

Subject Code: XXXXX

Roll No:

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**BTECH
(SEM-7) POWER QUALITY AND FACTS 2021-22**

TIME:3 HOUR

Total Marks: 100

Instruction: Attempt the questions as per the given instructions. Assume missing data suitably.

SECTION - A

Attempt *All Parts* in Brief

2*10 = 20

Q1	Questions	Marks
(a)	Define transients and surges ?	2
(b)	Define impulsive transients.	2
(c)	List two reasons for voltage sags.	2
(d)	Distinguish between static UPS and rotary UPS.	2
(e)	Discuss the neutral voltage swing condition.	2
(f)	Electrical transients are created due to switching of UPS. Elaborate.	2
(g)	Explain any two FACT controller devices.	2
(h)	Discuss the working of SSC.	2
(i)	List two devices used for measuring power quality and harmonics.	2
(j)	Analyze the role of harmonics on the communication lines.	2

SECTION - B

Attempt Any Three of the following

3*10 = 30

Q2	Questions	Marks
(a)	Differentiate between harmonics and inter-harmonics.	10
(b)	Starting of induction motor is a major cause for voltage sag. Discuss.	10
(c)	Explain any two devices used for the protection from over-voltages.	10
(d)	Explain the necessity of FACT controllers.	10
(e)	Discuss the effects of harmonics on the operation of AC motors.	10

SECTION - C

Attempt Any One of the following

5*10 = 50

Q3	Questions	Marks
(a)	What are the disturbances coming under the term waveform distortion ? Explain each with neat figures.	10
(b)	With a waveform sketch, explain the terms ; i. Voltage sag ii. Voltage interruption iii. Voltage swells iv. Harmonics.	10
Q4	Questions	Marks
(a)	Analyze the sources/causes of voltage sag. Explain in detail.	10
(b)	How can we estimate the performance of voltage sag?	10
Q5	Questions	Marks
(a)	Summarize the sources/causes of overvoltage transients.	10
(b)	Summarize the methods to reduce the effects of overvoltage transients.	10
Q6	Questions	Marks
(a)	Summarize the concept of series compensation. Explain with neat diagram.	10
(b)	Summarize the concept of shunt compensation. Explain with neat diagram.	10
Q7	Questions	Marks

(a)	Discuss the effects of harmonics on transformers and cables.	10
(b)	Categorize the different harmonics mitigation techniques with diagrams.	10