



MANIPAL INSTITUTE OF TECHNOLOGY
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(A constituent Unit of Manipal Academy of Higher Education)

MANIPAL

Drives, Controls and Modelling Laboratory Manual (MTE 3211)

Fifth Semester B.Tech (Mechatronics Engineering)

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REG NO: 210929156

ROLL NO: 37

1. General Guidelines in Lab:

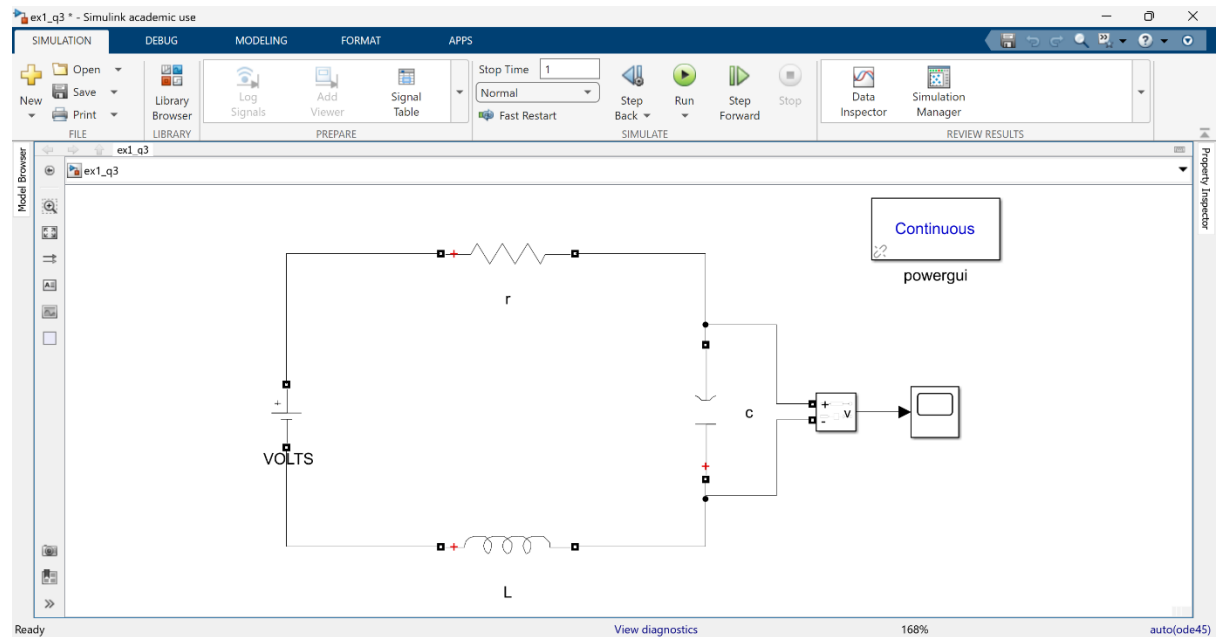
1. Conduct yourself in a responsible manner at all times in the laboratory.
2. Follow all written and verbal instructions carefully. If you do not understand a direction or part of a procedure, ASK YOUR TEACHER BEFORE PROCEEDING WITH THE ACTIVITY.
3. Perform only those experiments authorized by your teacher. Carefully follow all instructions, both written and oral. Unauthorized experiments are not allowed.
4. Observe good housekeeping practices. Work areas should be kept clean and tidy at all times.
5. Be alert and proceed with caution at all times in the laboratory. Notify the teacher immediately of any unsafe conditions you observe.
6. Labels and equipment instructions must be read carefully before use. Set up and use the equipment as directed by your teacher.
7. Experiments must be personally monitored at all times. Do not wander around the room, distract other students, startle other students or interfere with the laboratory experiments of others.
8. Report any accident (spill, breakage, etc.) or injury (cut, burn, etc.) to the teacher immediately, no matter how trivial it seems. Do not panic.

