

B.Tech
(SEM VIII) THEORY EXAMINATION 2018-19
POWER QUALITY

Time: 3 Hours

Total Marks: 100

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

- 1. Attempt all questions in brief. 2 x 10 = 20**
- Define the terms notching and harmonics
 - What are the causes of power frequency variations?
 - What is voltage sag?
 - Write a short note on Rotary UPS.
 - Define crowbar devices.
 - Explain clamping devices.
 - Explain complication introduced by power electronic switches.
 - Define best possible method of harmonic elimination.
 - Explain harmonic analyzers.
 - Define Disturbance analyzers.

SECTION B

- 2. Attempt any three of the following: 10 x 3 = 30**
- Define overvoltage and undervoltage. Also explain different cause of the overvoltage and undervoltage in power systems.
 - Explain the working of different uninterruptable power supplies.
 - What are different types of electrical transients that occur in power system.
 - What kinds of harmonics are generated due to switching operation of devices like IGBT, MOSFET and BJT etc. Explain the problems associated with kind of harmonics.
 - State and explain different mitigation methods and operational measures to minimize the voltage disturbances of customer site.

SECTION C

- 3. Attempt any one part of the following: 10 x 1 = 10**
- What are causes of interruptions? How do short duration interruptions differ from sustained interruptions? What is the importance of interruptions?
 - Write short note on a.) Voltage imbalance b.) Voltage fluctuations c.) Power frequency variations.
- 4. Attempt any one part of the following: 10 x 1 = 10**
- Briefly explain the uses of isolations transformer , voltage regulator and active series compensator.

- b) With a typical ferro-resonant circuit diagram discuss, how a ferrous-resonant transformers hands voltage sag conditions.

5. Attempt any *one* part of the following: 10 x 1 = 10

- a) Explain the sources of transient overvoltage also the devices used for overvoltage protection.
- b) Write short note on a) Capacitor switching transient b.) ups switching transients

6. Attempt any *one* part of the following: 10 x 1 = 10

- a) What are the causes of voltage and current harmonics? Discuss the harmonic measurement technique.
- b) Explain the impact of harmonic distortion on: (i) capacitors (ii) transformers (iii) motors.

7. Attempt any *one* part of the following: 10 x 1 = 10

- a) Explain the working principle of Unified power quality conditioner (UPQC).
- b) Discuss load compensation and voltage regulation using DSTATCOM.

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