Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SEVENTH SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

Course Code: EE465

Course Name: POWER QUALITY

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 5 marks. Marks

1		Define power quality. Why power quality has become an issue in recent years	(5)
2		Differentiate between linear loads and non-linear loads with suitable examples.	(5)
3		Explain how Fourier series can be used for harmonic analysis.	(5)
4		Explain the importance of power quality monitoring.	(5)
5		With neat diagram, explain shunt passive filters.	(5)
6		Distinguish between active filter and passive filter	(5)
7		Explain about power frequency field.	(5)
8		Explain common mode rejection ratio and common mode noise.	(5)

PART B

Answer any two full questions, each carries 10 marks.

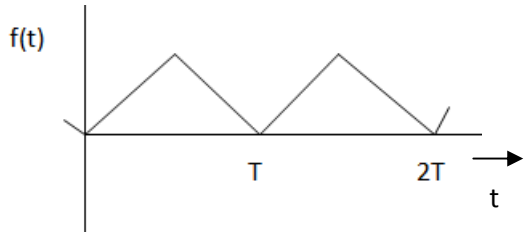
9		What are the disturbances coming under the term "waveform distortion". Explain each one them with neat figures	(10)
10	a)	What is meant by voltage sag and voltage swell as per IEEE standard.	(5)
	b)	Find the harmonic distortion of a voltage with following harmonic components: Fundamental=114V 3rd harmonic=4V 5th harmonic=27V 7th harmonic=1.5V 9th harmonic=1V	(5)
11	a)	Explain in detail how the following indices can be used to measure harmonic distortion in power system: a)THD b)TDD c)TIF d)DIN	(10)

e)C message weights

PART C

Answer any two full questions, each carries 10 marks.

12 a) Find the amplitude of the 5th harmonic of given waveform. Peak value is unity. (5)



b) Define windowing. How window function can be used for harmonic analysis (5)

13 a) What are the common monitoring objectives? (5)

b) Explain the features for power line disturbance analyser (5)

14 a) What is meant by aliasing? (3)

b) With the help of block diagram, explain in detail about the flickermeter. (7)

PART D

Answer any two full questions, each carries 10 marks.

15 a) Explain the role of filters in power quality? (3)

b) With neat diagram, Explain the operation of series active filter to improve power quality. (7)

16 a) Distinguish between conducted and radiated emission (5)

b) Explain about high frequency EMI sources. (5)

17 Explain various power quality conditioners for smart grid. (10)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SEVENTH SEMESTER B.TECH DEGREE EXAMINATION(S), MAY 2019

Course Code: EE465

Course Name: Power Quality

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 5 marks. Marks

1		Illustrate about notching in power quality	(5)
2		Explain the following harmonic indices: a)THD b)TDD	(5)
3		Define windowing. How window function can be used for harmonic analysis	(5)
4		What are the objectives of power quality monitoring?	(5)
5		With neat diagram, explain shunt active filters.	(5)
6		Explain hybrid filters.	(5)
7		Explain common mode rejection ratio and common mode noise.	(5)
8		Distinguish between conducted and radiated emission	(5)

PART B

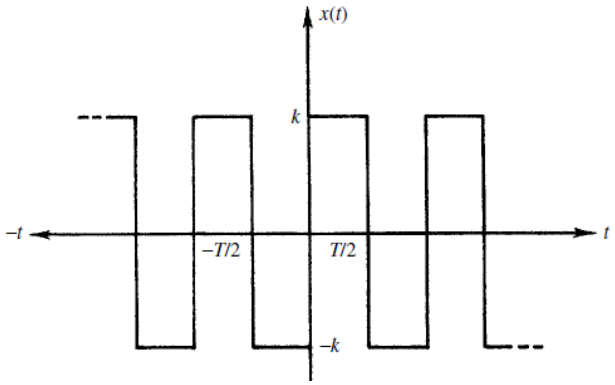
Answer any two full questions, each carries 10 marks.

9	a)	Explain voltage unbalance and voltage flicker	(5)
	b)	Find the total harmonic distortion of the waveform having magnitude of fundamental component unity and 3^{rd} ,5^{th} ,7^{th} and 9^{th} harmonics, reciprocal of harmonic number.	(5)
10	a)	What is the need of power quality standards? Mention the various IEEE standards for power quality	(10)
11	a)	Differentiate between harmonics and interharmonics	(5)
	b)	Explain the mechanism of harmonic generation.	(5)

PART C

Answer any two full questions, each carries 10 marks.

