QUESTION BANK (K Scheme)

Name of subject: Fundamentals of Power Electronics
Course Title: FPE (313335) **Unit Test: I**
Semester: 3K **Program Code: EE**

CHAPTER 1: Power Electronic Devices (12 marks) (CO1)

2 marks

1. State the need of power Electronics.
2. Compare Ideal and Practical Switches.
3. Draw the Symbols of :
   i) SCR ii) IGBT iii) Power MOSFET iv) TRIAC
4. Define the terms related to SCR:
   (a)Latching current (b) Holding current
5. State any 4 applications of SCR.
6. State any 2 applications of Power MOSFET and TRIAC.
7. Draw I-V characteristics of IGBT.
8. Draw I-V characteristics of TRIAC.
9. Draw I-V characteristics of MOSFET.

4 marks

10. Draw and explain the general block diagram of power electronic system.
11. State any 4 advantages and disadvantages of power electronic system.
12. Explain the need and importance of switching in power electronic circuits.
13. Explain Ideal switch with conduction losses and switching losses of power Electronics.
14. Explain practical switch with conduction losses and switching losses of power Electronics.

15. Draw and explain construction and working principle of SCR.
16. Draw and explain I-V characteristics of SCR.
17. Describe with sketch the construction of IGBT.
18. Describe with sketch the construction of TRIAC.
19. Describe with sketch the construction of MOSFET.
20. Comparison of Power Devices (SCR, MOSFET,IGBT)

CHAPTER 2: Protection and Firing circuit of Thyristor (18 marks) (CO2)

2 marks

1. Explain Voltage clamping device.
2. State the need of protection circuits in SCR.
3. Explain the need of Thermal protection of SCR.
4. Explain the thermal resistance of SCR.
5. Explain and give any 4 specification of heat sink.
6. Give any 4 Features of SCR.
7. Explain Heat Sink in brief.
8. Define triggering. List the type triggering.
9. Explain Light (illumination/Radiation) Triggering method of SCR
10. State the meaning of Commutation.
11. Explain the conditions of successful Commutation.

4 marks

12. Draw & explain the di/dt protection (Turn ON Snubber circuit).
13. Draw & explain the dv/dt protection (Turn OFF Snubber circuit).
14. Explain with neat diagram Overvoltage protection (Internal and External overvoltage).
15. Explain with neat diagram Overcurrent protection (Internal and External overvoltage).
16. Explain the operation of crowbar protection circuit with Diagram.

17. Explain with neat diagram general layout of firing scheme
18. Explain the thermal (Temperature) triggering method for SCR.
19. Explain the Gate triggering method for SCR.
20. Explain the Forward Voltage triggering method for SCR.
21. Explain the dv/dt triggering method for SCR.
22. Explain the operation of Resistance (R) firing circuit with neat diagram.
23. Explain the operation of RC Firing circuit with neat diagram.
24. Explain the operation of Pulse Transformer Based Triggering circuit with neat diagram.
25. Explain Load Commutation(ClassA) Method with neat diagram.
26. Explain Line Commutation (Class F) Method with neat diagram.

CHAPTER 3: Controlled Converters (22 marks) (CO3)

2 marks

1) Draw and Explain block diagram of controlled Rectifier.
2) Define :- i) Voltage across switch ii) Source voltage
3) Define Firing Angle or Phase Angle (α) with proper waveform.
4) Define Conduction Angle (θ) with proper waveform.
5) Compare controlled and uncontrolled Rectifiers (4 Points).
6) Compare controlled H.W.R and controlled F.W.R (4 Points).

4 marks

7) Draw the circuit diagram; and explain the working principle of single phase half wave convertor with resistive load. Draw the waveform across load for firing angle 90° degree
8) Draw the circuit diagram; and explain the working principle of single phase half wave convertor with RL load. Draw the waveform across load for firing angle 90° degree
9) State the function of freewheeling diode in convertor with a neat diagram.

10) Draw and explain the single phase full wave controlled bridge rectifier with Resistive load (R).
11) Draw and explain the single phase full wave controlled bridge rectifier with RL load
12) Draw and explain the Three phase full wave controlled bridge rectifier with Resistive load (R).