

Seat No. **MAR\_APR 2025 SUMMER EXAMINATION****11731 Bachelor of Technology (NEP-2.0)****Sub. Name: Power Electronics****Sub. Code: 81648/81858****Day and Date: MAY ,15-05-2025****Total Marks: 70****Time: 02:30 PM To 05:00 PM**

- Instructions:**
1. All questions are compulsory
  2. Figures to the right indicate full marks
  3. Use Sketches/Diagrams wherever necessary
  4. Use of Scientific calculator is allowed

**Q1) Solve following MCQ.****[14]**

- i. In a Class B turn-off method for SCR, the device is turned off by:
  - A. Self commutation using LC circuit
  - B. Reverse current
  - C. Resonant pulse
  - D. Line commutation
- ii. In a full-wave controlled converter, the average output voltage is maximum when:
  - A. Firing angle is  $0^\circ$
  - B. Firing angle is  $45^\circ$
  - C. Firing angle is  $90^\circ$
  - D. Firing angle is  $180^\circ$
- iii. Which technique is used for harmonic reduction in inverters?
  - A. Full-wave rectification
  - B. Voltage clamping
  - C. Sinusoidal PWM
  - D. Commutation
- iv. A step-up chopper increases:
  - A. Current
  - B. Frequency
  - C. Voltage
  - D. Power
- v. An AC voltage stabilizer of relay type works based on:
  - A. Transformer tap changing
  - B. MOSFET switching
  - C. IGBT control
  - D. Capacitor switching

- vi. Dielectric heating is commonly used for:
- A. Metal welding
  - B. Plastic sealing
  - C. AC motor control
  - D. Battery charging
- vii. The  $dv/dt$  protection in SCR is provided by:
- A. Resistor
  - B. Inductor
  - C. Capacitor
  - D. Snubber circuit

**Q2) Solve Any two Questions below [14]**

- a. Explain the Class B and Class C turn-off methods for SCR with circuit diagrams. [7]
- b. Discuss any two SCR turn-on methods with neat diagrams. [7]
- c. Explain the operation of a full-controlled bridge rectifier and derive the expression for average output voltage. [7]

**Q3) Solve Any two Questions below [14]**

- a. Compare and contrast the characteristics of Power MOSFET and IGBT. [7]
- b. Explain the working of PUT-based SCR triggering circuit. [7]
- c. A Single Phase semiconverter operated from 230V at 50Hz, if  $\alpha = \pi/4$ . find out [7]  
a) average output voltage b) RMS output voltage c) Form factor d) Ripple Factor

**Q4) Solve Any two Questions below [14]**

- a. What is PWM technique? Discuss sine PWM and multiple PWM techniques [7]
- b. Describe voltage commutated chopper circuit with a neat diagram and waveforms. [7]
- c. Describe the operation and application of induction heating [7]

**Q5) Solve Any two Questions below [14]**

- a. Describe the harmonic reduction techniques used in inverters. [7]
- b. Explain the working of Jones chopper. [7]

- c. Explain the working of SMPS and its industrial applications.

## **End Of Question Paper**

**Important Note for Chief Exam Officer / SRPD Coordinator / Sr Supervisor/ Student -**

This Question Paper may be distributed for following Subjects as common code.

सदरची प्रश्नपत्रिका खालील विषयांकरिता वितरित करता येईल.

- 1] (101) Bachelor of Engineering (81858) Power Electronics Part 3 SEM 6
- 2] (1154) B.Tech. CBCS (81648) Power Electronics Part 3 SEM 6