Register No.: …… Name: ……..

SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM)

SECOND SEMESTER M.TECH DEGREE EXAMINATION (Regular), JULY 2022

POWER SYSTEMS

(2021 Scheme)

Course Code: **21PS202**

Course Name: **Flexible AC Transmission Systems**

Max. Marks: **60** **Duration: 3 Hours**

PART A

(Answer all questions. Each question carries 3 marks)

1. What are the problems associated with AC power transmission and briefly explain how FACTS devices can support the power system?
2. Discuss about the midpoint voltage regulation using FACTS devices. What are the assumptions?
3. Explain the concept of VAR generation and control in switching converter type generators.
4. What are the objectives of series compensation? Explain principle of stability enhancement using series compensation.
5. Draw the block diagram of functional internal control scheme of SSSC.
6. With neat figures, explain the role of switching converters in SSSC for grid support.
7. Compare between UPFC and IPFC.
8. Discuss about the transmission control capabilities of UPFC.

PART B

(Answer one full question from each module, each question carries 6 marks)

MODULE I

9. a) What are FACTS devices? Enlist the different types of FACTS controllers. (4)
   b) Discuss about series connected controllers. (2)

OR

10. List the different types of power converters used in FACTS controllers and explain any two types of power converters in detail. (6)

MODULE II

11 With neat diagram, explain the principle of operation of TCR and TSR. Also compare the V-I characteristics. (6)

OR

12. a) List the objectives of shunt compensation. (2)
    b) Discuss about voltage stability improvement using shunt compensators. (4)

MODULE III

13. With neat diagrams and characteristics, explain how STATCOM supports real and reactive power compensation. (6)

OR

14. With simplified block diagram, explain the control scheme of SVC. (6)

MODULE IV

15. With neat diagrams and characteristics, explain the principle of operation of TSSC. (6)

OR

16. a) How transient stability of a power system is improved by using series compensators? Explain with suitable example. (3)
    b) Explain the phenomenon of power oscillation damping using series compensators. (3)

MODULE V

17. With neat diagrams and characteristics, explain the principle of operation of SSSC (6)

OR

18. Explain about the sub synchronous characteristics of series compensators. Explain how a basic NGH SSR damper can be used to damp out the oscillations. (6)

MODULE VI

19. With neat diagram, explain the configuration, characteristics and principle of operation of IPFC. (6)

OR

20. With neat block diagram, discuss about the independent real and reactive control scheme for UPFC. (6)

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