6E6053

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6E6053

B. Tech. VI-Sem. (Back) Exam., October - 2020
Electronic Instrumentation & Control Engineering
6EI3 (O) Industrial Electronics
AI, EC, EI

Time: 2 Hours **Maximum Marks: 48**

Min. Passing Marks: 16

Instructions to Candidates:

*Attempt **three questions,** selecting **one question each** from any three **unit.** All Questions carry **equal** marks. (Schematic diagrams must be shown wherever necessary. Any data you feel missing 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) Illustrate the basic layered structure, construction and transistor analogy of Silicon Controlled Rectifier. [8]

(b) Discuss the differences between forward and reverse blocking mode of SCR. [8]

OR

Q.1 (a) Briefly explain various triggering methods used for thyristor. [8]

(b) Explain the following for IGBT, FET and MOSFET – [8]

(i) Operation mode

(ii) Input/ output Impedance

(iii) Amplification

(iv) Switching property

UNIT- II

Q.2 A single phase bridge rectifier is connected to 240 V_{ac}, 60Hz source. The output of the rectifier is connected to 20 ohm resistor load. If the average output voltage is 40% of the maximum output voltage, determine – [16]

(a) The delay angle α

(b) The rms & average output current

(c) The average & rms thyristor current

(d) The input power factor

OR

Q.2 What is an Inverter? List a few industrial applications of inverters. Explain its principle of operation with the aid of diagram. [16]

UNIT- III

Q.3 (a) Distinguish between Buck-Boost and Boost converters. Give typical applications. [8]

(b) What is a dual converter? For simultaneous operation of single phase dual converters, find the relationship between firing angle α_1 and α_2. [8]

OR

Q.3 (a) Describe the principle of step–down chopper with different waveforms. [8]

(b) Derive an expression for the average output voltage in terms of input d.c. voltage and duty cycle. [8]

UNIT- IV

Q.4 (a) Discuss the speed–torque curves for a chopper controlled induction motor. [8]

(b) Explain in various schemes of d.c. motor speed control with their specific applications & limitations. [8]

OR

Q.4 (a) Draw and explain the operation of a speed control of d.c. series motor by a single phase full converter for continuous motor control. Draw a neat diagram along with associated voltage & current waveforms. [8]

(b) On the basis of 'four quadrant' operation and configuration, explain the working of a dc-dc chopper. [8]

UNIT- V

Q.5 (a) Identify the major constructive difference between a permanent magnet and variable reluctance type motor. [8]

(b) A step motor has 130 steps per resolution. Find the input digital pulse rate that produces continuous rotation at a speed of 10.5 revolutions/sec. [8]

OR

Q.5 (a) Distinguish between the terms full stepping and half stepping. [8]

(b) Explain with schematic diagram, open loop & closed loop control schemes used for stepper motor. [8]
