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| Question Paper Code | 12557 |
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B.E. / B.Tech. - DEGREE EXAMINATIONS, APRIL / MAY 2024

Eighth Semester

Electrical and Electronics Engineering

20EEEL801 - FACTS AND CUSTOM POWER DEVICES

Regulations - 2020

Duration: 3 Hours

Max. Marks: 100

PART - A (10 × 2 = 20 Marks)

Answer ALL Questions

| | Marks | K- Level | CO |
|--|-------|-------------|-----|
| 1. List the limits of line loading capability. | 2 | K1 | CO1 |
| 2. Mention the need of reactive power control in power transmission lines. | 2 | K1 | CO1 |
| 3. Write short notes on bang-bang control. | 2 | K1 | CO2 |
| 4. What are the three different modes of operation of TCSC? | 2 | K1 | CO2 |
| 5. Define linear loads. | 2 | K1 | CO3 |
| 6. Write the applications of UPFC. | 2 | K1 | CO3 |
| 7. Compare UPFC and IPFC. | 2 | K2 | CO4 |
| 8. Construct the basic control scheme of SSSC. | 2 | K2 | CO4 |
| 9. Differentiate STATCOM and DVR. | 2 | K2 | CO5 |
| 10. Mention the Classification of custom power devices. | 2 | K1 | CO5 |

PART - B (5 × 13 = 65 Marks)

Answer ALL Questions

| | | | |
|---|----|----|-----|
| 11. a) Explain the effect of shunt and series compensation on power transmission capacity of a short symmetrical transmission line. | 13 | K2 | CO1 |
| OR | | | |
| b) Derive the reactive power compensation at the sending, mid-point and receiving ends of the transmission lines. | 13 | K2 | CO1 |
| 12. a) Discuss the design of SVC voltage regulator. Also discuss the influence of SVC on system voltage. | 13 | K2 | CO2 |
| OR | | | |
| b) Describe the modelling of TCSC for load flow study. | 13 | K2 | CO2 |
| 13. a) With the aid of block diagram, explain the characteristics of UPFC. | 13 | K2 | CO3 |
| OR | | | |
| b) Explain with a neat sketch, the operating principle, V-I characteristic and application of static synchronous compensator. | 13 | K2 | CO3 |

14. a) Illustrate the different operating modes of SSSC for real and reactive power exchange. 13 K2 CO4

OR

b) Draw the schematic diagram and describe the basic operating principles of Interline power flow controller. 13 K2 CO4

15. a) Outline the principle of DVR operation used for sag mitigation. 13 K3 CO5

OR

b) Explain the principle and working of DSTATCOM with a neat sketch. 13 K2 CO5

PART - C (1× 15 = 15 Marks)

16. a) Design a deadbeat controller in FACTS device with neat diagram. 15 K3 CO6

OR

b) Choose an Adaptive control scheme for FACTS devices and derive the mathematical expressions for Adaptive control in FACTS controller design. 15 K3 CO6