

B.TECH
(SEM VII) THEORY EXAMINATION 2022-23
POWER QUALITY AND FACTS

Time: 3 Hours**Total Marks: 100****Note:** Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt all questions in brief.**2 x 10 = 20**

- (a) What is the meaning of power quality disturbances?
- (b) What are the causes of sags and swell?
- (c) Name two types of sag mitigation devices.
- (d) What is the importance of estimating sag performance?
- (e) What are the types of transient over voltages?
- (f) Define effect of capacitor switching transients on network?
- (g) Define the need of FACTS controllers in the power system.
- (h) Draw VI characteristics of SVC.
- (i) Mention the harmonic sources from industrial loads.
- (j) What is harmonic index? State it's significant.

SECTION B

2. Attempt any three of the following:

- (a) Discuss about the Power Quality Evaluation Procedure. Explain General Classes of Power Quality Problems.
- (b) Discuss about the Information Technology Industry Council (ITIC). Explain about the events described in the curve.
- (c) Define lightning? Explain in detail about the surge arrestors and surge suppressors.
- (d) Discuss in detail about the types of facts controllers with diagram.
- (e) What are the two important harmonic indices used in power system? Explain about it briefly

SECTION C

3. Attempt any one part of the following:

- (a) Explain short duration voltage variation and its mitigation technique with suitable example
- (b) Define waveform distortion? Explain the waveform distortion categories.

4. Attempt any one part of the following:

- (a) Discuss briefly about the Static Transfer Switches. How it is used to minimizing the severity of sags?
- (b) Explain the following sag mitigation techniques.
 - (i) Hybrid UP with energy storage
 - (ii) Flywheel wheel energy storage

5. Attempt any *one* part of the following:

- (a) What is the range of current induced due to lightning stroke? Explain in detail the mechanism of lightning.
- (b) Explain briefly about the fundamental principles of overvoltage protection of load equipment.

6. Attempt any *one* part of the following:

- (a) Explain the operation of DSTATCOM used for sag mitigation. Compare STATCOM and SVC.
- (b) What is static VAR system? Explain its advantages and applications

7. Attempt any *one* part of the following:

- (a) What is harmonic filter? Write the short notes on the benefits of active harmonic filter.
- (b) Explain for the following terms in detail :-
 - (i) individual and total harmonic distortion
 - (ii) Zig-zag transformer

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