2. General Electrical Safety Instructions in Lab:

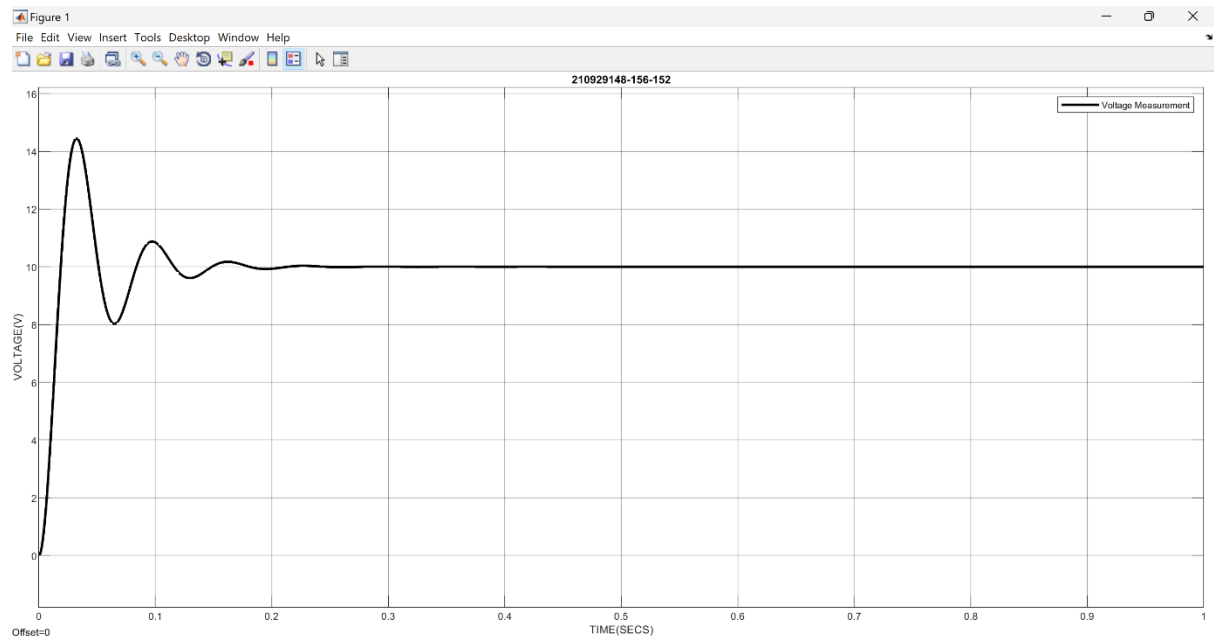
1. Avoid direct contact with the energized electrical circuits.
2. Disconnect the power source before servicing or repairing electrical equipment.
3. Always ensure that the earth pin is given properly to the main source.
4. Use only tools and equipment with non-conducting handles when working on electrical devices.
5. Never use metallic pencils or ruler, or wear rings or metal watchbands, when working with electrical equipments.
6. If water or chemical spilled onto equipment, shutoff power at the main power at the main switch or MCB breaker and unplug the equipment.
7. Disconnect the power source from the circuit breaker or pull out the plug using a leather belt etc.
8. Never touch another person's equipment or electrical control devices unless instructed to do so.
9. Never handle electrical equipment when hands, feet, or body are wet or perspiring, or when standing on a wet floor.

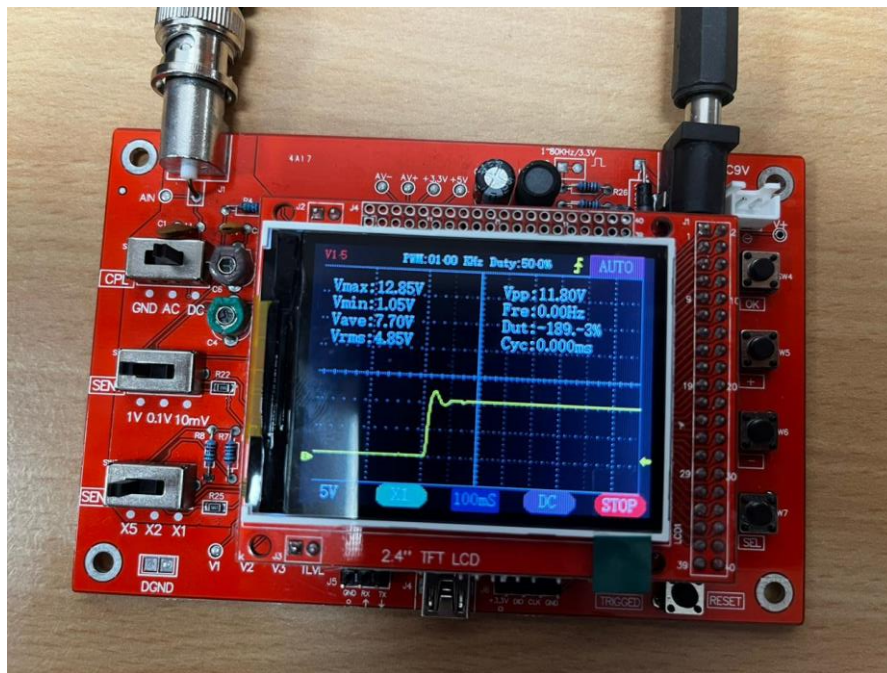
EXPERIMENT 1:

