B.E. Electrical (Electronics & Power) Engineering (Model Curriculum) Semester - VIII

PEC-5-1 - Power Quality and FACTS

P. Pages : 2 **GUG/S/23/14346**

Time : Three Hours * 3 0 3 4 * Max. Marks : 80

Notes : 1. All questions carry equal marks.
2. Answer **five** questions as per internal choice.
3. Due credit will be given to neatness and adequate dimensions.
4. Assume suitable data wherever necessary.
5. Illustrate your answers wherever necessary with the help of neat sketches.

1. a) Discuss the following characteristics of power quality issues. **8**
a) Short duration variation.
b) Long duration variations.

b) Mention two standards specified by IEEE and IEC, for PQ. **8**

OR

2. a) Discuss the following electrical power quality issue with examples **8**
a) Voltage swell
b) Voltage interruption.

b) Describe the significance of CBEMA curve with neat diagram. **8**

3. a) With a waveform sketch, explain the term **10**
a) Voltage sag
b) Voltage interruption.
c) Voltage swells
d) Sag with harmonics.

b) Classify different types of voltage sag. **6**

OR

4. a) Explain static transfer switch. **8**

b) Describe the importance of voltage sag estimation. **8**

5. a) Discuss following categories of FACTS. **8**
i) Series controller
ii) Shunt Controller
iii) Combined series-shunt controller
iv) Combined series-series controller.

b) What limits the loading Capability of transmission line? Discuss in detail. **8**

OR

6.	a)	What are the possible benefits of FACTS technology.	**8**
	b)	Discuss the various categories of FACTS controllers in brief.	**8**
7.	a)	Why there is a need of hybrid VAR generators? State the different types of hybrid VAR generators.	**8**
	b)	Explain the power oscillation damping with shunt compensation.	**8**

OR

8.	a)	What are the objectives of Shunt Compensation.	**8**
	b)	Explain FC-TCR and TSC-TCR by covering the following points. i) Diagram. ii) Operation. iii) V-I characteristics. iv) Loss characteristics.	**8**
9.	a)	Explain the operation of GTO-thyristor controlled series capacitor.	**8**
	b)	How can series compensation can be useful for power oscillation damping.	**8**

OR

10.	a)	What are the various approaches to control series compensation.	**8**
	b)	Explain what you mean by variable impedance type and switching Converter type FACT's devices.	**8**

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