

Enrollment No.....



Faculty of Engineering
End Sem (Odd) Examination Dec-2018
OE00003 Industrial Electronics

Programme: B.Tech.

Branch/Specialisation: All

Duration: 3 Hrs.**Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d.

- Q.1 i. A triac is a _____ switch **1**
 (a) Bidirectional (b) Unidirectional
 (c) Mechanical (d) None of these
- ii. What is basically a two-terminal parallel-inverse combination of semiconductor layers that permits triggering in either direction? **1**
 (a) DIAC (b) TRIAC (c) QUADRAC (d) Shockley Diode
- iii. An SCR is a _____ triggered device. **1**
 (a) Current (b) Power (c) Voltage (d) Noise
- iv. A technique use to turn off a thyristor using an external circuit which causes the anode to become negatively biased. **1**
 (a) Force commutation (b) Reverse triggering
 (c) Negative feedback (d) Doping
- v. The load voltage of a chopper can be controlled by varying the **1**
 (a) Duty cycle (b) Firing angle
 (c) Reactor position (d) Extinction angle
- vi. A Zener diode is used as a _____ voltage regulation device. **1**
 (a) Shunt (b) Series (c) Shunt series (d) None of these
- vii. The ac output voltage waveform of VSI and AC output current waveform of CSI respectively is composed of **1**
 (a) High dv/dt , low di/dt (b) Low dv/dt , low di/dt
 (c) Low dv/dt , high di/dt (d) High dv/dt , high di/dt
- viii. Single phase VSI are mainly used in **1**
 (a) Power supplies (b) UPS
 (c) Multilevel configuration (d) All of these

- ix. A cycloconverter is a _____ **1**
 (a) One stage power converter.
 (b) One stage voltage converter.
 (c) One stage frequency converter.
 (d) None of these
- x. Single phase mid-point type cycloconverter uses _____ number of SCR. **1**
 (a) 4 (b) 8 (c) 6 (d) None of these
- Q.2 i. Draw the characteristic of SCR. **2**
 ii. Explain the construction feature of power diode. **3**
 iii. Explain the turn on and turn off switching characteristic of SCR. **5**
- OR iv. Discuss the working of Triac with diagram and write its applications **5**
- Q.3 i. How thyristor can be turned off? **2**
 ii. Explain class A and Class B commutation circuits with neat diagram **8**
- OR iii. Explain the use of freewheeling diode in controlled rectifier with suitable waveform. **8**
- Q.4 i. Explain the basic principle of chopper. **3**
 ii. Explain buck converter and boost converter with suitable diagram. **7**
- OR iii. Explain working of series and shunt voltage regulator with diagram. **7**
- Q.5 i. Describe the working of single phase half bridge inverter. **4**
 ii. Explain working of voltage source inverter. **6**
- OR iii. Explain working of current source inverter. **6**
- Q.6 Attempt any two:
 i. Write different industrial application of cycloconverter. **5**
 ii. Describe the operating principle of single phase to single phase step up cycloconverter. **5**
 iii. What are AC voltage controllers? Enumerate its merits and demerits. **5**

P.T.O.

Marking Scheme
OE00003 Industrial Electronics

- Q.1 i. A triac is a _____ switch **1**
(a) Bidirectional
- ii. What is basically a two-terminal parallel-inverse combination of semiconductor layers that permits triggering in either direction? **1**
(b) TRIAC
- iii. An SCR is a _____ triggered device. **1**
(a) Current
- iv. A technique use to turn off a thyristor using an external circuit which causes the anode to become negatively biased. **1**
(a) Force commutation
- v. The load voltage of a chopper can be controlled by varying the _____ **1**
(a) Duty cycle
- vi. A Zener diode is used as a _____ voltage regulation device. **1**
(a) Shunt
- vii. The ac output voltage waveform of VSI and AC output current waveform of CSI respectively is composed of _____ **1**
(d) High dv/dt, high di/dt
- viii. Single phase VSI are mainly used in _____ **1**
(d) All of these
- ix. A cycloconverter is a _____ **1**
(c) One stage frequency converter.
- x. Single phase mid-point type cycloconverter uses _____ number of SCR. **1**
(a) 4

- Q.2 i. Characteristic of SCR. **2**
- ii. Construction feature of power diode. **3**
- iii. Turn on switching characteristic with diagram **2.5 marks 5**
Turn off switching characteristic with diagram **2.5 marks**
- OR iv. Working of Triac **2 marks 5**
Diagram **1 mark**
Applications **2 marks**

- Q.3 i. Thyristor can be turned off **2**

- ii. Class A commutation with diagram **4 marks 8**
Class B commutation with diagram **4 marks**
- OR iii. controlled rectifier working **4 marks 8**
suitable waveform **2 marks**
controlled rectifier diagram **2 marks**
- Q.4 i. Principle of chopper. **3**
- ii. Buck converter **3.5 marks 7**
Boost converter **3.5 marks**
- OR iii. Shunt voltage regulator wtih diagram **3.5 marks 7**
Series voltage regulator wtih diagram **3.5 marks**
- Q.5 i. Working of single phase half bridge inverter **2 marks 4**
Diagram of single phase half bridge inverter **2 marks**
- ii. Voltage source inverter working **4 marks 6**
Diagram **2 marks**
- OR iii. Current source inverter working **4 marks 6**
Diagram **2 marks**
- Q.6 Attempt any two:
- i. Industrial application of cycloconverter. **5**
- ii. Principle of cycloconverter **3 marks 5**
Diagram **2 marks**
- iii. AC voltage controller **2 marks 5**
Merits **1.5 marks**
Demerit **1.5 marks**