RLC CIRCUIT ANALYSIS

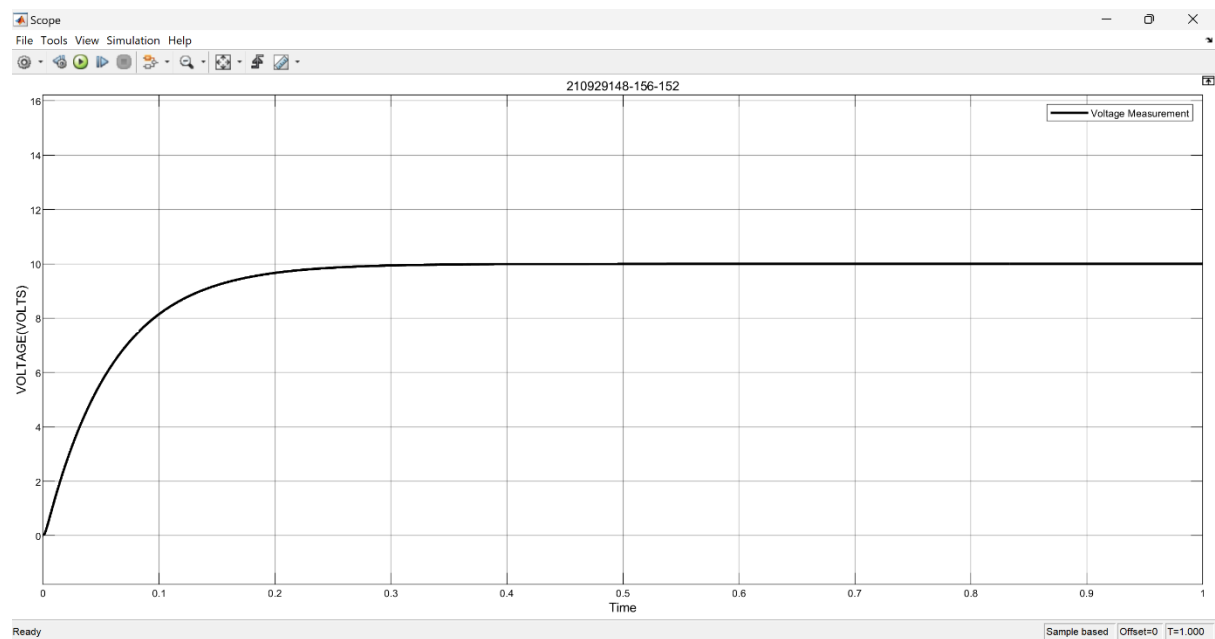


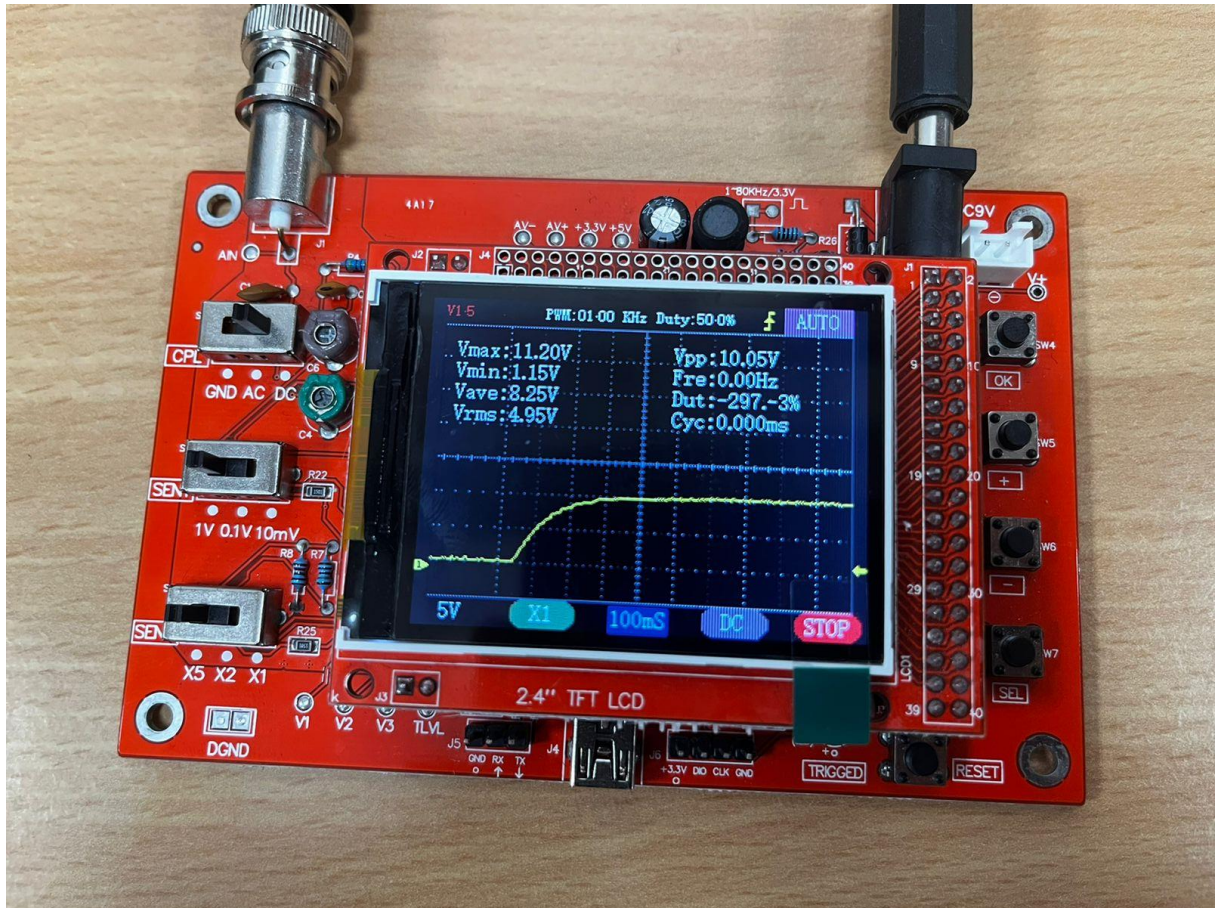
