**QUESTION BANK (I Scheme)**

**Name of subject: Fundamentals of Power Electronics**

**Course Title: FPE (22326)**  **Unit Test: I**

**Semester: 3I Program Code: EE**

**CHAPTER 1: Power Electronic Devices (06 marks) (CO1)**

**2 marks**

1. Draw the symbol and transfer characteristics of IGBT.
2. Define primary and secondary breakdown in power transistor.

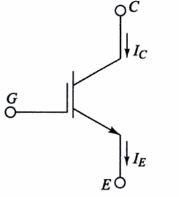
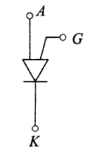
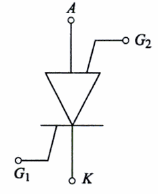
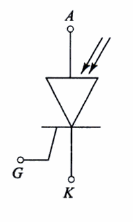
**4 marks**

1. Describe with sketch the construction of IGBT.
2. Draw the V-I characteristics of power transistor. Explain Quasi-saturation and hard saturation.
3. Explain the concept of SET in aspects of Nano-technology.

**CHAPTER 2: Thyristor Family Devices (17 marks) (CO2)**

**2 marks**

1. Interpret the following power electronic devices.



1. (b) (c) (d)
2. State the main difference between PUT & UJT.
3. State the difference between GTO and conventional thyristor in terms of commutation and also state any two advantages over conventional Thyristor.
4. Compare SCR & TRIAC (any four).
5. Define the terms related to SCR:
6. Latching current (c) Holding current
7. On state voltage (d) reverse break over voltage.

**4 marks**

1. Draw & explain the characteristics of SCR. State the effect of gate current on operation of SCR?
2. Explain two transistor analogy of SCR. Write relation between anode current and Gate current.
3. Describe SCR mounting and cooling with sketch.
4. Draw the constructional diagram of GTO & explain its operation.
5. Draw a structure of TRIAC with doping levels. Write operating principle and give two applications of it.
6. Compare UJT & PUT on the basis of
7. Construction
8. Symbol
9. Working Principle
10. V-I characteristics
11. Applications.
12. Explain the operation of DIAC.
13. State the need of protection circuits. Draw the basic diagram for: di/dt protection and dv/dt protection.
14. Explain the operation of crowbar protection circuit with diagram.

**CHAPTER 3: Turn ON and Turn OFF methods of Thyristors (14 marks) (CO3)**

**2 marks**

1. Define commutation. State the types of commutation.
2. What is the need of isolation in pulse transformer in triggering circuits and give its two applications.
3. Define triggering. List the type of triggering. Which method is mostly preferred?
4. Differentiate between Natural and Forced commutation (any four).

**4 marks**

1. Show the effect of resistance variations on firing & conduction angle with waveform in RC triggering.
2. Explain the working of resistance triggering with neat waveforms.
3. Draw & explain the operation of UJT relaxation oscillator. Write the expression for frequency.
4. Draw class A commutation circuit with its neat waveform.
5. Draw and explain the circuit diagram of Class C commutation.
6. Explain the operation of opto coupler based triggering circuit with neat diagram.