PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
B.Tech. Winter 2019 - 20 Examination

Semester: 5   Date: 05/12/2019
Subject Code: 03106304   Time: 10:30am to 01:00pm
Subject Name: Industrial Electronics- II   Total Marks: 60

Instructions:
1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

Q.1 **Objective Type Questions** - (Fill in the blanks, one word answer, MCQ-not more than Five in case **(15)**
of MCQ) (All are compulsory) (Each of one mark)
1. Several equidistant pulses per half cycle are used in _____ type of modulation technique.
a) single-pulse
b) multiple-pulse
c) sine-pulse
d) equidistant-pulse
2. The modulation index (MI) is given by
Vr = peak value of the reference wave.
Vc = peak value of the carrier wave.
a) Vr/Vc
b) Vc/Vr
c) (1 + Vc/Vr)
d) 1/(Vc Vr)
3. In a PWM inverter, if the frequency of the lowest harmonic is 180 Hz, then the frequency of the
fundamental component would be _____
a) 50 Hz
b) 60 Hz
c) 540 Hz
d) 90 Hz
4. In an inverter, if the fundamental output frequency is 45 Hz, then the frequency of the lowest order
harmonic will be
a) 45 Hz
b) 225 Hz
c) 15 Hz
d) 135 Hz
5. Which of the following is used as a harmonic reduction technique in inverters?
a) Amplitude modulation
b) Cycloconverter control
c) Transformer connection
d) Series connection of two inverters
6. In sinusoidal pulse width modulation, _____ wave is compared with a _____ type of
wave.
7. The waveform obtained by _____ Circuit is more near to a sinusoidal wave.
8. A single-phase half wave voltage controller consists of one SCR is anti parallel with one
_____.
9. In a single-phase half wave inverter _____ SCR(s) are/is gated at a time.
10. In the 180° mode VSI, _____ devices conduct at a time.
11.In single-phase modulation of PWM inverters, the lowest harmonic can be eliminated if the pulse
width is made equal to _____
12. In pulse width modulated inverters, the output voltage is controlled by controlling the
_____.
13. _____ is used for critical loads where temporary power failure can cause a great deal of
inconvenience.
14. Voltage Controllers convert the fixed ac voltage to variable ac by changing the values of
_____.
15. The single phase bridge type cycloconverter uses _____ number of SCRs.

Q.2 **Answer the following questions. (Attempt any three)** **(15)**

A) Explain why a PWM inverter is superior to square wave inverters?

B) Compare on off control and phase angle control.

C) Compare on VSI and CSI.

D) A Short Note on UPS with block diagram.

Q.3 A) Derive the expression for the RMS value of output voltage for the 1 phase half wave controller circuit. **(07)**

B) A single phase half bridge inverter has a resistive load of R = 10 ohms. DC input voltage V=48V. Determine : **(08)**

1. The rms ouptut voltage at the fundamental frequency, V_1

2. The output power, P_o

3. The average and peak currents of each transistor.

OR

B) A single phase bridge inverter has a resistive load of R=24 ohms and dc input voltage V=48V. Determine : **(08)**

1. The output power, P_o

2. The average and peak currents of each transistor.

3. The peak reverse blocking voltage V_{BR} for each transistor.

Q.4 A) What is PWM ? Explain SPWM Techniques. **(07)**

OR

A) Write a short note on Solid State Relays. **(07)**

B) What is the principle of operation of Cycloconverters ? Explain Single phase to Single phase Circuit of Cycloconverter. **(08)**