



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2012/2013**

COURSE NAME : ELECTRICAL PRINCIPLES I
COURSE CODE : DAR 11003
PROGRAMME : 1 DAR
EXAMINATION DATE : OCTOBER 2012
DURATION : 3 HOURS
INSTRUCTION : ANSWER **FIVE(5)** QUESTIONS ONLY

THIS PAPER CONSISTS OF SEVEN (7) PAGES

- Q1** For the circuit of Figure Q1:
- (a) Find the currents I and I_6 . (8 marks)
 - (b) Find the voltages V_1 and V_5 . (8 marks)
 - (c) Find the power delivered to the $6\text{ k}\Omega$ resistor. (4 marks)
- Q2** For the circuits of Figure Q2(a) and Figure Q2(b), using mesh analysis determine:
- (a) the current through the $5\ \Omega$ resistor for each circuit. (10 marks)
 - (b) the voltage V_a for each circuit. (10 marks)
- Q3** Find the Thévenin equivalent circuit for the network external to the resistor R in each of the circuits of Figure Q3(a) and Figure Q3(b). (20 marks)
- Q4** For the circuit of Figure Q4:
- (a) Find the time required for v_C to reach 60 V following the closing of the switch. (8 marks)
 - (b) Calculate the current i_C at the instant $v_C = 60\text{ V}$. (6 marks)
 - (c) Determine the power delivered by the source at the instant $t = 2\tau$. (6 marks)

Q5 For the circuit of Figure Q5:

(a) Determine τ .

(2 marks)

(b) Write the mathematical expression for the current i_L after the switch is closed at $t = 0$ sec.

(4 marks)

(c) Write the mathematical expressions for v_L and v_R after the switch is closed at $t = 0$ sec.

(8 marks)

(d) Determine i_L and v_L at $t = 5\tau$.

(6 marks)

Q6 Write the analytical expressions for the waveforms of Figure Q6(a), Figure Q6(b), Figure Q6(c) and Figure Q6(d) with the phase angle in degrees.

(20 marks)

Q7 (a) Find the sinusoidal expression for the applied voltage e_m for the system of Figure Q7(a) if

$$V_a = 60 \sin(\omega t + 30^\circ)$$

$$V_b = 30 \sin(\omega t - 30^\circ)$$

$$V_c = 40 \sin(\omega t + 120^\circ)$$

(10 marks)

(b) Find the sinusoidal expression for the current i_s for the system of Figure Q7(b) if

$$i_1 = 6 \times 10^{-3} \sin(377t + 180^\circ)$$

$$i_2 = 8 \times 10^{-3} \sin 377t$$

$$i_3 = 2i_2$$

(10 marks)

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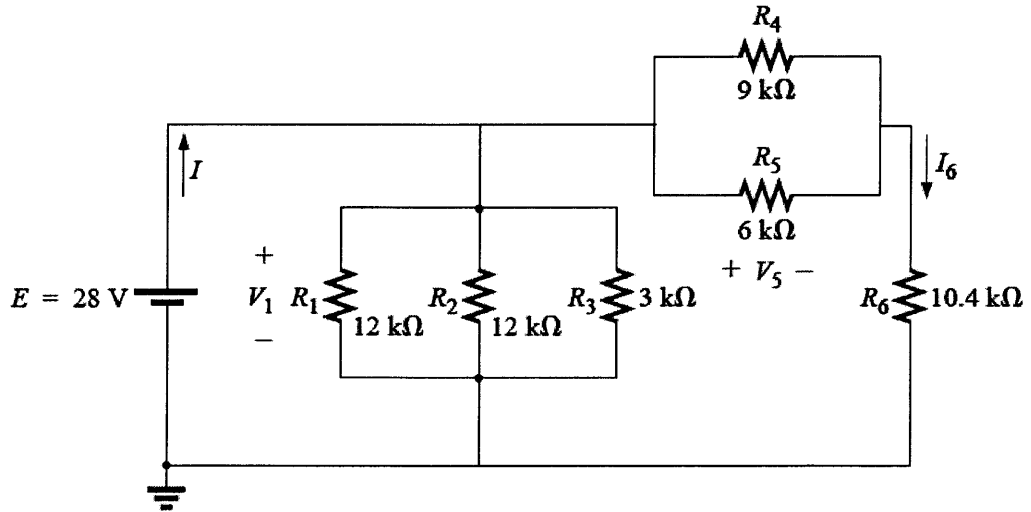