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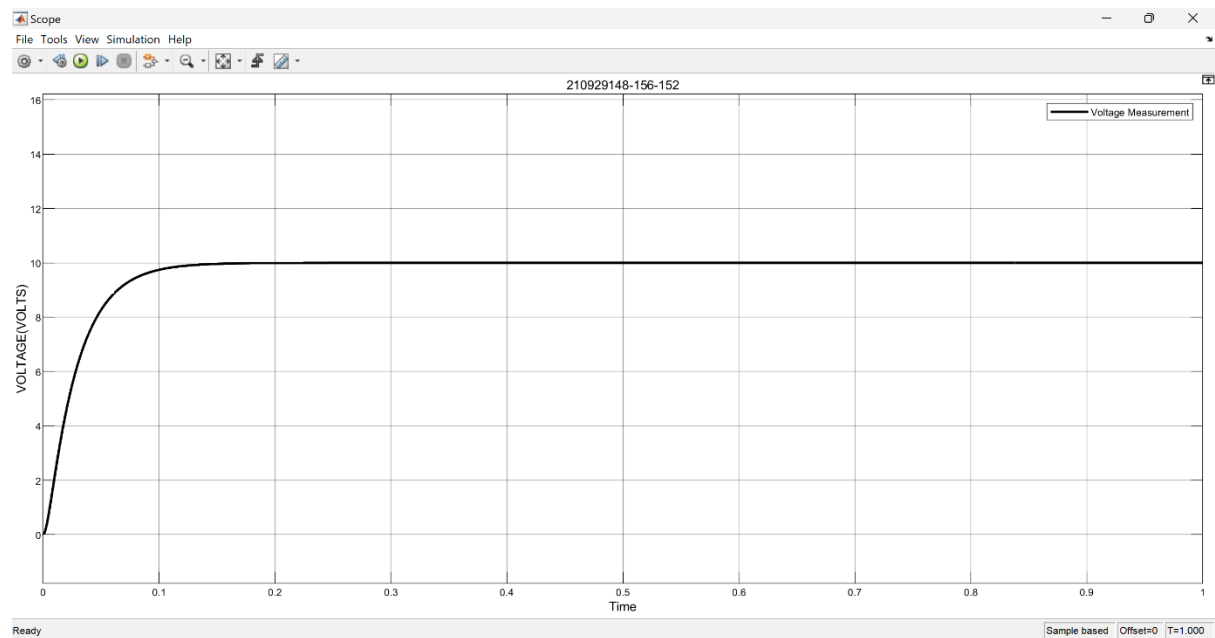


