

6E6053

Roll No. _____

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B. Tech. VI-Sem. (Main/Back) Exam., April/May-2016

Electronics & Communication Engineering

6EC3A Industrial Electronics

Common with AI, EC, EI

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks (Main & Back): 26

Instructions to Candidates:-

Attempt any five questions, selecting one question from each unit. All Questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly.

Units of quantities used/ calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205)

1. NIL

2. NIL

UNIT-I

Q.1 (a) Describe the reverse recovery characteristics of power diode and derive expression of reverse recovery time. [8]

(b) Latching current for an SCR, inserted in between a dc voltage source of 200V and the load is 100mA. Compute the minimum width of gate pulse current required to turn on SCR in case of load consist of - [8]

(i) $R = 20\Omega$ in series with $L = 0.2H$

(ii) $R = 20\Omega$ in series with $L = 2.0H$

OR

- Q.1 (a) Draw the basic structure of IGBT and explain its working. [8]
- (b) Define the following terms - [8]
- (i) Critical rate of rise of voltage.
- (ii) Finger voltage.

UNIT-II

- Q.2 (a) A single phase bridge converter is connected to RLE Load. For continuous load current draw the source voltage, output voltage, load current, source current as a function of time. [10]
- (b) Explain the working of single phase half wave circuit with RL Load and freewheeling diode. [6]

OR

- Q.2 (a) Explain in detail three phase converters. [8]
- (b) Describe voltage control technique in inverter. [8]

UNIT-III

- Q.3 (a) What is class C chopper? Explain the basic operating principle of class C chopper with circuit diagram. [6]
- (b) A step up chopper has input voltage 220V & output voltage 660V. If the non conducting time of thyristor chopper is 100us, compute the pulse width. [10]

OR

- Q.3 (a) Explain the circuit diagram of switch mode power supply. [10]
- (b) Differentiate between step up & step down chopper. [6]

UNIT-IV

- Q.4 (a) Define the term DC motor. How can we control the speed of 2-phase induction motors? [8]
- (b) Explain chopper control in DC series motor. [8]

OR

- Q.4 (a) Explain circuit diagram, quadrant diagram and waveforms of single phase half wave converter drives. [8]
- (b) A Three phase 400V, 15kw, 1440 rpm, 50 Hz star connected induction motor leakage impedance of $0.4 + j 1.6\Omega$ stator impedance and rotational losses are assumed negligible. If this motor is energized from 120 Hz 400V, 3-phase source then calculate - [8]
- (i) Motor speed at rated load
- (ii) The slip at which maximum Torque occurs. .

UNIT-V

Q.5 Write short note on the following -

- (a) Permanent magnet stepper motor. [8]
- (b) Induction heating control. [8]

OR

Q.5 Write short note on the following -

- (a) Variable reluctance stepper motor. [8]
- (b) Hybrid stepper motor. [8]