

**BRAC University**

Semester: Fall 22  
Course No: CSE250  
Course Title: CIRCUITS AND ELECTRONICS



Final Assignment  
Full Marks: 80

**Deadline: 01 January, 2023**

## Instructions

- This assignment contains 7 questions on AC circuits. **All the questions are mandatory to answer.**
- Make an effort to solve and comprehend them.
- Turn in the **soft copy (PDF)** of the assignment by **11:59 PM on January 01, 2022** (Link is given below).
- Your cover page must include your name, ID, course code, section, and submission date.
- Any form of copying will result in severe penalties. Best wishes.

Submission Link:

[https://docs.google.com/forms/d/e/1FAIpQLScMCS1zwZH-g8QKJzqecm8PQp5dhTY-XoouhT4ISU3VX6h3qg/viewform?usp=sf\\_link](https://docs.google.com/forms/d/e/1FAIpQLScMCS1zwZH-g8QKJzqecm8PQp5dhTY-XoouhT4ISU3VX6h3qg/viewform?usp=sf_link)

## Questions

### Question 1 of 7

[5 + 5 Marks]

Find the phase difference between **V** and **I**. Also mention which one is leading. Write all the parameters in phasor form.

(i)  $I = 2 \cos (\omega t + 10^\circ)$

(ii)  $I = 16 \cos (\omega t + 10^\circ)$

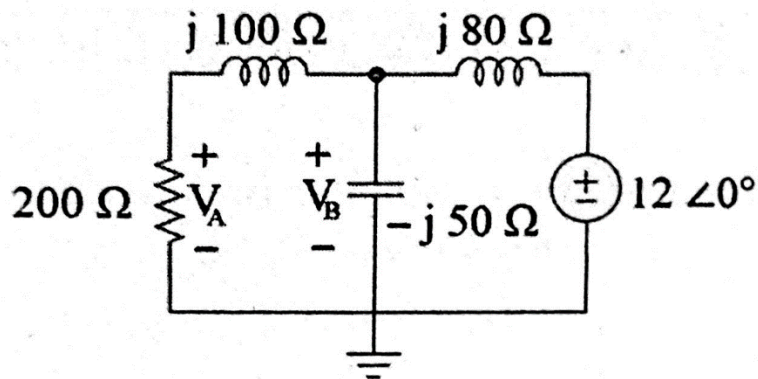
$V = 3 \sin (\omega t - 10^\circ)$

$V = -20 \sin (\omega t - 10^\circ)$

### Question 2 of 7

[10 Marks]

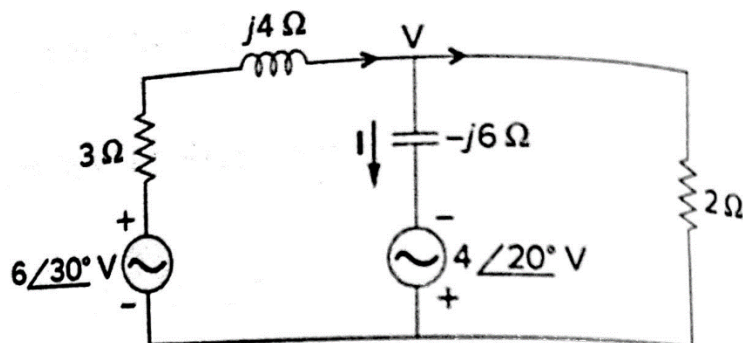
Find **V<sub>A</sub>** and **V<sub>B</sub>** in the following circuit.



### Question 3 of 7

[10 Marks]

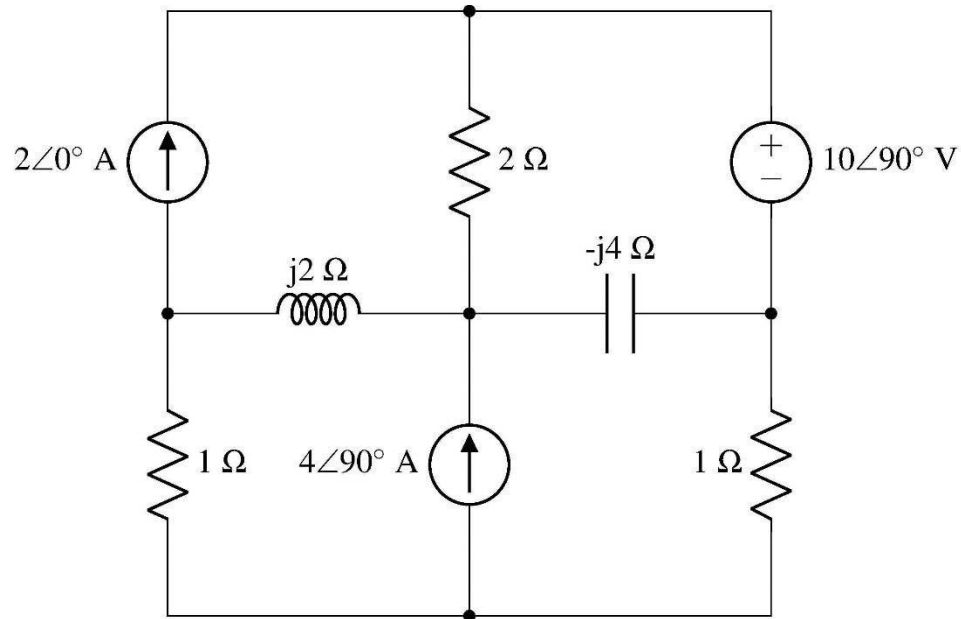
Find **V** and **I** in the following circuit using **nodal analysis**.



