

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**

- a) Define the terms notching and harmonics
- b) What are the causes of power frequency variations?
- c) What is voltage sag?
- d) Write a short note on Rotary UPS.
- e) Define crowbar devices.
- f) Explain clamping devices.
- g) Explain complication introduced by power electronic switches.
- h) Define best possible method of harmonic elimination.
- i) Explain harmonic analyzers.
- j) Define Disturbance analyzers.

SECTION B**2. Attempt any three of the following: 10 x 3 = 30**

- a) Define overvoltage and undervoltage. Also explain different cause of the overvoltage and undervoltage in power systems.
- b) Explain the working of different uninterruptable power supplies.
- c) What are different types of electrical transients that occur in power system.
- d) 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.
- e) 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**

- a) What are causes of interruptions? How do short duration interruptions differ from sustained interruptions? What is the importance of interruptions?
- b) 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

- a) 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.