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Paper Code : PE-EE 602B/PE-EEE 602B Power Quality And Facts

UPID : 006605

Time Allotted : 3 Hours

Full Marks : 70

The Figures in the margin indicate full marks.

Candidate are required to give their answers in their own words as far as practicable

Group-A (Very Short Answer Type Question)

1. Answer any ten of the following :

[1 x 10 = 10]

- (i) What is a Unified Power Quality Conditioner (UPQC)?
- (ii) What are voltage swells and how do they affect electrical systems?
- (iii) How do FACTS devices improve power transmission?
- (iv) What role does a Fault Current Limiter play in FACTS systems?
- (v) How do FACTS technologies contribute to reducing transmission line losses?
- (vi) What are common power quality problems in distribution systems?
- (vii) What does passive reactive power compensation entail?
- (viii) How does a Unified Power Quality Conditioner (UPQC) differ from other power quality mitigation devices?
- (ix) What is the key aspect of the comparison between series and shunt compensation?
- (x) PSTs stands for _____.
- (xi) How does flicker affect consumers?
- (xii) How is flicker measured?

Group-B (Short Answer Type Question)

Answer any three of the following :

[5 x 3 = 15]

2. Explain the objectives of FACTS controllers in the power system network. [5]
3. Write a short note for Voltage Source Converter based (FACTS) controllers. [5]
4. Explain the concept and need for reactive power and how mitigate the reactive power by FACTS controller? [5]
5. What are the Advantages of TCSC? [5]
6. What is Series FACTS controllers, Shunt FACTS controllers and Combined Series- Shant FACTS controllers? [5]

Group-C (Long Answer Type Question)

Answer any three of the following :

[15 x 3 = 45]

7. (a) Explain Harmonics and Unbalance mitigation in Distribution Systems by using DSTATCOM and Shunt Active Filters. [5]
- (b) Discuss the Current Control Techniques for DSTATCOM <https://www.makaut.com> [5]
- (c) What are the future trends in Power Quality improvement techniques and FACTS technology? [5]
8. (a) What are the control parameters attained by the SSSC? [5]
- (b) What is the disadvantage of fixed series compensation? [5]
- (c) What is meant by Thyristor Controlled Series Capacitor and Reactor? [3]
- (d) Write the key features and benefits of Thyristor Controlled Series Capacitors. [2]
9. (a) What are the different constraints for operating UPFC? [5]
- (b) How active and reactive power control by UPFC? [5]
- (c) Draw equivalent circuit diagram and phasor diagram for VSI based UPFC. [5]
10. (a) Explain single and three phase Thyristor Controlled Reactor (TCR) with single line diagram. [5]
- (b) Draw a three phase SVC circuit diagram and explain it. [5]
- (c) What is Bypassed Thyristor mode, blocked - Thyristor Mode and Partially Conducting Thyristor Mode or Vernier Mode for TCSC? [5]
11. (a) Compare the V-I Characteristic of STATCOM & SVC. [9]
- (b) What are the parameters that can be improved using STATCOM in power system? [6]