12		Obtain the Fourier series expansion of given function	(10)



13 a) Define voltage flicker. What are the major flicker sources? (4)

b) With the help of block diagram, explain in detail about the flickermeter. (6)

14 a) How can the aperiodic signals be analysed? Write the expression (5)

b) What are the information that are obtained from monitoring as part of site surveys? (5)

PART D

Answer any two full questions, each carries 10 marks.

15 Explain the procedure for designing the harmonic filter (10)

16 Explain power quality issues of grid connected renewable energy sources. (10)

17 a) Explain the procedure to shield radiated noise. (5)

b) Distinguish between active and passive filter. (5)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

SEVENTH SEMESTER B.TECH DEGREE EXAMINATION(R&S), DECEMBER 2019

Course Code: EE465

Course Name: Power Quality

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 5 marks. Marks

1		Differentiate between impulsive and oscillatory transients	(5)
2		Calculate the total harmonic distortion of a voltage waveform with following harmonic frequency makeup: Fundamental V_1=114V, V_3=4V, V_5=2V, V_7=1.5V, V_9=1V	(5)
3		Define windowing. How window function can be used for harmonic analysis	(5)
4		What are the objectives of power quality monitoring?	(5)
5		Differentiate between active and passive filters used for harmonic elimination.	(5)
6		Explain how transformer connection employing phase shift helps in the cancellation of current harmonics?	(5)
7		What do you mean by CMRR?	(5)
8		Explain power frequency fields.	(5)

PART B

Answer any two full questions, each carries 10 marks.

9		What are the disturbances coming under the term waveform distortion? Explain each with neat figures.	(10)
10	a)	With the help of neat figure illustrate about transients.	(6)
	b)	Define the following i) THD ii)TDD	(4)
11		Explain the effects of harmonic distortion on power system.	(10)

PART C

Answer any two full questions, each carries 10 marks.

12 Obtain the Fourier series expression for the waveform shown below. Peak value of the waveform is unity. (10)

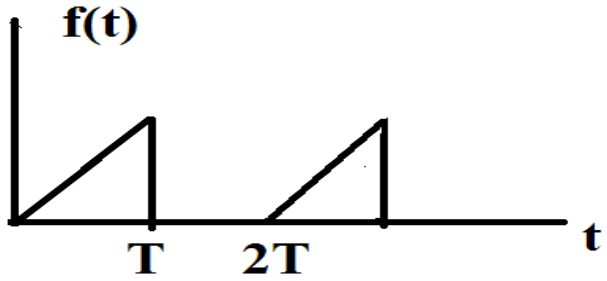

Figure:1

13 a) Explain why waveforms need processing? (4)

b) Explain spectrum analysers and harmonic analysers. (6)

14 With the help of a neat diagram explain flicker meter. (10)

PART D

Answer any two full questions, each carries 10 marks.

15 Explain in detail about principle of operation and various configurations of active power filter with neat schematic diagrams (10)

16 a) What are the limitation of passive filters (5)

b) Mention any five power quality issues of grid connected renewable energy sources. (5)

17 a) Explain conducted emission and radiated emission (4)

b) Write a note on EMI Mitigation methods (6)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Seventh semester B.Tech examinations (S), September 2020

Course Code: EE465

Course Name: Power Quality

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 5 marks.

		Marks
1	Define power quality. Comment on the growing concern on the quality of electric power by both electrical utilities and end users.	(5)
2	Define triplen harmonics and explain its effects in power system?	(5)
3	Explain how non periodic signals are analysed?	(5)
4	What is meant by power quality monitoring? List any 6 specifications of a power quality monitoring equipment.	(5)
5	Explain hybrid filters.	(5)
6	Distinguish between active and passive filters.	(5)
7	Distinguish between common mode rejection ratio and common mode noise.	(5)
8	Explain high frequency interference.	(5)