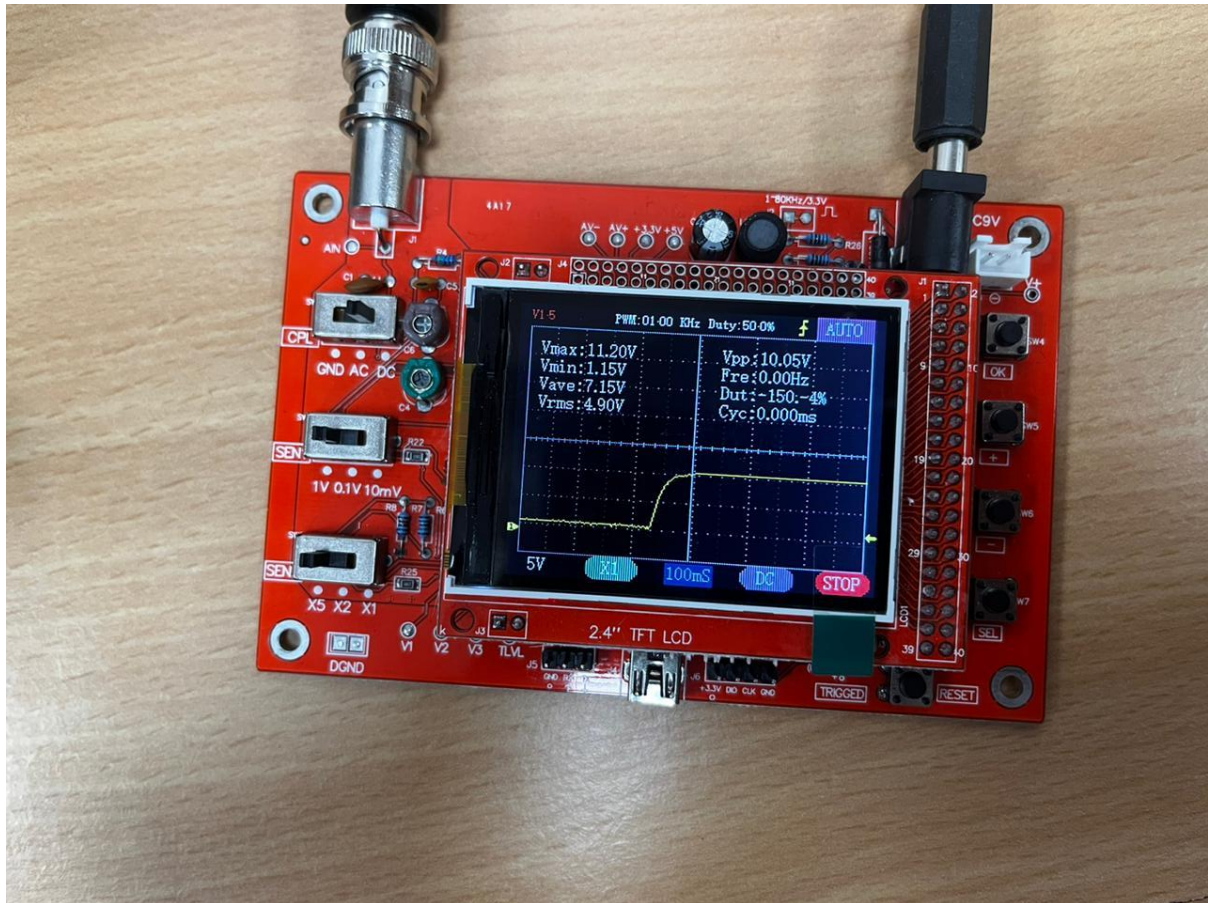
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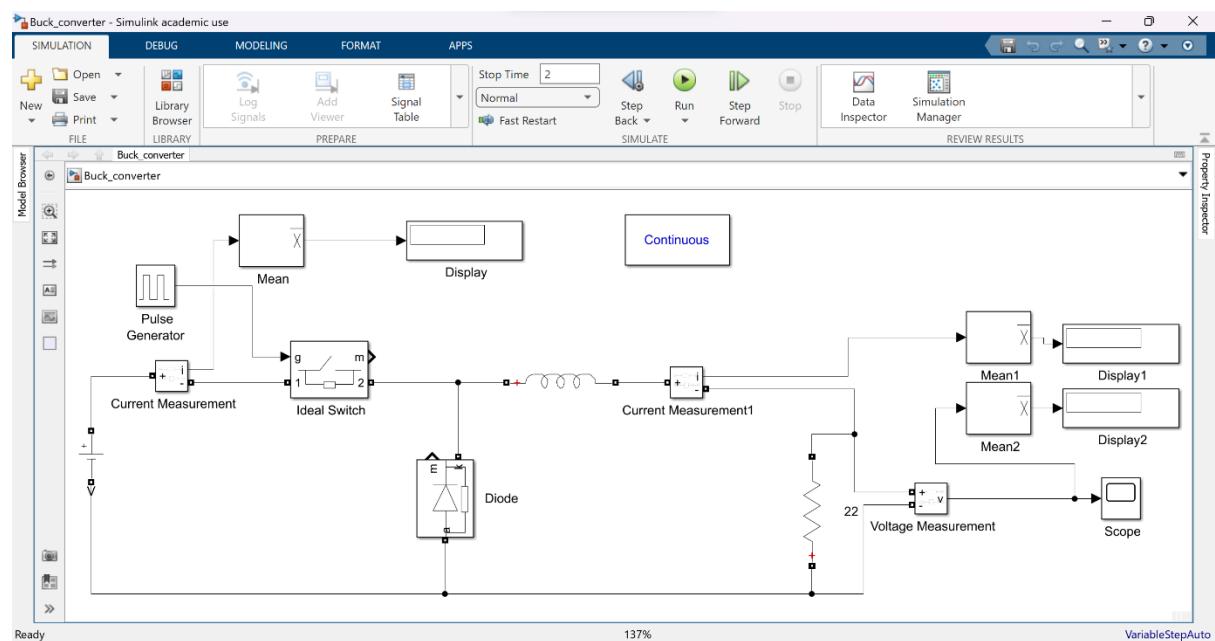
