Code No:158CD

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech IV Year II Semester Examinations, July - 2023
POWER QUALITY AND FACTS
(Electrical and Electronics Engineering)

Time: 3 Hours **Max. Marks: 75**

Note: i) Question paper consists of Part A, Part B.
ii) Part A is compulsory, which carries 25 marks. In Part A, Answer all questions.
iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

1.a)	What are the causes of voltage swell?	[2]
b)	List the remedies to improve power quality.	[3]
c)	What is reactive-power control in electrical power transmission system?	[2]
d)	What is the difference between active and passive reactive compensation?	[3]
e)	What is a static VAR compensator?	[2]
f)	Explain the basic operating principle of STATCOM.	[3]
g)	What are the uses of FACTS devices?	[2]
h)	Write the objectives of Series Compensators.	[3]
i)	List the different functionalities of UPFC.	[2]
j)	Draw the circuit diagram of Unified Power flow Controller.	[3]

PART – B

(50 Marks)

2. Explain the terms Voltage sag, Voltage interruption, Voltage swells and Sag with harmonics with neat waveforms. [10]

OR

3.a) What is the impact of transients on power quality? Classify the transients that occur in power systems.
b) What is harmonics? Explain harmonic distortion with relevant waveforms. [5+5]

4. Explain in detail about the Two – machine power system with an ideal midpoint reactive compensator with corresponding phasor diagram. [10]

OR

5.a) Explain why series compensation is more advantageous than shunt compensation?
b) Explain the power oscillation damping in shunt compensation. [5+5]

6. Explain with a neat block diagram general control scheme of Static Var Compensator (SVC). [10]

OR

7. Explain basic Fixed Capacitor–Thyristor-Controlled reactor type Static Var Generator with a neat circuit and its output characteristics. [10]

8. Explain in detail, the basic operating principle and control scheme of TCSC. [10]

OR

9. Explain in detail, the basic operating principle and control scheme of SSSC. [10]

10. Explain the basic operating principles of UPFC with a conceptual representation. [10]

OR

11. Illustrate the conventional transmission control capabilities of the UPFC with the help of phasor diagrams. [10]

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