0539

Code : 9EC-51

Register Number | | | | | | 90 | 76 |

V Semester Diploma Examination May, 2012

E & C BOARD

INDUSTRIAL AUTOMATION

Time : 3 Hours] **[Max. Marks : 100**

Instructions : (1) Section – **I** is *compulsory*.

(2) Answer any **two** main questions from each of the remaining sections.

SECTION – I

1. (a) Fill in the blanks : **5**

   (i) IGBT is a _____ controlled device.

   (ii) Average value of output voltage of SCR can be controlled by controlling the _____.

   (iii) Step-up chopper operates in _____ quadrant.

   (iv) _____ commutation does not need any external circuitry.

   (v) PID stands for _____.

   (b) Sketch & explain the structure and characteristics of GTO. **5**

SECTION – II

2. (a) With neat structural diagram explain the characteristics of IGBT. **8**

   (b) Explain the working principle of Reverse recovery diode. **4**

   (c) List the classification of power semiconductor diodes. **3**

3. (a) Explain the working principle of triac with neat circuit diagram. **6**

   (b) Explain how SCR can be triggered using UJT relaxation Oscillator. **5**

   (c) Explain auxiliary commutation using neat diagram. **4**

4. (a) Explain single phase fullwave mid point controlled rectifier with neat circuit and waveform. **8**

   (b) Explain light dimmer circuit using diac with neat circuit. **7**

[Turn over

SECTION – III

5.	(a)	Define chopper and give its classification.	4
	(b)	Explain two quadrant class D chopper.	6
	(c)	Explain briefly the control schemes of chopper.	5
6.	(a)	Explain the working principle of basic series inverter.	7
	(b)	Explain the operation of dual converter circuit.	5
	(c)	Explain single PWM with waveform.	3
7.	(a)	Explain speed control of DC motor using field control method.	8
	(b)	Explain over voltage protection of motor.	4
	(c)	List the advantages of electronic control of motor.	3

SECTION – IV

8.	(a)	With the help of block diagram, explain the PLC System.	6
	(b)	Explain briefly PLC Scanning.	3
	(c)	List the advantages of PLC over relay logic.	6
9.	(a)	Explain OR gate and its PLC logic equivalent.	5
	(b)	Explain briefly input and output register.	5
	(c)	Explain PLC counter with an example.	5
10.	(a)	Brief out move and basic number comparision functions with an example.	5
	(b)	Explain the necessity of PID in process control and explain its principle of operation with neat diagram.	6
	(c)	Explain PID module with block diagram.	4

0548

Code : 9EC-51

Register Number | 1 | 1 | 9 | E | C | 0 | 9057

V Semester Diploma Examination, November 2011

E & C BOARD

INDUSTRIAL AUTOMATION

Time : 3 Hours] **[Max. Marks : 100**

Instructions : (1) Section – I is *compulsory*.
(2) Answer **six** full questions choosing any **two** full questions each from Section – II, III and IV.

SECTION – I

1. (a) Fill in the blanks : 5
   (i) A UJT after reaching valley point goes into _____ state.
   (ii) An SCR will be turned off using _____ circuit.
   (iii) Step up chopper operates in _____ quadrant
   (iv) PLC stands for _____.
   (v) _____ register holds the contents of calculation on PLC.

   (b) What is a cycloconverter ? List its application. 5

SECTION – II

2. (a) Explain the working principle of SCR. 6
   (b) Mention the advantages of Triac over SCR. 3
   (c) List Turn on methods of an SCR and explain any one of them. 6

3. (a) Briefly explain the working and VI characteristic of Diac. 6
   (b) Explain the following terms : 6
   (i) Natural commutation
   (ii) Forced commutation
   (iii) Resonant commutation
   (c) Write the neat circuit diagram of SCR being triggered by UJT. 3

4. (a) Explain three phase full wave controlled rectifier circuit along with input and output waveforms. 10
   (b) Explain variable DC link inverter with block diagram. 5

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SECTION – III

5. (a) Classify the inverters based on commutation and explain. 5

   (b) Explain the principle of operation of single phase to single phase cycloconverter. Draw the required waveforms also. 10

6. (a) Explain the basic principle of chopper operations. 7

   (b) Explain the operation of two quadrant DC choppers. 4

   (c) Explain briefly PWM technique used in inverters. 4

7. (a) List the advantages of electronic control of electric devices. 4

   (b) Explain over voltage protection of DC motors. 3

   (c) With neat block diagram explain the field control method for speed control of DC motor. 8

SECTION – IV

8. (a) List the type of counters used in PLC and explain. Write the relative diagrams. 9

   (b) With neat block diagram explain PID module used in PLC. 6

9. (a) With relevant diagram explain the jump functions used in PLC programming. 7

   (b) List the timer types used in PLC and explain each of them with neat diagram. 8

10. (a) Explain in detail with relevant diagrams the move functions used in PLC programming. 6

    (b) With neat diagram show and explain general levels of control of an industry used in PLC networking. 9