**Question 4 of 7**

**[10 Marks]**

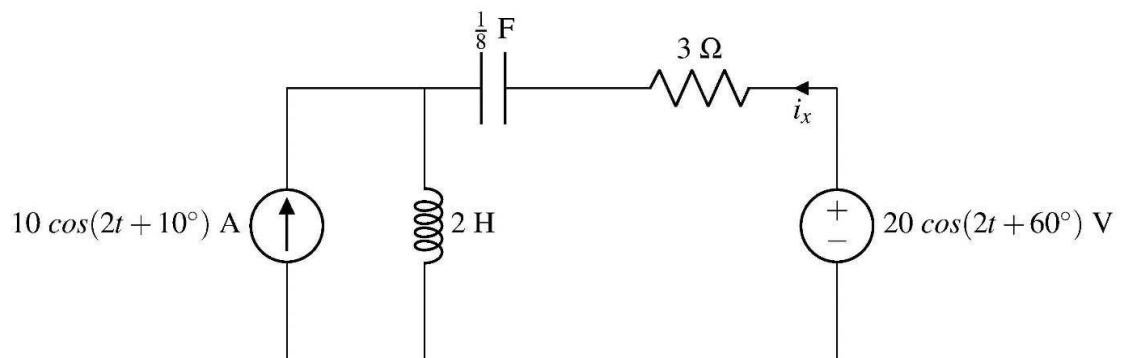
Derive the **mesh equations** in their simplified form for the circuit below.



**Question 5 of 7**

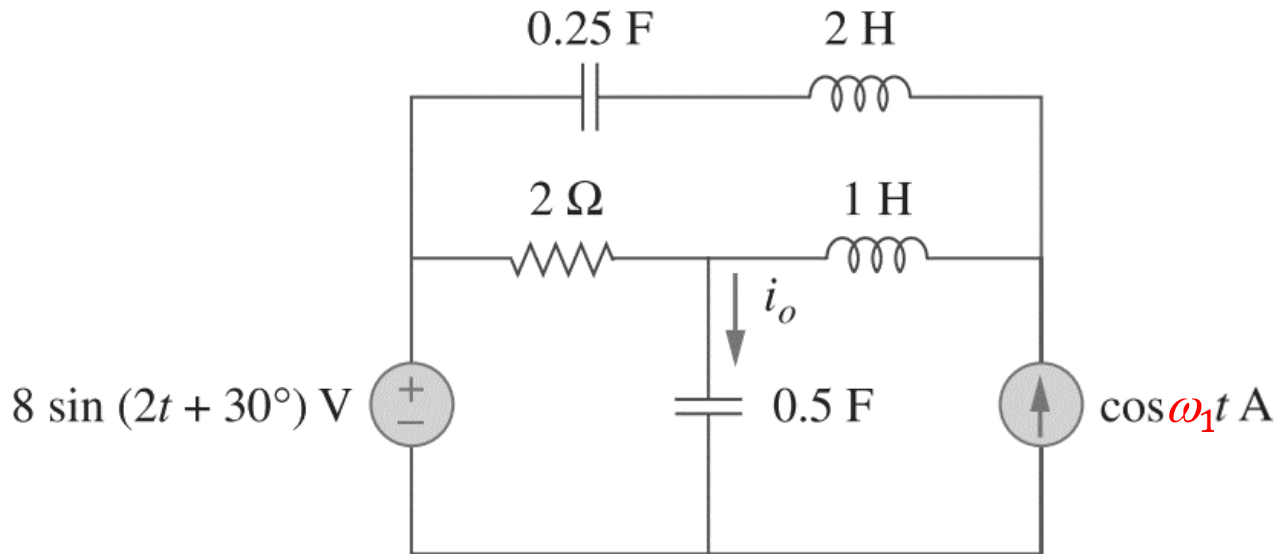
**[10 Marks]**

Use **superposition theorem**, find  $\mathbf{i_x}$  in the following circuit.



**Question 6 of 7****[20 Marks]**

Use **superposition theorem**, find  $\mathbf{i_o}$  in the following circuit.  $\omega_1$  is the sum of the last 2 digits of your student ID. For example, for a student with student ID 1120329  $\omega_1 = 2+9 = 11$ .

**Question 7 of 7****[10 Marks]**

Use **superposition theorem**, find  $\mathbf{V_x}$  in the following circuit.  $\omega_1$  is the sum of the **first** 2 digits of your student ID and  $\omega_2$  is the sum of the **last** 2 digits of your student ID. For example, for a student with student ID 1120329  $\omega_1 = 1+1 = 2$  and  $\omega_2 = 2+9 = 11$

