

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

MSc DEGREE EXAMINATION MAY 2019
(First Semester)

Branch - APPLIED ELECTRONICS

POWER ELECTRONICS

Time : Three Hours

Maximum : 75 Marks

SECTION-A (10 Marks)

Answer ALL questions

ALL questions carry EQUAL marks ' (10 x 1 = 10)

- 1 In a IGBT, the p⁺ layer connected to the collector is called as the _____ layer.
(i) drift (ii) injection
(iii) body (iv) collector
- 2 In a GTO, the n⁺ layer forms the _____ .
(i) anode & gate (ii) cathode & gate
(iii) cathode (iv) gate
- 3 The natural reversal of AC supply voltage commutates the SCR in _____.
(i) forced commutation (ii) only line commutation
(iii) only natural commutation (iv) both line & natural commutation
- 4 The value of anode current required to maintain the conduction of an SCR even though the gate signal is removed is called _____ current.
(i) holding (ii) latching
(iii) switching (iv) peak anode
- 5 High frequency gating uses a _____.
(i) train of pulses (ii) continuous gating block
(iii) carrier signal (iv) dc voltage
- 6 Solid State Relays consists of a (an) _____.
(i) coil and contact arrangement (ii) optocoupler
(iii) SCR (iv) SCS
- 7 If the duty cycle of a step-up chopper is increased, the average value of the output voltage _____.
(i) increases (ii) decreases
(iii) remain the same (iv) becomes zero
- 8 Find the output voltage of a step-up chopper operated at 50% duty cycle with $V_s = 240$ V.
(i) 240 V (ii) 480 V
(iii) 560 V (iv) 120 V
- 9 In the three-phase bridge inverter, each step consist is of
(i) 30° (ii) 60°
(iii) 90° (iv) 45°
- 10 A current Source Inverter converts _____.
(i) the input DC current to an AC current at output
(ii) the input AC current to DC current at output
(iii) the input DC current to amplified DC current at the output
(iv) the input AC current to amplified AC current at the output.

SECTION - B (35 Marks)

Answer **ALL** Questions

ALL Questions Carry **EQUAL** Marks (5 x 7 = 35)

- 11 a Justify the use of UJTs in TRIAC triggering circuits.
OR
b Illustrate the basic structure and operation of Insulated Gate Bipolar Transistor.
- 12 a Evaluate the advantages of Resonant Pulse commutation.
OR
b State the features of Controlled Rectifiers.
- 13 a Illustrate the operation of Reversing switches.
OR
b Discuss about the principles of On - OFF Control.
- 14 a Explain the operation of Current Commutated Chopper.
OR
b Analyze the functions of MOSET' based choppers.
- 15 a Sketch the block diagram of a Current source inverter and explain the operation.
OR
b Show how does the Rotor resistance control is performed in AC drives.

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SECTION - C (30 Marks)

Answer any **THREE** Questions

ALL Questions Carry **EQUAL** Marks (3 x 10 = 30)

- 16 Construct a speed control circuit for DC Shunt motor using thyristors.
- 17 Analyze the complementary commutation of SCRs using neat diagram.
- 18 Classify the type of AC switches and evaluate the operation of a 3-phase AC switch.
- 19 Elucidate the operation of voltage commutated chopper with bloc diagram.
- 20 Differentiate between convertor and chopper fed DC drives.

Z-Z-Z

END