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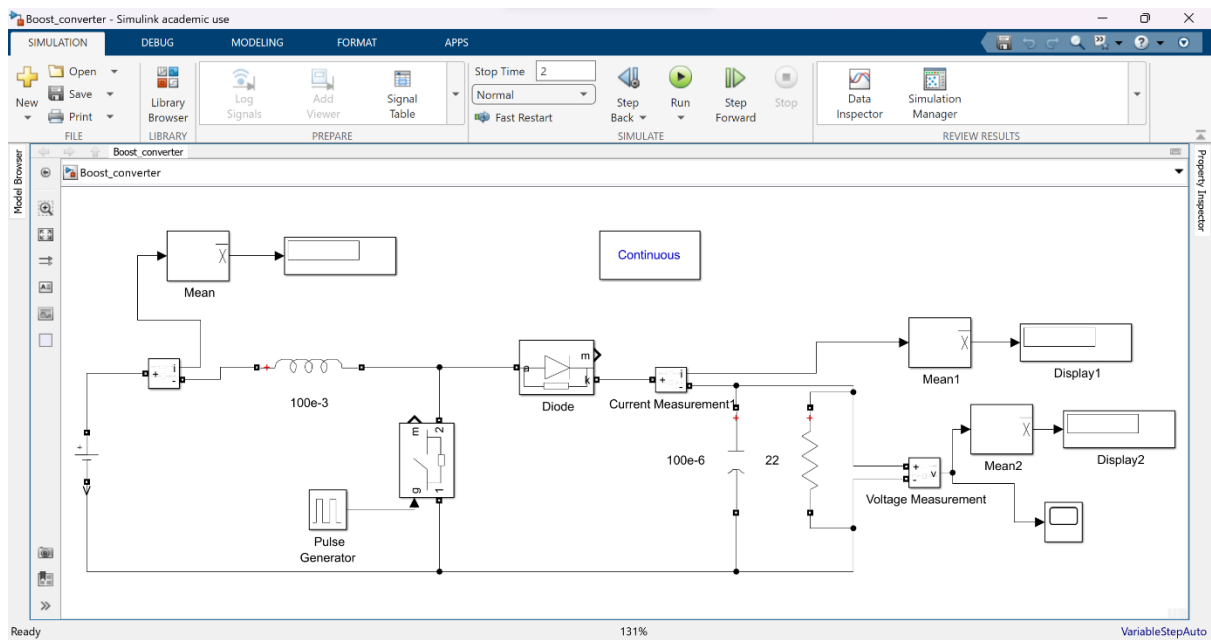
EXPERIMENT 2:

