

GANPAT UNIVERSITY

B. Tech. Semester: IV Mechanical Engineering

Regular Examination May– June 2014

2ME403 INDUSTRIAL ELECTRONICS

Time: 3 Hours

Total Marks: 70

Instruction:

- 1). All questions are **compulsory**.
- 2). Figures to the **right** indicate full marks.
- 3). Answers to the two sections must be written in **separate answer books**.
- 4). Assume all necessary data.

SECTION-I

- Que-1 Attempt All.** 12
- (A) Derive necessary equations for diodes with RLC loads. 4
- (B) Explain the phenomenon of Reverse Recovery with necessary equations. 4
- (C) Explain parallel inverter in detail. 4
- OR**
- Que-1 Attempt All.** 12
- (A) Explain V-I characteristics of Thyristor with its symbol and internal structure. 4
- (B) What is TRIAC? Explain its V-I characteristics with symbol and internal structure. 4
- (C) What is the function of full wave rectifier? Write down its performance parameters, equations only. 4
- Que-2 Attempt All.** 11
- (A) Describe function of freewheeling diode. 3
- (B) Explain Parallel operation of Thyristor. 4
- (C) In a light-activated turn OFF circuit an LDR is connected in series with a resistance of 30k. The values of current flowing in the circuit under illumination and dark conditions are 7.65mA and 1mA respectively. Find out the resistance of the LDR in (i) illumination condition, (ii) dark condition. The supply voltage is 230 V AC. 4
- OR**
- Que-2 Attempt All.** 11
- (A) A series inverter circuit has output frequency of 50Hz. The time gap between turn off of one SCR and turn on of other SCR is 20msec. Calculate (i) time period of oscillation, (ii) the resonance frequency. 3
- (B) How can a thyristor be split in two transistor model? 3
- (C) Explain triggering of thyristor by using UJT with necessary circuit and waveforms. 5

- Que-3 Attempt All.** 12
- (A) How can DIAC and TRIAC be used to control the illumination? 4
- (B) Explain different methods to Turn-on a thyristor. 4
- (C) Write short note on current commutation in Bridge inverters. 4

SECTION-II

- Que-4 Attempt All.** 12
- (A) List main three control types of PLC with their functions. 4
- (B) Describe proper chemical mixing in a tank using PLC with figure. 4
- (C) Define PLC. Explain its block diagram. 4

OR

- Que-4 Attempt All.** 12
- (A) Describe Automatic Water level Indicator using Thyristor. 4
- (B) What is the function of cycloconverter? Explain center tapped transformer configuration of cycloconverter. 4
- (C) Describe the use of dual converter to control speed of dc motor. 4

- Que-5 Attempt All.** 11
- (A) Write short note on McMurray inverter. 4
- (B) Explain dc chopper speed control with block diagram. 4
- (C) Explain speed control of single phase induction motor using TRIAC. 3

OR

- Que-5 Attempt All.** 11
- (A) What is Microprocessor ? Explain its block diagram. 4
- (B) Explain different types of registers in microprocessor. 4
- (C) What is the difference between PLC and Microprocessor ? 3

- Que-6 Attempt All.** 12
- (A) Explain field control method of speed control of dc motor with block diagram. 4
- (B) Explain speed control of dc motor using bridge rectifier. 4
- (C) Explain armature voltage control method with its features. 4

END OF PAPER