Experiment 7

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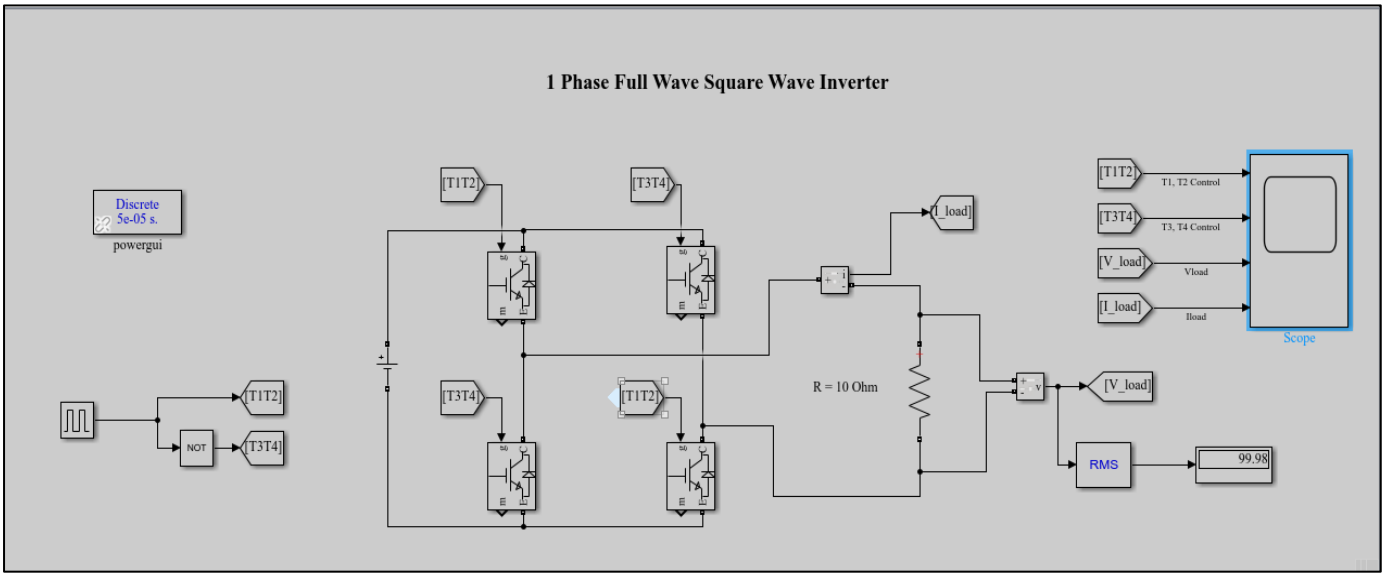
Sec No. - 6 **Batch No.** - 4

Marks Obtained - **Date - 0**8/04/2021

OBJECTIVE: Study of various controlling schemes like square wave, quasi-square wave and SPWM for 1 Phase Full Bridge Inverter.

1. Study of 1-ϕ Square-wave Full-Bridge inverter with R load

Simulink Circuit:



Formulae used :

Von/Vin = 10^(g/20) **[g in dB]**

% THD = $(g_3^2 + g_5^2 + g_7^2)^{0.5} / g_1$ **[g not in dB]**

Observations:

