

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER- VI EXAMINATION – SUMMER 2020

Subject Code: 2160902

Date: 26/10/2020

Subject Name: POWER ELECTRONICS – II

Time: 10:30 AM TO 01:00 PM

Total Marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full mark0073.

MARKS

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|------------|--|-----------|
| Q.1 | (a) Classify AC converters. | 03 |
| | (b) Explain requirement and function of gate driver circuit. | 04 |
| | (c) Explain 3-phase inverter operation with 180° conduction period.
Draw waveform of gate voltage, phase voltage and line voltage
for resistive Y connected load. | 07 |
| Q.2 | (a) Explain line commutation with waveforms. | 03 |
| | (b) Explain concept of Pulse Width Modulation. | 04 |
| | (c) Discuss effect of modulation index and carrier to modulation
frequency ratio on output of sine PWM technique. | 07 |
| | OR | |
| | (c) Discuss concept of space vectors. How more output voltage can
be obtained in SVPWM compared to sine PWM technique. | 07 |
| Q.3 | (a) Compare cycloconverter with matrix converter. | 03 |
| | (b) Classify AC voltage controller. Draw waveform of single phase
full wave AC voltage controller with RL load and firing
angle= 60° . | 04 |
| | (c) With circuit diagram explain basic principle of 3-phase
cycloconverter. | 07 |
| | OR | |
| Q.3 | (a) Explain integral cycle control technique in brief. | 03 |
| | (b) Explain selected harmonic elimination technique in brief. | 04 |
| | (c) Can we control frequency of AC voltage controller? Justify the
answer by explaining operation of 3-phase full wave AC
controller. | 07 |
| Q.4 | (a) Discuss various types of load that can be connected with power
electronics converters. | 03 |
| | (b) What is R-L-E load? How is it different than R-L load? | 04 |
| | (c) How three single phase cycloconverter can be operated as three
phase cycloconverter? Explain with necessary diagrams. | 07 |
| | OR | |
| Q.4 | (a) Explain principle of current source inverter in brief. | 03 |
| | (b) Explain single phase cycloconverter in brief. | 04 |
| | (c) With diagram explain basic principle of matrix converter. | 07 |
| Q.5 | (a) Explain load commutated cycloconverter in brief. | 03 |
| | (b) Explain application of load commutated thyristors inverter. | 04 |
| | (c) What is static Kramer drive? With circuit diagram explain its
operation. | 07 |

- Q.5 (a) Discuss different region of speed torque characteristics of induction motor. 03
- (b) Explain in brief the self-controlled synchronous motor drive. 04
- (c) Discuss V/f control technique of induction motor drive. 07

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