

2101171

BACHELOR OF VOCATION
Robotics and Automation
Subject: Power Electronics & Drives
Subject Code: DBEE-307
Semester: Fifth
January 2021
Theory (External): 35 Marks
Time: 03 Hours

Instructions to the Students

1. This Question paper consists of two Sections. All sections are compulsory.
2. Section A comprises 10 questions of objective type in nature. All questions are compulsory. Each question carries 1 mark.
3. Section B comprises 8 essay type questions out of which students need to do any 5. Each question carries 5 marks.
4. Read the questions carefully and write the answers in the answer sheets provided.
5. Do not write anything on the question paper.
6. Wherever necessary, the diagram drawn should be neat and properly labelled

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SECTION -A (SHORT/OBJECTIVE TYPE QUESTIONS)
(10x1=10 Marks)

- A How is SCR turned off ?
- B Define extinction angle .
- C What are the effects of freewheeling diode.
- D Why power factor of semi converter is better than full converter?
- E What is constant frequency control of chopper?
- F How di/dt and dv/dt protection is accomplished in SCR
- G What is sequence control in single phase ac voltage controllers?
- H Write two points on closed loop control of DC drives .
- I Differentiate a Current source inverter from a Voltage source Inverter
- J Why IGBT's are becoming famous in power electronics application.

SECTION – B (ESSAY TYPE QUESTIONS)

(5×5 = 25)

- 1 Define holding current and latching current of SCR. Show these currents on the static VI characteristics of SCR.
- 2 Explain a half-wave controlled rectifier feeding RL load, with waveforms of output voltage and output current. Derive the expression for average output voltage.
- 3 Describe the working of a three phase voltage source inverter with an appropriate circuit diagram.
- 4 For a type A chopper, dc source voltage is 230 V, load resistance 10 Ω , drop across the switch is 2V and duty cycle 0.4. Calculate average and RMS value of output voltage and chopper efficiency.
- 5 Compare Thyristor , Power MOSFET and IGBT on the basis of following parameters:
i) Switching frequency ii) Voltage and current ratings.
- 6 Explain the basic working of an ideal Dual converter and its four-quadrant operation.
- 7 A single phase semi-converter fed from 120 V, 50 Hz supply is connected to a load resistance of 10 Ω . If the average output voltage is 25% of its maximum possible average output voltage, find the circuit turn off time.
- 8 How four-quadrant operation is achieved in a Type E Chopper? Explain with neat circuit diagram.

==END OF PAPER==