INPUT SUPPLY VOLTAGE (DC) = 100V

OUTPUT RMS VALUE (VOLTS) = 99.98V

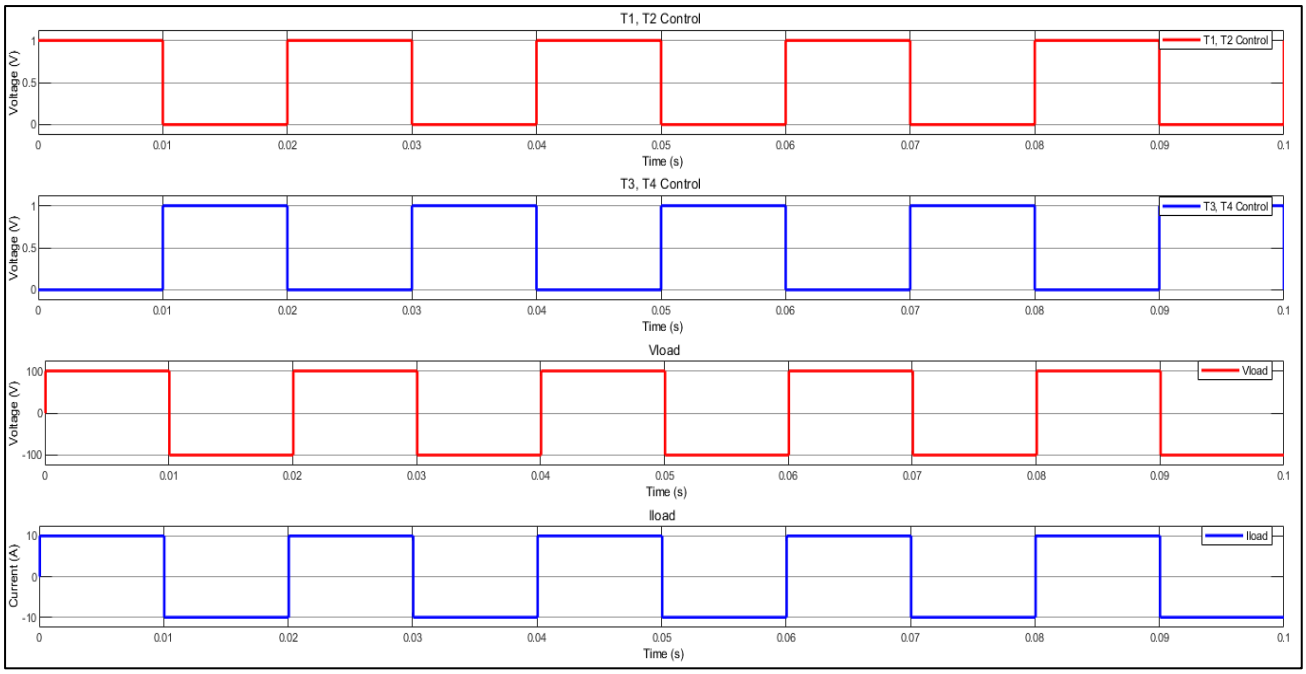
FREQUENCY = 50 HZ

THD = 45.68%

FFT DATA TO CALCULATE THD OF LOAD VOLTAGE WAVEFORM

FREQUENCY (HZ)	HARMONIC VALUE IN DB	$V_{o(n)}/V_{IN}$
50 (FUNDAMENTAL)	2.096568	1.273
150 (THIRD)	-7.53315	0.42009
250 (FIFTH)	-11.9264	0.25332
350 (SEVENTH)	-14.8089	0.18178
450 (NINTH)	-16.997	0.14130

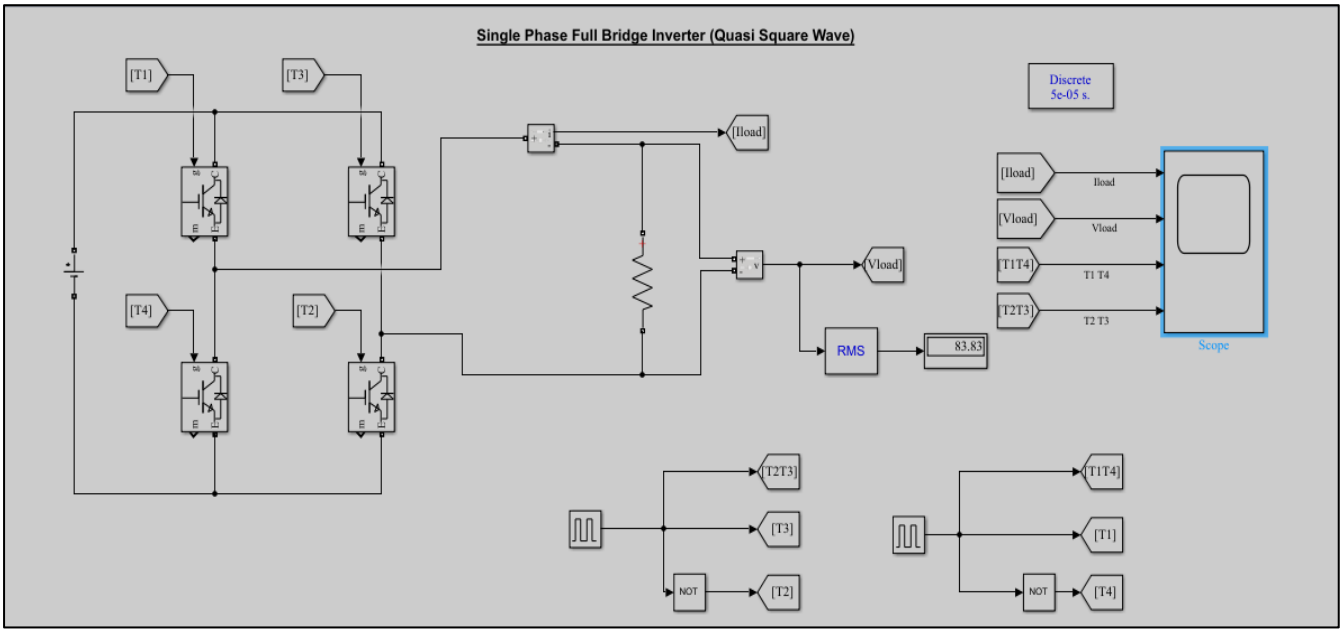
Waveforms:



