

Total No. of Questions : 6]

SEAT No. :

P5831

[Total No. of Pages : 1

BE/Insem./Oct.-562
B.E. (Electrical)
POWER QUALITY
(2015 Pattern) (Semester - I) (Elective - I)

Time :1 Hour]

[Max. Marks :30

Instructions to the candidates:

- 1) *Solve Q1 or Q2, Q3 or Q4, Q5 or Q6.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicates full marks.*
- 4) *Use of Calculator is allowed.*
- 5) *Assume suitable data if necessary.*

- Q1)** a) Write symptoms/ indicators of poor power quality and the associated cause of problems. [5]
b) Describe the grounding practices for sensitive equipment as per IEEE 1100. [5]

OR

- Q2)** a) Discuss classification of various power quality issues as per IEEE 1159. [5]
b) Discuss the sources and effects of long duration RMS voltage variations. [5]

- Q3)** a) What are the factors governing severity of voltage sag? [5]
b) Draw and explain ITIC curve. [5]

OR

- Q4)** a) What are causes of voltage sag? [5]
b) Explain the Voltage sag mitigation techniques at equipment level. [5]

- Q5)** a) What are the causes of Impulsive and oscillatory transients? Explain. [5]
b) Discuss the factors which affects severity of flicker. [5]

OR

- Q6)** a) What is Ferro-resonance? What is its effect? [5]
b) Explain the terms P_{st} and P_{lt} with reference to Flicker measurement. [5]



Total No. of Questions : 10]

SEAT No. :

P3909

[Total No. of Pages : 2

[5561]-579

B.E.(Electrical)

POWER QUALITY

(2015 Course) (Semester - I) (Elective - I) (403143B)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Solve Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicates full marks.*
- 4) *Use of calculator is allowed.*
- 5) *Assume Suitable data if necessary.*

- Q1)** a) Classify Power Quality events related to voltage and current. [5]
b) How voltage sag is characterized? What are the causes of voltage sag? [5]

OR

- Q2)** a) Explain Voltage tolerance curve for investigation of equipment sensitivity to voltage sag. [5]
b) Define and List the short duration RMS voltage variations. [5]

- Q3)** a) What is the effect of voltage sag on Motors? [5]
b) Explain factors governing severity of voltage flicker. [5]

OR

- Q4)** a) What are the sources of transient over voltages? What are the effects of over voltage on equipment? [5]
b) What is voltage sag mitigation technique used at equipment level? [5]

- Q5)** a) Classify harmonics based on various criteria. [8]
b) What indices are used for harmonic measurement? Explain. [8]

OR

- Q6)** a) What is harmonics? What are the causes of harmonics? [8]
b) Explain effects of harmonics on Electrical equipment and cables. [8]

P.T.O.

- Q7)** a) What is the need for identifying the source of harmonics? What is the role of capacitor in harmonic study? [8]
- b) How harmonics are mitigated ? Explain. [8]

OR

- Q8)** a) Explain series resonance problem related to harmonics. How it can be avoided? [8]
- b) How tuned filters are used to mitigate harmonics? [8]

- Q9)** a) What are the objectives for Power quality monitoring? How it varies for old and new industrial set up? [10]
- b) Explain selection of Power Quality equipment for power quality monitoring. [8]

OR

- Q10)** a) Explain the provisions for Power Quality monitoring made in IEEE Std 1159? [10]
- b) What computer tools are used for effective Power quality analysis? Explain. [8]



Total No. of Questions : 10]

SEAT No. :

[Total No. of Pages : 2

P3318

[5461]-575

B.E. (Electrical)

POWER QUALITY

(2015 Course) (Semester - I) (End Sem.) (Elective - I) (403143B)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Solve Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicates full marks.
- 4) Use of calculator is allowed.
- 5) Assume suitable data, if necessary.