BUCK CONVERTER



Duty cycle	Voltage	Current	Simulation (V)	Simulation (A)
20	5.3	0.05	4.16	0.189
30	7.6	0.007	6.64	0.3018
40	9.9	0.01	9.12	0.4145
50	12.2	0.012	11.6	0.527
60	14.5	0.014	14.08	0.64
70	16.8	0.016	16.56	0.75
80	19.1	0.019	19.04	0.865

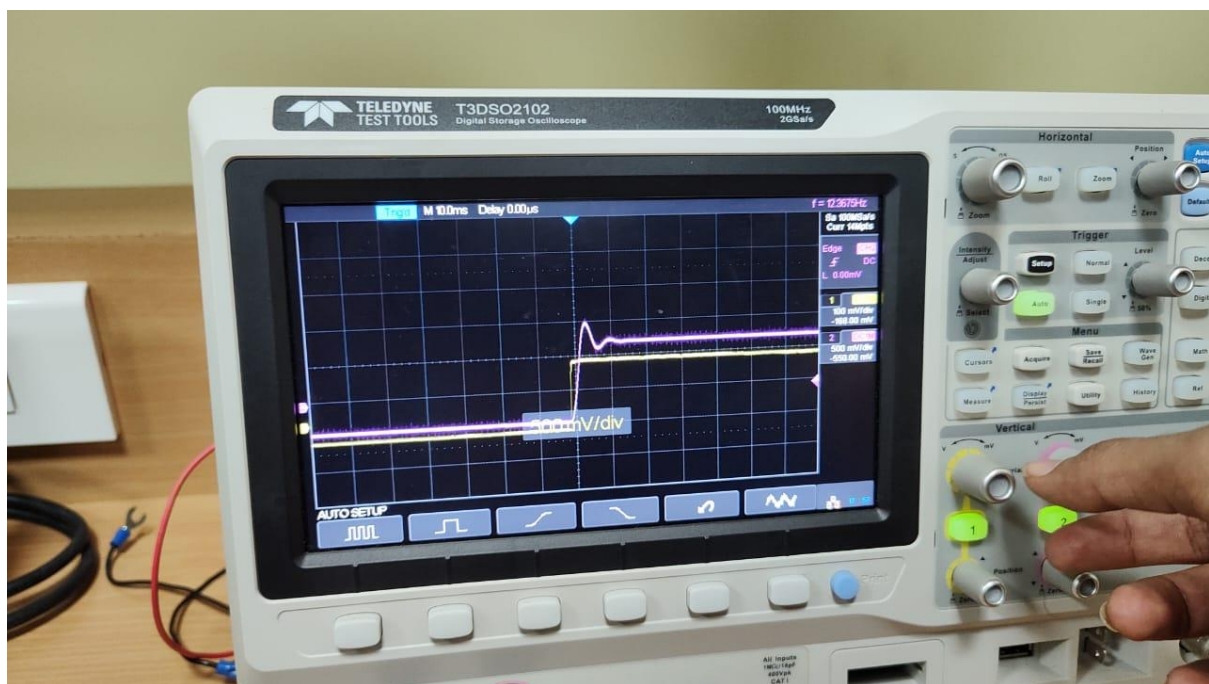
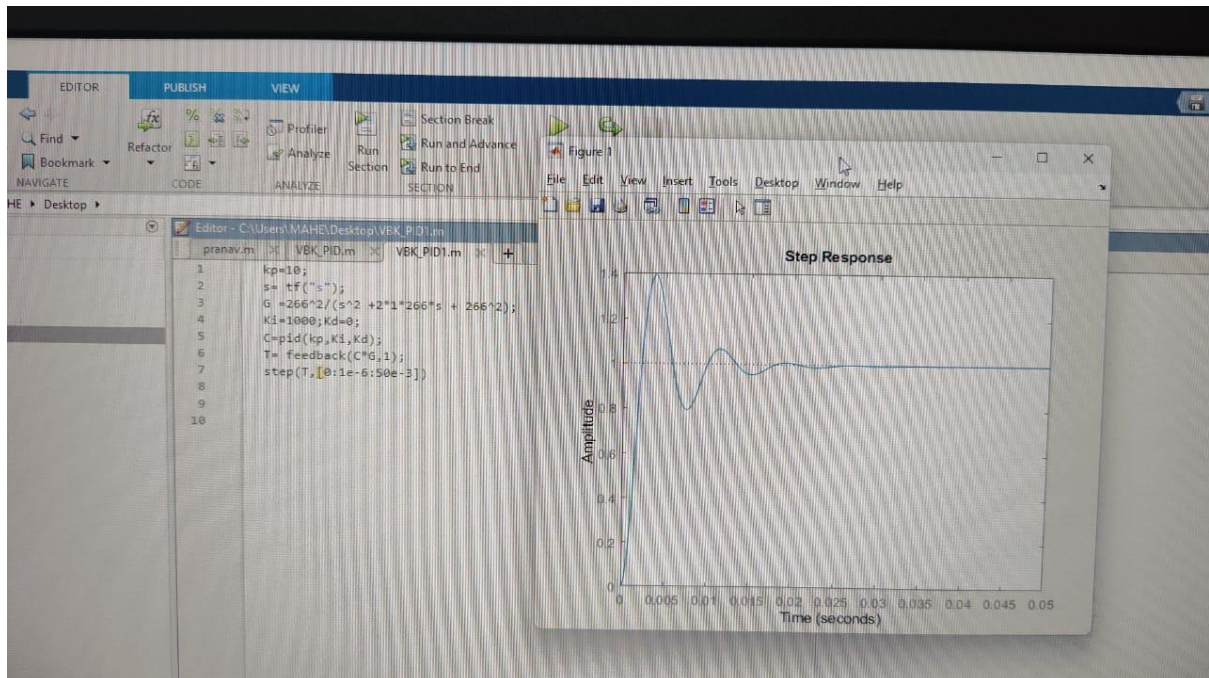
BOOST CONVERTER



Duty cycle	Voltage	Current	Simulation (V)	Simulation (A)
20	13.9	0.014	14.18	0.644
30	16.3	0.016	16.31	0.74
40	18.7	0.018	19.12	0.86
50	21.9	0.021	23.07	1.04
60	27.1	0.027	28.98	1.3
70	35.5	0.035	38.81	1.76
80	50.8	0.05	58.44	2.65

EXPERIMENT 3:

PID CONTROLLER



EXPERIMENT 4: Tachometer

FORWARD

voltage	current	DUTY CYCLE	rpm
24.4	0.08	10	54
25	0.14	20	1060
24.1	0.17	30	1361
24	0.17	40	1540
24	0.17	50	1624
24	0.17	60	1694
24	0.17	70	1749
24	0.18	80	1787
24	0.17	90	1822
24	0.17	100	1859

REVERSE

voltage	current	DUTY CYCLE	rpm
24.1	0.08	10	64
24.9	0.14	20	1125
24.1	0.15	30	1457
24	0.16	40	1633
24	0.16	50	1735
24	0.16	60	1799
24	0.16	70	1846
24	0.17	80	1880
24	0.17	90	1907
24	0.17	100	1939