2). Study of 1-ϕ Quasi Square-wave Full-Bridge inverter with R load

Apparatus: Single phase inverter trainer kit, Oscilloscope, Connecting probes, Multi-meter

Simulink Circuit:



Observations:

INPUT SUPPLY VOLTAGE (DC) = 100V

OUTPUT RMS VALUE (VOLTS) = 83.83V

FREQUENCY = 50 HZ

THD = 38.59%

Formulae used :

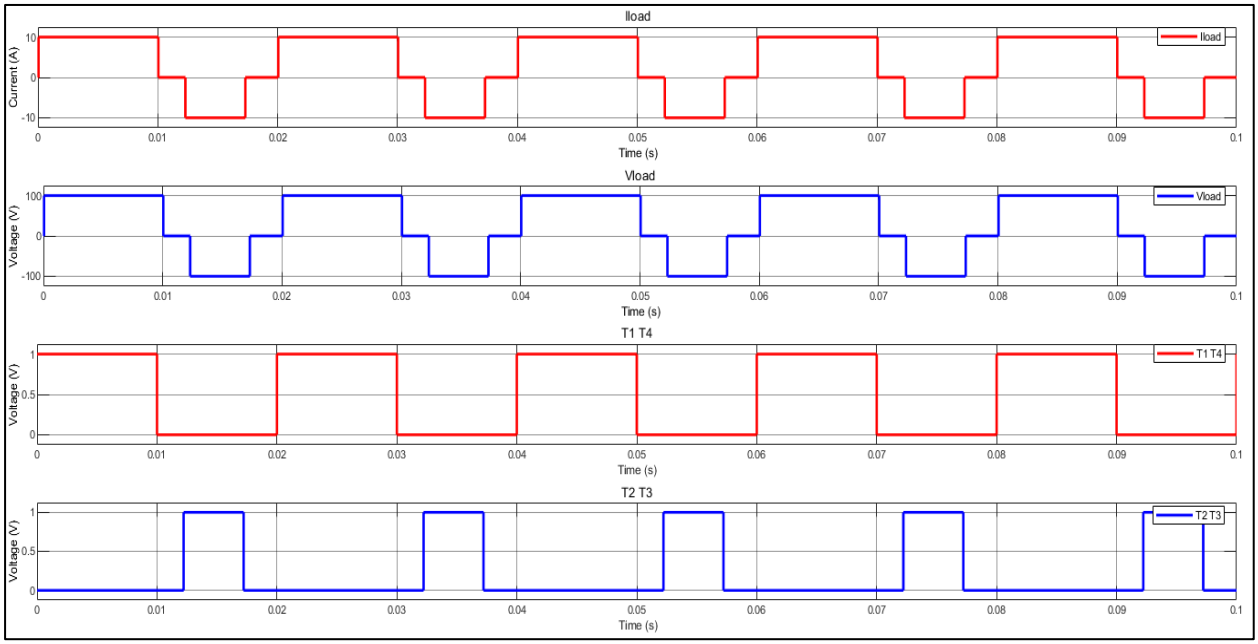
Von/Vin = 10^(g/20) **[g in dB]**

% THD = $(g_2^2 + g_3^2 + g_4^2)^{0.5} / g_1$ **[g not in dB]**

FFT DATA TO CALCULATE THD OF LOAD VOLTAGE WAVEFORM

FREQUENCY (HZ)	HARMONIC VALUE IN DB	$V_{o(n)}/V_{IN}$
50 (FUNDAMENTAL)	0.716597	1.086
150 (THIRD)	-22.5316	0.074717
250 (FIFTH)	-25.132	0.055386
350 (SEVENTH)	-16.4984	0.149651
450 (NINTH)	-18.8679	0.113921

