

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2021****Subject Code:3170921****Date:17/12/2021****Subject Name:Power Quality and FACTS****Time:10:30 AM TO 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) Discuss the sources of voltage sag. **03**
(b) Define flicker. List reasons responsible for flicker. **04**
(c) What do you mean by term “power quality”? Discuss all the power quality issues in brief. **07**

- Q.2** (a) What are the types of FACTS controllers? **03**
(b) Explain single point and multi point grounding. **04**
(c) Discuss harmonics in No-Load Exciting Current and Harmonics due to Inrush Current in transformer. **07**

OR

- (c) Discuss the effect of harmonics on AC Motors Drives. **07**
Q.3 (a) State the importance of power factor in industry as per power quality study. **03**
(b) Discuss in brief, about the various applications of SVCs. **04**
(c) Explain working of TSC- TCR with neat circuit diagram and waveform. **07**

OR

- Q.3** (a) Explain application of synchronous condensers. **03**
(b) Discuss in brief, about harmonics in a Thyristor-Controlled Reactor. **04**
(c) Explain the schematic diagram and working principle of a STATCOM. **07**
Q.4 (a) What is THD? According to IEEE 519, state various voltage and current THD? **03**
(b) Classify different types of harmonics filter. **04**
(c) Mention the methods of passive reactive power compensation. Compare them with compensation using FACTS devices. **07**

OR

- Q.4** (a) Write short note on true RMS meter. **03**
(b) Write a note on harmonic analyzer. **04**
(c) What are CBEMA and ITIC graphs? Draw and discuss the ITIC graph in detail. **07**
Q.5 (a) Define: 1.Linear Loads 2.Inrush Current 3.Voltage Swell **03**
(b) Explain single-tuned filter for harmonic reduction. **04**
(c) Describe the objectives and procedures for performing power quality monitoring. **07**

OR

- Q.5** (a) What are the various instruments used for power quality measurements? **03**
(b) Explain the features of flicker meters. **04**
(c) Discuss the effect of harmonics on transformer and derive expression for k factor. **07**

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (NEW) EXAMINATION – SUMMER 2022****Subject Code:3170921****Date:14/06/2022****Subject Name:Power Quality and FACTS****Time:02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

MARKS

- Q.1** (a) Define the term “Power Quality”. **03**
- (b) Explain about Power Quality Standards Consider for Power Quality. **04**
- (c) Explain the all Power Quality Issues with necessary diagrams. **07**

- Q.2** (a) Explain the role of Grounding in terms of Power Quality. **03**
- (b) Give the importance of FACTS controller for Power Quality. **04**
- (c) Explain the role of SVC device for Reactive Power Compensation with necessary diagrams. **07**

OR

- (c) Write Short Note on Reactive Power Compensation and Also explain the comparison of Series & Shunt Compensation. **07**
- Q.3** (a) Explain the operation of single point and Multi Point Grounding. **03**
- (b) Explain the role of Harmonic Filters in Harmonics Mitigation. **04**
- (c) Explain the working of SVC device using TSC-TCR with necessary diagrams. **07**

OR

- Q.3** (a) Explain the concept of Harmonics and its side effects in Power System. **03**
- (b) Explain the Applications of SVC and STATCOM devices. **04**
- (c) Explain the Operating Principle of STATCOM with Necessary Diagrams. **07**

- Q.4** (a) Write a Short Note on Harmonic Analyzer. **03**
- (b) Prevention of Voltage Stability using SVC. **04**
- (c) Give the Comparison of DC Drives & AC Drives. **07**

OR

- Q.4** (a) Explain the Harmonics Effects in 3-Phase Transformer. **03**
- (b) What is THD? Explain the Power Quality Standards for THD. **04**
- (c) Explain the operating principle of Pulse Width Modulation (PWM) for Harmonics Mitigation. **07**