Q1) a) Why power quality is gaining importance now a days? **[5]**

b) Classify power quality events in long duration events and short duration events. **[5]**

OR

Q2) a) Discuss how power quality is affected due to grounding problems. **[5]**

b) Differentiate between transients and harmonics. **[5]**

Q3) a) Explain economic impact of voltage sag. **[5]**

b) Discuss in brief flicker mitigation techniques. **[5]**

OR

Q4) a) List techniques are used for voltage sag mitigation and explain any one in brief. **[5]**

b) Explain the following terms with reference to transient overvoltage **[5]**

i) Capacitor switching

ii) Ferro resonance

Q5) a) Explain harmonic indices used in analyzing harmonic distortion. **[6]**

b) Explain the waveform distortion due to different nonlinear loads. **[10]**

OR

P.T.O.

- Q6)** a) Explain impact of harmonics on various power system quantities. (Voltage, Current, Power). [8]
- b) Write a short note on triplen harmonics. [8]

- Q7)** a) What are the harmonic resonances? Explain consequences of harmonic resonances. [8]
- b) What are the harmonic mitigation techniques? Explain any one. [8]

OR

- Q8)** a) Write a short note on IEEE 519 standard for harmonic distortion. [8]
- b) What is the need of locating harmonic sources? How capacitors affect the power system characteristics? [8]

- Q9)** a) Discuss in detail about the instruments used for analyzing non sinusoidal voltage and currents. [10]
- b) What computer tools are used for effective power quality analysis? Explain. [8]

OR

- Q10)** a) Bring out the significance of Power quality monitoring. What is the important power quality monitoring objectives? [10]
- b) Explain the harmonic analyzer and disturbance analyzer. [8]



Total No. of Questions :10]

SEAT No. :

P3310

[5670]. -579

[Total No. of Pages :2

B.E. (Electrical)

POWER QUALITY

(2015 Pattern) (Semester-I) (Elective-I) (403143B) (End Sem.)

Time :2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q9 or Q.10.*
- 2) *Neat Diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicates full marks.*
- 4) *Use of Calculator is allowed.*
- 5) *Assume Suitable data if necessary*

Q1) a) Define power quality terms transients, voltage fluctuation and waveform distortion **[5]**

b) Define Voltage Sag. How voltage sag is characterized? **[5]**

OR

Q2) a) Why power quality has become important in today's context? **[5]**

b) What is the effect of voltage swell on Motors and Transformers? **[5]**

Q3) a) What are the sources of transient over voltages? what are the effects on equipment? **[5]**

b) What is Flicker? Discuss different sources of flicker. **[5]**

OR

Q4) a) Explain various grounding practices as per IEEE standard. **[5]**

b) Explain Area of vulnerability. **[5]**

P.T.O.

- Q5)** a) Explain effects of harmonics on Capacitor and cables. [8]
b) Explain following terms. [8]
i) Interharmonics
ii) Subharmonics
iii) Triplen harmonics
iv) Harmonic phase sequence

OR

- Q6)** a) Explain Effects of Harmonics on various power system equipment. [8]
b) Explain the following with example: [8]
i) Total harmonic distortion (THD)
ii) Total demand distortion(TDD)
- Q7)** a) Explain in detail about general procedure for harmonic distortion evaluation at the point of coupling at industrial facility. [8]
b) Explain series resonance problem related to harmonics. How it can be avoided? [8]

OR

- Q8)** a) Explain various principles of controlling harmonic distortion. [8]
b) How tuned filters are used to mitigate harmonics? [8]
- Q9)** a) List the power quality monitoring equipment? Explain any three in detail. [10]
b) Explain instrument setup and various guidelines to be followed in power quality monitoring [8]

OR

- Q10)** Write short notes on the following [18]
a) True RMS meters
b) Transinet disturbance analysers
c) Harmonic Analysers



Total No. of Questions :6]

SEAT No. :

[Total No. of Pages :2

P220

Oct./ BE/ Insem. - 536

B.E. (Electrical)

POWER QUALITY

(2015 Course) (Semester - I) (403143B) (Elective-I)

Time : 1 Hour]

[Max. Marks :30

Instructions to the candidates:

- 1) Answer Q1 or Q2, Q3 or Q4, Q5 or Q6.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.
- 4) Use of calculator is allowed.
- 5) Assume suitable data, if necessary.

