

**2023 SUPER MOCK APPLIED ELECTRICITY 3**

PAPER 3

3 hours

ESSAY

[100 marks]

1. Aim: determine the lead angle in an a.c RC circuit.

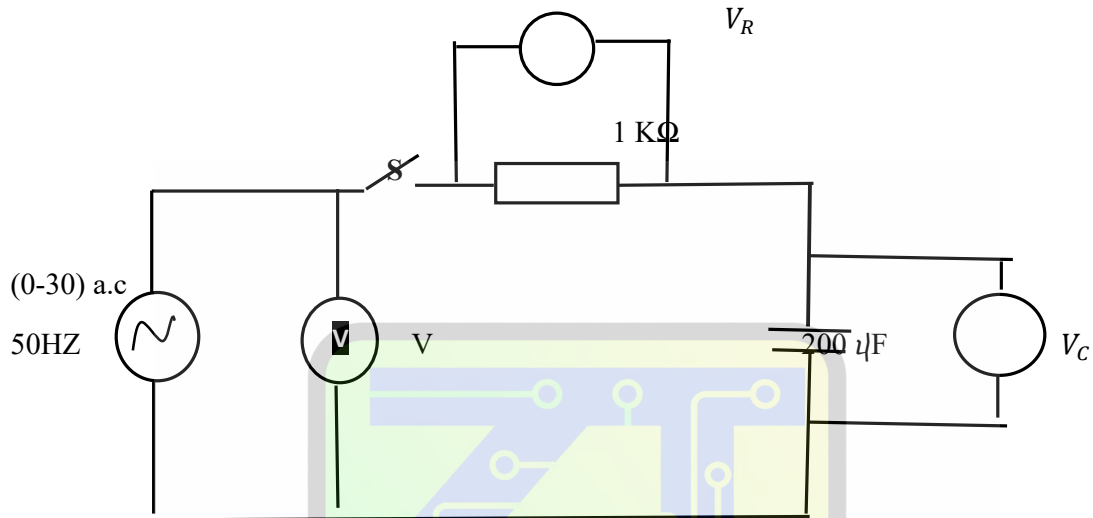


Figure 1

- Connect the circuit as shown in figure 1.
- Ask the supervisor to check the circuit connection.
- Copy the table 1 into your answer booklet.

Smart Learning Tools

Table 1

| $V_S$ | $V_R$ | $V_C$ (V) |
|-------|-------|-----------|
| 0     | (V)   |           |
| 5     |       |           |
| 10    |       |           |
| 15    |       |           |
| 20    |       |           |
| 25    |       |           |

- Set the variable a.c. power supply to 0V and close the switch (S).
- Read and record in the Table 1, the voltmeter reading of  $V_R$  (V) and  $V_C$  (V)
- Open the switch, S
- Adjust the variable a.c. power supply to 5V and close the switch, S.
- Read and record in the Table 1, the voltmeter reading of  $V_R$  (V) and  $V_C$  (V)

- (i) Repeat steps (f) to (h) for the other values of  $V_S$  in the Table 1.
- (j) Plot a graph of  $V_C$  (V) on the vertical axis against  $V_R$  (V) on the horizontal axis.
- (k) Determine
  - (i) Slope of the graph
  - (ii) Lead angle using the slope of the graph

2. Aim: To determine the effect of resistance on the current in an a.c. circuit.

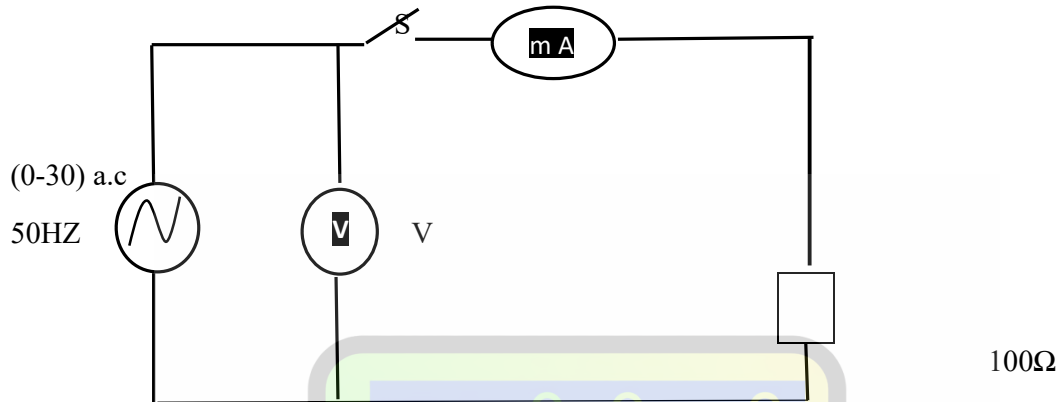


Figure 2

- (a) Connect the circuit as shown in Figure 2.
- (b) Ask the supervisor to check the connection.
- (c) Copy Table 2 into your answer booklet

| Resistance ( $\Omega$ ) | Current (m A) |
|-------------------------|---------------|
| 100                     |               |
| 200                     |               |
| 300                     |               |
| 400                     |               |
| 500                     |               |

- (d) Set the variable a.c power supply to 25V.
- (e) Close the switch, S.
- (f) Read and record in Table 2, the ammeter readings.
- (g) Open the switch, S.
- (h) Replace the 100 $\Omega$  resistor with the 200 $\Omega$  resistor and close the switch, S
- (i) Read and record in Table 2 the corresponding ammeter reading.
- (j) Repeat steps (g) to (i) for the other values of resistors in the Table 2.
- (k) Plot a graph of current ( m A) on the vertical axis against resistance ( $\Omega$ ) on the horizontal axis
- (l) Comment on the graph

**END OF PAPER**