PART B

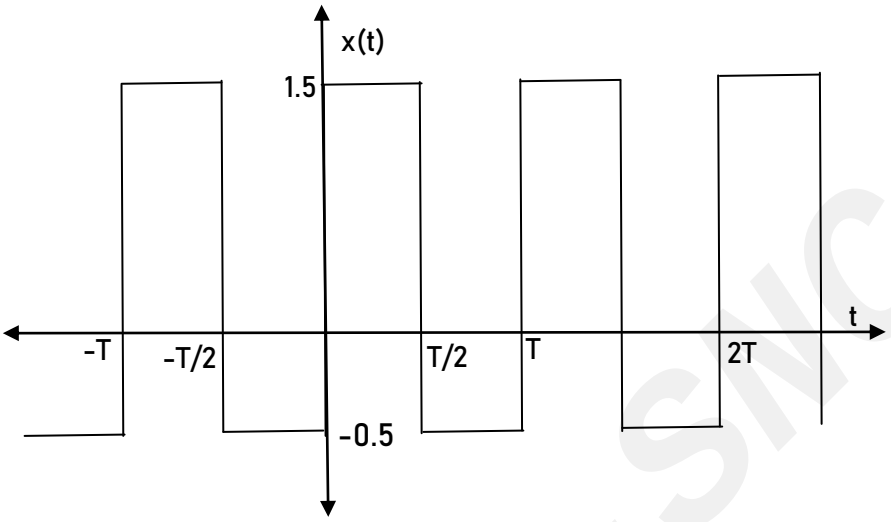
Answer any two full questions, each carries 10 marks.

9	a)	Explain the various short duration voltage variations.	(6)
	b)	With the help of waveform explain the term DC offset.	(4)
10	a)	List any five objectives for framing power quality standards.	(5)
	b)	Discuss the effects of harmonic distortion on capacitors.	(5)
11	a)	Briefly discuss the common non-linear loads which cause voltage distortion.	(5)
	b)	Find the harmonic distortion of a voltage with following harmonic components: Fundamental=308V, 3^{rd} harmonic=30V 5^{th} harmonic=16V, 7^{th} harmonic=9V 9^{th} harmonic=4V	(5)

PART C

Answer any two full questions, each carries 10 marks.

12 a) Find the amplitude of the 5^{th} harmonics of the given wave form. (5)



b) Also find the dc component and rms value of the fundamental component of the above waveform. (5)

13 Write short note on the following

a) Powerline disturbance analyzer (10)

b) Flicker meter

14 a) Define Windowing. How window function can be used for harmonic analysis. (5)

b) What are the information that are obtained from monitoring as part of site surveys? (5)

PART D

Answer any two full questions, each carries 10 marks.

15 Explain in detail about principles of operation of shunt APF and series APF with neat schematic. (10)

16 a) Explain the Power Quality issues of Grid connected Renewable Energy Sources. (10)

17 a) What are the advantages and drawbacks of active power filters? (5)

b) Explain the procedure for reducing conducted emission. (5)

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Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Seventh Semester B.Tech Degree Examination (Regular and Supplementary), December 2020

Course Code: EE465

Course Name: Power Quality

Max. Marks: 100 Duration: 3 Hours

PART A

Answer all questions, each carries 5 marks. Marks

1		Define power quality .What are the sources of power quality?	(5)
2		Define TIF and C-message weight factor.	(5)
3		Define windowing. How window function can be used for harmonic analysis?	(5)
4		What is the operation of spectrum analyzer?	(5)
5		What are the advantages and disadvantages of passive filter?	(5)
6		Explain hybrid filters.	(5)
7		Explain common mode noise and transverse mode noise.	(5)
8		Explain about high frequency EMI sources.	(5)

PART B

Answer any two full questions, each carries 10 marks.

9		Explain in detail about different power quality issues.	(10)
10	a)	With the help of waveform explain the term DC offset.	(4)
	b)	Explain the terms THD & DIN. How are they related to each other?	(6)
11		Explain about different sources of harmonics in electrical distribution system.	(10)

PART C

Answer any two full questions, each carries 10 marks.

12	a)	Let f(x) be a function of period 2π such that $f(x) = 1, -\pi < x < 0$ $= 0, 0 < x < \pi$ Sketch a graph of f(x) in the interval $-2\pi < x < 2\pi$. Find the Fourier series of f(x).	(10)
13	a)	What is meant by aliasing?	(4)
	b)	Write short note on the power quality Monitoring Considerations.	(6)

14	a)	Mention the factors that should be considered for selecting the instrument.	(5)
	b)	What are the types of power quality measurement equipment?	(5)

PART D

Answer any two full questions, each carries 10 marks.

15		Discuss the steps involved in harmonic filter design.	(10)
16	a)	With neat diagram, explain the operation of series active filter to improve power Quality.	(5)
	b)	Explain various power quality conditioners for smart grid.	(5)
17	a)	Explain about power quality issues of grid connected energy sources.	(5)
	b)	What are the methods to mitigate EMI?	(5)

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