Q1) a) Why power quality is important in today's modern world? [5]

b) What are symptoms of poor power quality & its effect on equipment performance? [5]

OR

Q2) a) What are the sources for long duration RMS voltage variations? Explain any one in detail. [5]

b) Write note on grounding of sensitive electronic equipment. [5]

Q3) a) With suitable diagram explain voltage sag and interruption. [5]

b) Discuss the factors which governs the severity of voltage sag. [5]

OR

P.T.O.

Q4) a) List different voltage sag characteristics? Explain any one in detail. [5]

b) Draw & explain SEMI F47 curve in connection with voltage sag? [5]

Q5) a) Discuss the sources of transient overvoltages. [5]

b) Define flicker and discuss means to reduce voltage flicker. [5]

OR

Q6) a) What do you mean by impulsive and oscillatory transients? [5]

b) State and explain the principles of overvoltage protection [5]

Total No. of Questions : 6]

SEAT No. :

[Total No. of Pages :2

P4951

BE/In Sem. - 31
B.E. (Electrical)
POWER QUALITY
(2012 Course) (Semester - I) (Elective - I) (403143)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) *Solve Q1 or Q2, Q3 or Q4, Q5 or Q6.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Use of Calculator is allowed.*
- 5) *Assume suitable data, if necessary.*

- Q1)** a) Explain definition of power quality with reference to each stake holder.[5]
- b) Summaries in tabular format the power quality problem characteristics as per IEEE Standard 1159. [5]

OR

- Q2)** a) Explain importance of Power Quality in today's context. [5]
- b) Discuss best grounding practices to improve the power quality. [5]
- Q3)** a) Explain voltage sag characteristics- Magnitude, Duration. [4]
- b) Draw and explain ITIC curve. [6]

OR

- Q4)** a) Explain in brief the impact of voltage sag on equipments. [5]
- b) Explain the use of Ferroresonance transformer to mitigate the voltage sag problem. [5]

P.T.O.

- Q5)** a) Discuss the sources of transient over voltage. [6]
b) Discuss Pst and Plt terms in connection with flicker. [4]

OR

- Q6)** a) Write note on computer tools used for transient analysis. [5]
b) Discuss in brief flicker mitigation techniques. [5]



Total No. of Questions :6]

SEAT No. :

P5160

[Total No. of Pages : 1

B.E./Insem.-565
B.E.(Electrical) (Semester - I)
POWER QUALITY
(2012 Pattern) (Elective - I)

Time : 1 Hour]

[Max. Marks :30

Instructions to the candidates:

- 1) *Solve Q1 or Q2, Q3 or Q4, Q5 or Q6.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Use of calculator is allowed.*
- 5) *Assume suitable data, if necessary.*

- Q1)** a) Define power quality with reference to each stakeholder. [4]
b) Categorize different power quality issues as per IEEE 1159 standard. [6]

OR

- Q2)** a) Discuss in brief symptoms of poor power quality. [5]
b) Discuss power quality issues due to improper grounding. [5]

- Q3)** a) Differentiate between voltage sag and interruption. [5]
b) What is ITIC curve? Explain its use in power quality. [5]

OR

- Q4)** a) Write a short note on the area of vulnerability. [6]
b) Explain voltage sag characteristics - Magnitude, point on wave initiation. [4]

- Q5)** a) What is transient? Classify transients. [6]
b) Discuss various causes of voltage flicker. [4]

OR

- Q6)** a) Briefly, explain the devices for overvoltage protection. [6]
b) Write a note on computer tools used for transient analysis. [4]



Total No. of Questions : 10]

SEAT No. :

P3593

[Total No. of Pages : 2

[4959]-1065

B.E. (Electrical)

POWER QUALITY

(2012 Course) (Semester - I) (Elective - I)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Solve Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.
- 4) Use of calculator is allowed.
- 5) Assume suitable data, if necessary.

- Q1)** a) Explain various grounding practices as per IEEE standard. [5]
b) Explain economic impact of voltage sags. [5]

OR

- Q2)** a) Why are we concerned more about power quality now days? [5]
b) Explain various voltage flicker parameters obtained from flicker measurements. [5]

- Q3)** a) Explain voltage sag characteristics such as magnitude, duration, phase angle jump and missing voltage. [5]
b) Explain various computer tools used for transient's analysis. [5]

OR

- Q4)** a) What are the various sources of transients over voltages? [5]
b) Explain following terms related with voltage flicker (i) Short term (Pst) and (ii) Long term (Plt) voltage flicker. [5]

P.T.O.

- Q5) a)** Explain following terms related with waveform distortion: [9]
i) Harmonics
ii) Interharmonics
iii) Sub-harmonics
iv) Characteristic harmonics
v) Triplen harmonics.

- b) What are the various harmonics indices used? Explain. [9]

OR

- Q6) a)** What are the various sources of harmonics and their effects on the operation of various equipment's? [9]
b) Explain impact of harmonics on active, reactive and apparent power. [9]

- Q7) a)** What is harmonic filtering? Explain active and passive filters. [8]
b) Explain step by step procedure for harmonics analysis. [8]

OR

- Q8) a)** Explain the concept of point of common coupling and its use in harmonic analysis. [8]
b) Explain computer tools used in harmonic analysis. [8]

- Q9) a)** Explain need of power quality monitoring. What is reactive and proactive approach? [8]
b) What are the requirements of power quality monitor to monitor various power quality parameters? [8]

OR

- Q10) a)** Explain various objectives of power quality monitoring equipment's to monitor various power quality parameters? [8]
b) Explain various techniques of data collection and its analysis. [8]



Total No. of Questions : 10]

SEAT No. :

P3069

[5154]-635

[Total No. of Pages : 2

B.E. (Electrical)

POWER QUALITY

(2012 Course) (Semester - I) (Elective - I) (403143 B) (End Sem.)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9 or Q.10.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicates full marks.
- 4) Use of Calculator is allowed.
- 5) Assume Suitable data if necessary.

Q1) a) Define Power Quality in general sense. What are the objectives of grounding? **[5]**

b) State & describe various power quality issues related to voltage. **[5]**

OR

Q2) a) Define and explain

- i) Short duration voltage fluctuations
- ii) Long duration voltage fluctuations **[5]**

b) Explain power quality issues like overvoltage, undervoltage, voltage sag and voltage imbalance. **[5]**

Q3) a) Define voltage flicker and explain one method for voltage flicker mitigation. **[5]**

b) Explain in brief the impact of voltage sag on various equipment. **[5]**

OR

Q4) a) Explain various voltage flicker parameters obtained from flicker measurements. **[5]**

b) Explain in brief various voltage sag characteristics. **[5]**

P.T.O.

Q5) a) What are the causes and explain effects of harmonics on power system equipment. [8]

b) Write detail note on triplen harmonics. [8]

OR

Q6) a) Explain different harmonic indices. [8]

b) What is displacement and true power factor, explain its significance in Power Quality. [8]

Q7) a) Discuss in detail various principles of controlling harmonics. [8]

b) Explain passive filter design procedure for harmonic reduction. [8]

OR

Q8) a) Write note on devices for controlling harmonic distortion. [8]

b) Explain the concept of point of common coupling and its use in harmonic study. [8]

Q9) a) Explain use of various equipment required for power quality monitoring. [10]

b) Write note on choosing PQ monitoring duration. [8]

OR

Q10)a) Explain the need of power quality monitoring? What are different approaches? [10]

b) Explain the role of oscilloscopes, data loggers in power quality measurements. [8]

x

x

x

Total No. of Questions : 10]

P3783

SEAT No. :

[Total No. of Pages : 2

[5561]-184

B.E. (Electrical)

POWER QUALITY

(2012 Course) (Semester -I) (Elective-I) (403143B)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q9 or Q10.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicates full marks.*
- 4) *Use of Calculator is allowed.*
- 5) *Assume Suitable data if necessary.*

Q1) a) Explain the symptoms of poor power quality? **[5]**

b) Explain voltage sag characteristics - **[5]**

i) Magnitude

ii) Phase angle jump

OR

Q2) a) What are the causes of Voltage Flicker? **[5]**

b) What is the effect of voltage sag on Motors? **[5]**

Q3) a) Explain in detail one method followed for mitigating voltage sag. **[5]**

b) Write various sources of transient over voltages and explain any one in detail. **[5]**

OR

Q4) a) What are the problems associated with grounding affecting power quality? **[5]**

b) Define long duration rms voltage variations. **[5]**

P.T.O.

- Q5)** a) What indices are used for harmonic measurement? Explain. [8]
b) Define Power and power factor in power system under non sinusoidal conditions. [8]

OR

- Q6)** a) Explain the harmonic effects on Transformers and motors briefly. [8]
b) What is harmonics? What are the causes of harmonics? [8]

- Q7)** a) Discuss shunt passive filters used for harmonic reduction. [8]
b) How harmonics are mitigated? Explain. [8]

OR

- Q8)** a) Explain various principles of controlling harmonic distortion. [8]
b) Explain the concept of point of common coupling and its use in harmonic study. [8]

- Q9)** Write short notes on the following. [18]
a) Harmonic analysers
b) True RMS meters
c) Transient disturbance analysers

OR

- Q10)** a) What are the objectives of the power quality monitoring? [10]
b) Write note on test location in PQ monitoring. [8]



Total No. of Questions : 10]

SEAT No. :

P2045

[4859] - 1029

[Total No. of Pages : 2

B.E. (Electrical) (Semester - I)
POWER QUALITY (End Semester)
(2012 Pattern) (Elective - I (b))

Time : 2.5 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Solve Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicates full marks.*
- 4) *Use of Calculator is allowed.*
- 5) *Assume Suitable data if necessary.*

Q1) a) Why Power Quality has become important in today's context? [5]

b) Explain voltage sag characteristics - point on wave initiation, missing voltage. [5]

OR

Q2) a) Discussion in brief any one over voltage mitigation technique. [5]

b) Discuss how power quality is affected due to grounding problems. [5]

Q3) a) List various voltage sag mitigation techniques and explain any one. [5]

b) What is flicker? List various sources of flicker. [5]

OR

Q4) a) Write short note on power quality problem characteristics as per IEEE Standard 1159. [5]

b) Write short note on computer tools used for transient analysis. [5]

Q5) a) What is harmonics? Explain voltage and current harmonic distortion. [9]

b) Explain in brief the impact of harmonics on active, reactive and apparent power. [9]

P.T.O.

OR

- Q6)** a) Write detail note on triplen harmonics. [9]
b) Discuss in detail various sources of harmonics. [9]

- Q7)** a) Explain the concept of point of common coupling and its use in harmonic study. [8]
b) Explain in brief devices for controlling harmonic distortion. [8]

OR

- Q8)** a) Explain in detail different principles of controlling harmonics. [8]
b) Discuss harmonic study procedure. [8]

- Q9)** a) List and explain use of various equipment's required for power quality monitoring. [10]
b) Write note on choosing PQ monitoring location. [6]

OR

- Q10)** a) Discuss different objectives/consideration for power quality monitoring. [10]
b) Write note on choosing PQ monitoring duration. [6]



Total No. of Questions : 10]

P1990

SEAT No. :

[Total No. of Pages : 2

[5059]-585

B.E. (Electrical) (Semester - I)

POWER QUALITY

(2012 Pattern) (Elective - I)

Time : 2.30 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) Solve Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10.*
- 2) Neat diagrams must be drawn wherever necessary.*
- 3) Figures to the right indicates full marks.*
- 4) Use of Calculator is allowed.*
- 5) Assume Suitable data if necessary.*

Q1) a) Define power quality issues like voltage variations, voltage imbalance and voltage flicker. **[5]**

b) State and explain the relationship between immunity, emission and compatibility. **[5]**

OR

Q2) a) Explain various grounding practices as per IEEE standards. **[5]**

b) Explain over voltage mitigation techniques. **[5]**

Q3) a) Define sag? Explain any two voltage sag mitigation methods. **[5]**

b) What are the various sources of transient overvoltages? **[5]**

OR

Q4) a) Explain area of vulnerability concept related with voltage sag. **[5]**

b) Define flicker? What are the various sources of voltage flickers? **[5]**

Q5) a) What are the various sources of harmonics and their effects on the operation of various power system equipments? **[9]**

b) Explain the following terms related with waveform distortion **[9]**

i) Harmonics

ii) Interharmonics

iii) Subharmonics

iv) Triplen harmonics

P.T.O.