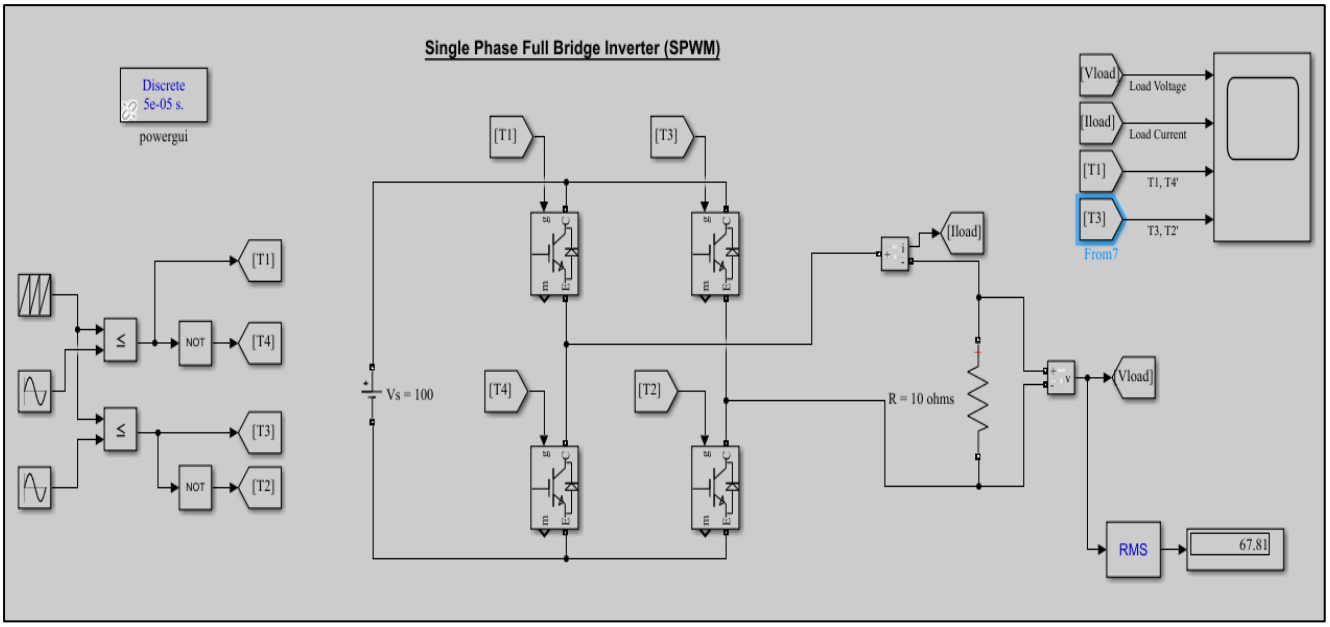
Waveforms:



3). **Study of 1-ϕ SPWM Full-Bridge inverter with R load**

Apparatus: Single phase inverter trainer kit, Oscilloscope, Connecting probes, Multi-meter

Simulink Circuit:



Observations:

INPUT SUPPLY VOLTAGE (DC) = 100V

OUTPUT RMS VALUE (VOLTS) = 67.81V

FREQUENCY = 50 HZ

THD VALUE = 50.31%

Formulae used :

Von/Vin = 10^(g/20) **[g in dB]**

% THD = $(g_3^2 + g_5^2 + g_7^2)^{0.5} / g_1$ **[g not in dB]**

FFT DATA TO CALCULATE THD OF LOAD VOLTAGE WAVEFORM

FREQUENCY (HZ)	HARMONIC VALUE IN DB	$V_{o(n)}/V_{IN}$
50 (FUNDAMENTAL)	-2.6424	0.7377
150 (THIRD)	-36.6218	0.014754
250 (FIFTH)	-45.1412	0.005533
350 (SEVENTH)	-36.9313	0.014238
450 (NINTH)	-51.761	0.002582

Waveforms: