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Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech.(Automation & Robotics) (2012 & Onward) (Sem.-4)****POWER ELECTRONICS & MOTORS****Subject Code : BTAR-401****M.Code : 63014****Time : 3 Hrs.****Max. Marks : 60****INSTRUCTION TO CANDIDATES :**

1. **SECTION-A** is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. **SECTION-B** contains **FIVE** questions carrying **FIVE** marks each and students have to attempt any **FOUR** questions.
3. **SECTION-C** contains **THREE** questions carrying **TEN** marks each and students have to attempt any **TWO** questions.

**SECTION-A****1. Answer briefly :**

- a) Draw symbol and V-I characteristics of SCR.
- b) Why TRIAC is preferred over DIAC?
- c) How the inductive load affects the output voltage and current in controlled rectifiers?
- d) List the applications of choppers.
- e) Explain the basic difference between voltage - source inverter and current - source inverter.
- f) What is snubber circuit?
- g) What are the causes of overvoltages in thyristors circuits?
- h) What is the need of freewheeling diode? Show its effect with the help of waveform.
- i) What is pulse width modulation control method in inverters?
- j) What is duty cycle in choppers?

**SECTION-B**

2. Draw and explain the two transistor model of SCR.
3. Why equalizing networks are required in series connection of SCRs?
4. What do you mean by commutation of SCR? Explain class-A and class-B methods.
5. Explain single-phase to single-phase step-down cycloconverter with discontinuous load current by showing its waveforms.
6. Draw and explain three-phase bridge inverter using  $180^\circ$  mode VSI. Draw its waveforms upto first four steps along with relevant circuits. Also draw waveforms for  $V_{ab}$ ,  $V_{bc}$ ,  $V_{ca}$ .

**SECTION-C**

7.
  - a) Describe various operating modes of SCR with the help of proper diagrams.
  - b) Explain the method to control the speed of DC motor drives.
8.
  - a) Why 3-phase to 1-phase cycloconverter requires positive and negative group phase-controlled converters? How should the firing angles of the two converters be controlled?
  - b) Discuss the working of a current-commutated chopper with relevant voltage and current waveforms.
9. Describe modified McMurray full - bridge single - phase inverter with relevant voltage and current waveforms.

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**