OR

- Q6)** a) What are different harmonic indices used? Explain their use. [9]
b) Explain power system quantities like active power, reactive power, displacement and true power factor under non-sinusoidal conditions. [9]

- Q7)** a) Discuss Concept of point of common coupling and its significance. [8]
b) Explain various computer tools used for harmonics analysis. [8]

OR

- Q8)** a) Explain passive filter design procedure for harmonic reduction. [8]
b) Explain in detail different principles of controlling harmonics. [8]

- Q9)** a) What are the requirements of power quality monitor to monitor various power quality parameters? Explain power quality analyzer used for PQ measurements. [10]
b) Write note on choosing PQ monitoring location and its duration. [6]

OR

- Q10)** a) Explain instrument setup and various guidelines to be followed for monitoring power quality. [10]
b) Explain the role of oscilloscopes, data loggers in PQ measurements. [6]



Total No. of Questions : 10]

SEAT No. :

P2291

[Total No. of Pages : 2

[5254]-625

B.E. (Electrical)

POWER QUALITY

(Elective – I) (Semester – I) (2012 Pattern)

Time : 2:30 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Solve Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicates full marks.*
- 4) *Use of calculator is allowed.*
- 5) *Assume suitable data if necessary.*

- Q1)** a) Why power quality has become important in today's context? [5]
b) Write note on how power quality is affected due to grounding problems. [5]

OR

- Q2)** a) Define power quality terms transients, voltage fluctuation and waveform distortion. [5]
b) State voltage sag mitigation techniques and explain any one in details. [5]

- Q3)** a) Write various sources of transient over voltages and explain any one in detail [5]
b) What is Flicker? Explain sources of flicker. [5]

OR

- Q4)** a) Explain various grounding practices as per IEEE standards. [5]
b) Explain Area of vulnerability. [5]

P.T.O.

- Q5)** a) Discuss in details various sources of harmonics. [8]
b) Explain following terms [8]
i) Interharmonics ii) subharmonics
iii) Triplen harmonics iv) Harmonic phase sequence

OR

- Q6)** a) Explain Effects of Harmonics on various power system equipments. [8]
b) Explain Harmonic indices in detail. [8]
Q7) a) What is point of common coupling and its use in harmonic study? [8]
b) Explain Harmonic distortion study procedure in details. [8]

OR

- Q8)** a) Explain various principles of controlling harmonic distortion. [8]
b) Explain passive filter design procedure for harmonics reduction. [8]
Q9) a) State equipment used for power quality monitoring and explain any three equipment in detail. [10]
b) Write note on choosing PQ monitoring duration. [8]

OR

- Q10)** Write short notes on the following [18]
a) True RMS meters
b) Transient disturbance analyser
c) Harmonic analyser



Total No. of Questions : 10]

SEAT No. :

[Total No. of Pages :2

P3186

[5461] - 225

B.E. (Electrical)

POWER QUALITY

(2012 Course) (Semester - I) (Elective - I) (403143B) (End Sem.)

Time : 2½ Hours]

[Max. Marks :70

Instructions to the candidates:

- 1) Solve Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8, Q9 or Q10.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Use of calculator is allowed.
- 5) Assume suitable data if necessary.

Q1) a) Define power quality? Explain the reasons for increased concern in power quality. [5]

b) What are the various causes of over voltages? [5]

OR

Q2) a) Define and explain [5]

i) Short duration voltage fluctuations

ii) Long duration voltage fluctuations.

b) What are the problems associated with grounding affecting power quality? [5]

Q3) a) Write various sources of transient over voltages and explain any one in detail. [5]

b) What are the causes of Voltage Flicker? [5]

OR

Q4) a) Explain in detail one method followed for mitigating voltage sag. [5]

b) Define long duration rms voltage variations. [5]

P.T.O.

