Morning
Date-07/5/2016

Exam No: _____

GANPAT UNIVERSITY

B. TECH SEM- IV MECHANICAL

REGULAR EXAMINATION–APRIL-JUNE 2016

2MC405: Industrial Electronics

TIME: 3 HRS **TOTAL MARKS: 60**

Instructions: (1) This Question paper has two sections. Attempt each section in separate answer book.
(2) Figures on right indicate marks.
(3) Be precise and to the point in answering the descriptive questions.

SECTION: I

Q.1

(a) Explain time ratio control strategy for chopper. **(05)**

(b) A step-up chopper has input voltage of 230 V and output voltage of 690 V. If the conducting time of thyristor chopper is 120 μS, compute the pulse width of output voltage. In case output voltage pulse width is half for constant frequency operation find the average value of new output voltage. **(05)**

OR

Q.1

(a) Give detail explanation for Type-A chopper and Type-B chopper. **(05)**

(b) For type-A chopper a dc source voltage is 230 V, load resistance is 20 Ω. Take a voltage drop of 2.5 V across chopper when it is on. For a duty cycle of 0.4, calculate **(05)**
1) Average and RMS values of output voltage and
2) Chopper efficiency.

Q.2

(a) Describe single phase half bridge and full bridge inverter with its advantages and disadvantages. **(05)**

(b) Discuss with the help of a circuit diagram the scheme for speed control of a universal motor. **(05)**

OR

Q.2

(a) Explain speed control of single phase induction motor using TRIAC. **(05)**

(b) A single phase full bridge inverter is connected to an RL load for a dc source voltage of Vs and output frequency ($f = 1/T$) obtain the expression for load current as a function of time for the first two half cycles of the output voltage. Derive the expression for steady-state current for the first two half cycles. **(05)**

Q.3 Do as directed

(a) Draw the circuit with LC load with diode and derive the equation for current, voltage across capacitor, load voltage and voltage across diode. **(03)**

(b) For the circuit diode with LC load consider $Vs = 220\ V$, $L = 4\ mH$, $C = 5\ \mu F$. Find the diode conduction time and peak diode current. Determine also Vc, V_L and V_D after diode stop conducting. **(03)**

(c) What is overload protection of dc motor. **(04)**

(P.T.O.)

SECTION: II

Q.4

(a) Define PLC. Explain its block diagram. (05)

(b) Explain different operating modes of dc drives. (05)

OR

Q.4

(a) Describe in detail V-I characteristics of Thyristor with its symbol and internal structure. (05)

(b) Give the name of different programming method for PLC. Explain any two. (05)

Q.5

(a) Define Latching current, Holding current and Gate current of thyristor. (05)

(b) What is DIAC? Draw its symbol and explain its V-I characteristics. (05)

OR

Q.5

(a) What is TRIAC? Draw its symbol and explain its V-I characteristics. (05)

(b) Differentiate between Microprocessor and Microcontroller. (05)

Q.6

(a) How can a thyristor be split in two transistor model? (03)

(b) Explain Parallel operation of Thyristor. (03)

(c) Describe two types of commutation in Thyristor. (04)

----------END OF PAPER----------