensation?
3. examine the Active and Passive VAR Control?
4. Define the Series Compensation?
5. Label the load Compensation?
6. Summarize the System Compensation?
7. Estimate voltage regulation & power factor correction?
8. Examine Passive Power Filter?
9. Classify the Passive Power Filter?
10. Summarize Shunt and series Passive Filters?

Part-B

1. Examine Principle of Operation of Passive Shunt and Series Compensators?
2. Describe the general Classification of Passive Shunt and Series Compensators?
3. Explain about the various types of Shunt and Series Compensation based on the single phase and three Phase Load?
4. Analysis and Design of Shunt Compensators for Power Factor Correction?
5. Analysis the Design methodology of Shunt Compensators for Zero Voltage Regulation?

6. Describe the main Classification of Passive Filters?
7. Examine the Principle of Operation of Passive Power Filters?
8. Illustrate Classification of Passive Filters based on the Connection and Configuration?
9. Explain about the Analysis and Design of Passive Power Filters?
10. Explain the Parallel Resonance of Passive Filters with the Supply System and Its Mitigation?
11. A single-phase load having $Z_L = (4.0 + j1.0)$ is fed from an AC supply with an input AC voltage of 230 V at 50 Hz and a base impedance of 4.15Ω . It is to be realized as a unity power factor load on the AC supply system using a shunt connected loss less passive element (L or C) as shown in Fig. Calculate (a) the value of the compensator element (in farads or henries) and (b) equivalent resistance (in ohms) of the compensated load?



12. Summarize the Classification of Passive Filters based on the topology, connection and the number of the spaces?
13. Explain the principle of operation of passive power filters?
14. compensation in an AC supply distribution system?

UNIT V - POWER QUALITY MONITORING & CUSTOM POWER DEVICES

2-Marks

1. Define power quality monitoring?
2. What is the need for power quality monitoring?
3. Describe about signal processing tools for analyzing power quality issues?
4. Interpret the benefits of power quality monitoring?
5. List some of the major power quality monitoring equipment's?
6. State and analyse the objectives of power quality monitoring?

7. Analyse the merits of digital power quality analyzers??
8. What is spectrum analyzers?
9. Mention any two signal processing tools for analyzing power quality issues?
10. Infer the power quality disturbance analyzer?

Part-B

1. Explain the different types of monitoring and diagnostic techniques in various power quality problems?
2. Explain in detail with necessary diagram the working principle the functioning of power quality analyzers?
3. Bring out the important characteristics of power quality variations?
4. Explain the steps involved in power quality monitoring. What are the information from monitoring site surveys?
5. Explain the various instruments used for power quality measurements?
6. Explain the features of spectrum analyzer and flicker meters?
7. Design the block diagram of advanced power quality monitoring systems. Explain it in detail?
8. Discuss the applications of expert systems for power quality monitoring with block diagram?
9. Analyze the role and application of expert systems in power quality monitoring?
10. Discuss briefly about the different features of harmonic analyzer?
11. Describe about the working principle of DSTATCOM and its applications?
12. Explain about the different modes of control mode in DSTATCOM?
13. Analyze about the working principle and Structure of DVR?
14. Explain monitoring requirement of different types of power quality variation?
15. Explain about the Configuration, Structure and Control of UPQC?