BB-5425/5426

B. E. III (Sem. VI) (ECC) Examination

May / June – 2006

Industrial Electronics

Time : 3 Hours] [Total Marks : 100

BB - 5425

Instructions :

(1)

નીચે દર્શાવેલ ☛ નિશાનીવાળી વિગતો ઉત્તરવહી પર અવશ્ય લખવી.
Fillup strictly the details of ☛ signs on your answer book.

Name of the Examination :

☛ B. E. 3 (Sem. 6) (ECC)

Name of the Subject :

☛ Industrial Electronics

☛ Subject Code No. : 5 4 2 5 ☛ Section No. (1, 2,.....) : 1

Seat No. :

Student's Signature

1 (a) Explain the advantages and disadvantages of BJT, MOSFET, Thyristor and IGBT semiconductor devices in power electronics applications. 8

(b) Discuss different methods of triggering thyristors, and explain each in brief. 10

2 (a) Explain dynamic characteristics of thyristor and its significance in power electronics circuits. 6

(b) Discuss the conditions which must be satisfied for turning ON and SCR with a gate signal. 5

(c) Design an UJT relaxation oscillator, using UJT having following characteristics. η = **0.7**, I_v = **6mA**, V_v = **2 V**, I_p = **50** μ**A**, **Vbb = 20V**, **Rbb = 7K ohm**, **leo = 2 mA**, take C = **0.1** micro farad. Also determine limits for the output frequency of oscillator. 5

OR

2 (a) Classify different methods of commutations for thyristors. Explain each in brief. 8

(b) Explain any five ratings of thyristor and explain in brief. 5

(c) Class A commutation technique cannot be used always-justify. 3

3 (a) For a single phase full converter explain the reduction in the O/P voltage due to the source inductance. Also derive the expression for O/P voltage with effect of source inductance. 8

(b) What is dual converter? Explain the practical dual converter. 8

OR

3 (a) Describe the working of single phase half controlled bridge converter using resistive load and resistive-inductive load. 10

Derive expression for average load voltage, average load current, and RMS load voltage.

(b) Explain the effect of battery load on the performance of single phase fully controlled bridge converter. 6

BB - 5426

Instructions :

(1)

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Name of the Examination :

☛ B. E. 3 (Sem. 6) (ECC)

Name of the Subject :

☛ Industrial Electronics

☛ Subject Code No. : 5 4 2 6 ☛ Section No. (1, 2,.....) : 2

Seat No. :

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4 (a) Explain the principle of chopper operation and its control strategies. 10

(b) A step-up chopper has input voltage if 200 V and o/p voltage of 660 V. If a non conducting time of thyristor chopper is 100 μsec. Compute the pulse width of output voltage. In case pulse width is halved for constant frequency operation. Find the new o/p voltage. 6

5 (a) Draw a circuit for single phase Mc Murray bridge Inverter and explain the commutation process with neat waveforms. 10

(b) Why is modulation required in Inverter circuit ? Describe multiphase modulation technique for Inverters with suitable example or derivation, prove that multi pulse modulation technique is superior to signal pulse modulation. 8

OR

5 (a) Explain the single phase full bridge Inverter connected to RL load. 10

(b) Why voltage control is required in Inverters? Discuss briefly different methods of voltage control for 1-Φ Inverters. 8

6. Write short notes on any **two** : 16

(a) Schemes for D C motor speed control

(b) Closed loop control of speed of DC drives

(c) Jones chopper

(d) Schemes for induction motor speed control.