- Q5) a)** Explain the causes of harmonics in power system. [8]
b) Explain the harmonic effects on Transformers and motors briefly. [8]

OR

- Q6) a)** Define power and power factor in power system under non sinusoidal conditions. [8]
b) Define THD and TDD with reference to harmonic measurements. [8]

- Q7) a)** Explain the concept of point of common coupling and its use in harmonic study. [8]
b) Explain in brief devices for controlling harmonic distortion. [8]

OR

- Q8) a)** Explain various principles of controlling harmonic distortion. [8]
b) Discuss shunt passive filters used for harmonic reduction. [8]

- Q9) a)** Explain various equipment required for power quality monitoring. [10]
b) What are the objectives of the power quality monitoring? [8]

OR

- Q10) a)** What are the desirable characteristics of power quality measurement equipments? (Explain with example). [10]
b) Write note on test location in PQ monitoring. [8]



Total No. of Questions : 10]

SEAT No. :

P3084

[Total No. of Pages : 2

[5670]-185

B.E. (Electrical)

POWER QUALITY

(2012 Pattern) (Elective - I) (Semester - I)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8, Q.9, or Q.10.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Use of calculator is allowed.*
- 5) *Assume suitable data if necessary.*

Q1) a) Explain various definitions of PQ with reference to stack holders. [5]

b) What are the various causes of voltage sag? Write in brief. [5]

OR

Q2) a) Define and explain following terms as per IEEE standard 1159. [10]

- i) Short duration voltage variation
- ii) Voltage flicker
- iii) Voltage Sag
- iv) Voltage Swell
- v) Voltage Interruption

Q3) a) Discuss the sources of transient over voltages. [5]

b) Describe Area of vulnerability concept related with voltage sag. [5]

OR

Q4) a) Describe any two voltage sag mitigation methods. [5]

b) What is ITIC curve? [5]

P.T.O.

- Q5)** a) Discuss in detail various sources of harmonics. [8]
b) Explain following terms [8]
i) Interharmonics
ii) Subharmonics
iii) Triplen harmonics
iv) Harmonic phase sequence

OR

- Q6)** a) Explain Effects of harmonics on various power system equipment. [8]
b) Explain Harmonic indices in detail. [8]

- Q7)** a) What is point of common coupling? Explain its use in harmonic study. [8]
b) Write note on devices for controlling harmonic distortion. [8]

OR

- Q8)** a) Explain various principles of controlling harmonic distortion. [8]
b) Explain passive filter design procedure for harmonics reduction. [8]

- Q9)** a) List the equipment used for power quality monitoring and explain any four equipment in detail. [10]
b) Explain instrument setup and various guidelines to be followed in power quality monitoring. [8]

OR

Q10) Write short notes on the following : [18]

- a) True RMS meters
b) Transient disturbance analysers
c) Harmonic Analysers



Total No. of Questions :6]

SEAT No. :

P75

OCT. -16/BE/Insem. - 129

[Total No. of Pages :2

B.E. (Electrical)

POWER QUALITY

(2012 Course) (Semester - I) (Elective-I) (403143 B)

Time : 1 Hour]

[Max. Marks :30

Instructions to the candidates:

- 1) *Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q6.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right indicate full marks.*
- 4) *Use of Calculator is allowed.*
- 5) *Assume suitable data if necessary.*

Q1) a) Define & explain various power quality terms as per IEEE standard 1159. [5]

b) Explain the importance of power quality in today's context. [5]

OR

Q2) a) Define & explain short and long duration voltage variations. [5]

b) Write a note on grounding and power quality issues. [5]

Q3) a) Explain in brief various voltage sag characteristics. [4]

b) Explain in detail any one method of mitigating voltage sag. [6]

OR

Q4) a) Explain with suitable diagram area of vulnerability concept. [5]

b) Draw & explain ITIC curve with respect to power quality. [5]

P.T.O.

- Q5)** a) Explain various sources of transient voltage. [5]
- b) Define flicker and explain various means to reduce voltage flicker. [5]

OR

- Q6)** a) Explain the various techniques adopted for over voltage protection. [5]
- b) Write in brief about computer tools used for transient analysis. [5]

EEE