NANDHA ENGINEERING COLLEGE

DEPARTMENT OF EEE

POWER ELECTRONICS APPLICATIONS TO POWER SYSTEMS

UNIT-I

PART –A

1. List of the power device used as a power system control.
2. Justify power system performance can be improved by STATCOM.
3. How power system stability limit can be improved.
4. Enumerate the characteristics of SSSC.
5. Highlight any two specific property of single & three phase converters.
6. What is the basic for selection of power converters for a particular power system application?
7. How voltage instability is identify in power system networks.
8. Define voltage & current Harmonics.
9. Brief the effects caused due to load impedance.
10. How reactive power can be controlled by using power electronic controllers.
11. Why feedback control of power in dc link is not desirable?

PART-B

1. Explain STATCOM&SSSC power system controller along with its characteristics.
2. What are the various converter configurations available for buck power control and also explain any one converter configuration in detail.
3. How voltage & current harmonics are generated in power system network& derive the analytical expressions for the same.
4. Discuss in detail the basic operating principal of UPFC.
5. What are the various recent advantage of power electronic converter used to optimize the power system control.

UNIT-II

PART –A

1. List some of the specific properties of phase controlled converters?

2. Define the inversion mode of operation of full converters?

3. Define circuit turn off time?

4. What is reverse recovery time?

5. Comment how current harmonics are generated?

6. Distinguish between voltage and current harmonics?

7. List the effect of input source inductance?

8. Define commutation overlap?

9. What are the constraints for selection of a power circuit for a particular application?

10. Sketch the power circuit for a steel rolling mill operated with dc source?

11. Justify power system performance can be improved by STATCOM.

12. Enumerate the characteristics of SSSC.

13. Write the different tests applied for thyristor valves?

14. What are the different types of firing?

15. Explain the two transistor analogy model of a thyristor?

16. Draw the switching characteristics of thyristor value?

17. Draw the block diagram typical control system for a thyristor control reactance?

PART-B

1. Explain in detail about the effect of source and load impedances in single & three phase converters.
2. Analyze Graetz circuit to avoided overlapping in single phase converters.
3. Justify in details about the choice of best power circuits suitable for DC drive applications.
4. Explain the basic characteristics of harmonics? Also derive the analytical expressions against voltage and current harmonics with respect to a 12-pulse converter

UNIT-III

PART-A

1. write the effect of source reactance on converter without AC filter?

2. what is meant by conducting overlap?

3. write the formula for value utilization factor?

4. name the different types of higher level controller applied in DC link?

5. what are the basic requirements for the firing pulse generation of HVDC values?

6. what are the different types of start-up procedures for converters?

7. what is ment by sample and hold circuit?

8. write the advantages and disadvantages of synchronous condenser?

9. write down the sources of reactive power?

10. list out the problem associated with the injection of harmonics?

11. draw the block diagram typical control system for a thyristor control reactance?

12. draw the circuits for different types of MTDC systems?

13. how the effectiveness of the DC filter can be judged?

14. what are criteria to be considered while designing AC filters?

PART-B

1. Explain the description of DC transmission system?

2. Explain briefly the choice of voltage level in DC power transmission technology?

3. Briefly analyze the two and three valve conduction mode?

4. Explain in detail about the choice of converter configuration?

5. Discuss the analysis of HVDC-turbine generator torsional interactions?

6. Draw and explain the various types of static VAR compensator systems?

7. Explain detail unified power flow controller?

8. Explain the characteristics and analysis of six pulse converter with filter ?

9. Explain the operation of power factor improvement and synchronized operation with grid supply?

UNIT-IV

PART-A

1. Draw the flow chart for AC/DC load flow?

2. What are the difference between freewhelling diode and feedback diode?

3. List few industrial application of converter?

4. Draw v-I characteristics of svc?

5. What is three phase utility interface?

6. Difference between series and shut reactive power compensation?

7. Define compensation?

8. Write the application of FACTS?

9. Give three types of solar energy collectors.

10. Mention any two applications of solar energy.

11. Define solar insulation.

12. Define solar constant.

13. Define solar attitude angle.

14. Define incident angle.

15. Define collector efficiency.

16. Define solar energy.

17. What is diffuse radiation?

18. What are the instruments used for measuring solar radiation and sunshine?

19. What are the components of solar water heater?

20. Define PV effect.

21. What are the main element of a PV system

22. What is the principle of solar photovoltaic power generation?

23. What is the basic principle of wind energy conversion?

24. How are wind energy conversion (WEC) system classified?

25. Define Drift and drag.

26. Define Tip-speed ratio (TSR).

27. Define Horizontal axis wind turbine.

28. Define Vertical axis wind turbine.

29. What are the advantages and disadvantages of horizontal axis turbine?

30. What are the advantages and disadvantages of vertical axis turbine?

31. Why tower is tallest place in horizontal axis wind turbine system

PART-B

1. With neat diagram explain briefly about different schemes for PV energy conversion?
2. Discuss the various methods adopted in the power system to improve the power factor of the system?
3. Describe about the application of PV system i) Stand-alone system ii) Grid interactive system
4. Write short notes on (i) Solar distillation (ii) Solar pumping (iii) Solar cell arrays.
5. What are the main components of flate-plate solar collector explain the function of each.
6. What are the main component of concentrating solar collector explain the function of each.
7. Describe the main considerations in selecting a side for wind generator
8. Describe with a neat sketch the working of a wind energy system (WECS) with main components.
9. How are wind energy conversion (WEC) systems classified? Discuss in brief
10. Discuss advantages and disadvantages of a wind energy conversion system?
11. i) Explain in details about reactive power control?
    ii) Explain ion detail about UPFC?
12. Describe in details about various converter configurations?
13. Explain the operation of power factor improvement and synchronized operation with grid Supply

UNIT V

1. Define LCC
2. Define power flow analysis
3. What are the assumptions made in the derivation of equations representing AC/DC converter ?
4. Draw the basic model of converter for dc system model
5. Give the converter equations for the dc system model
6. What are constraints?
7. What is power system stability and classify it.
8. Basic principle of power modulation
9. define voltage stability
10. define transient stability

PART B

1. Give the overview of power flow analysis

2. Derive the flexible per unit system for dc system model

3. Explain the online power flow analysis for security control

4. Expound the power flow analysis with VSC based HVDC system

5. Draw the block diagram for rectifier and inverter controller

6. Give the modeling of dc network

7. Explain the classification of power system stability

8. What are the practical considerations in the application of power modulation controller and explain it.

9. Expound direct methods for stability evaluation

10. Expound the simulation of electromechanical transients