EXPERIMENT 1: CAPACITOR

Course Learning Outcome:
Solve problems of electric current, **electronics**, magnetism, optics, quantization of light, wave properties of particles and nuclear physics.
(C4, PLO 4, CTPS 3, MQF LOD 6)

Learning Outcomes:
At the end of this lesson, students will able to explain the experiment to
i.   determine the time constant of an RC circuit.
ii. determine the capacitance of a capacitor using an RC circuit

Student Learning Time:

Face-to-face	Non face-to-face
1 hour	1 hour

Direction: Read over the lab manual and then answer the following question.

__Introduction__

1.   Figure below shows a capacitor.

   a.   What is the function of capacitor?
   ………………………………………………………………………………………………..

   b.   What is meant by 1000 μF?
   …………………………………………………………………………………………………

2.   *'Time constant, τ is a measurement of how fast the capacitor charges or discharges'.*

   a.   What is meant by time constant for current during discharging process?
   …………………………………………………………………………………………………
   ...……………………………………………………………………………………………….

   b.   What is the relationship between time constant, τ, resistance, R and capacitance, C.
   …………………………………………………………………………………………………

3.   During charging and discharging process what is the different in terms of their time constant.
   ……………………………………………………………………………………………….

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Experiment

4. Sketch and label the circuit diagram of the experiment?

5. From this experiment, identify

a. the manipulated variable,

    ……………………………………………………………………………………………..

b. the responding variable

    …………………………………………………………………………………………….

6. During the experiment, why we need to short circuit the capacitor when measure time t of discharging process?

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7. Which circuit combination will discharge faster? Explain your answer.

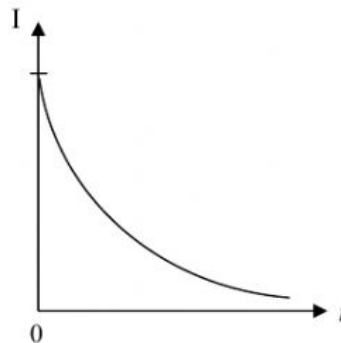   …………………………………………………………………………………………….

Data Analysis

8. Two capacitors, C_1 and C_2 can be connected either in series or parallel. Write the formula of effective capacitance for both combinations.

    Series :

    Parallel :

9. The graph shows the current, I versus time, t for discharging capacitors.

    a.   How to determine time constant, τ from the graph.

    b.   What is the physical meaning of I when t = 0.

..………………………………………………………………………………………

    c.   For the capacitance in parallel combination C_1 and C_2, how do we determine the capacitance, C_2.

10. Why micro ammeter is used instead of ammeter in the experiment?

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11. Why large resistance is used in the experiment?

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