FIGURE Q1

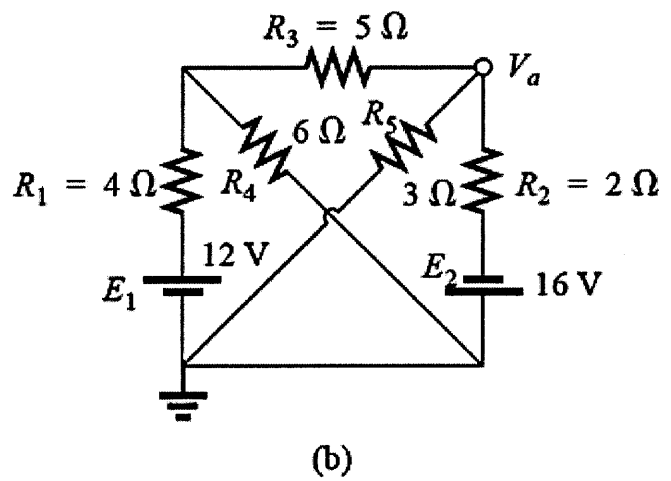
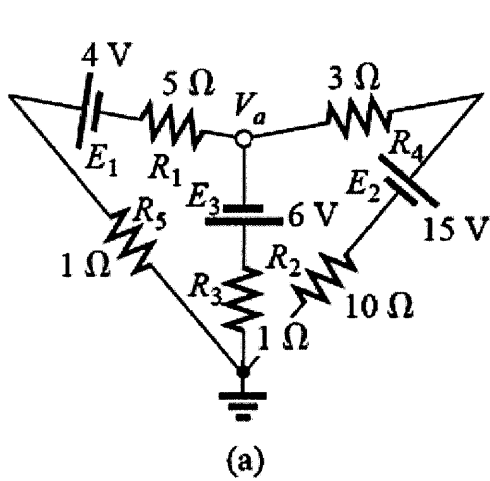


FIGURE Q2

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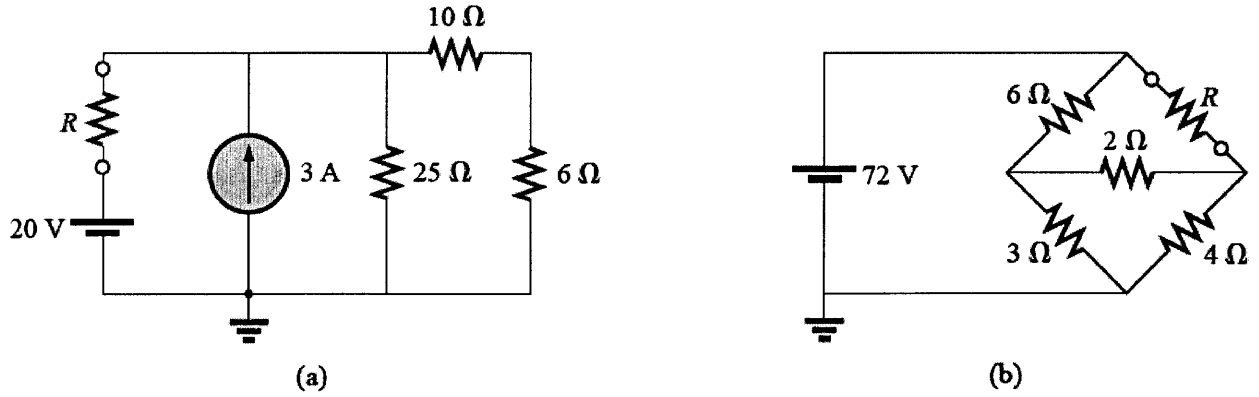


FIGURE Q3

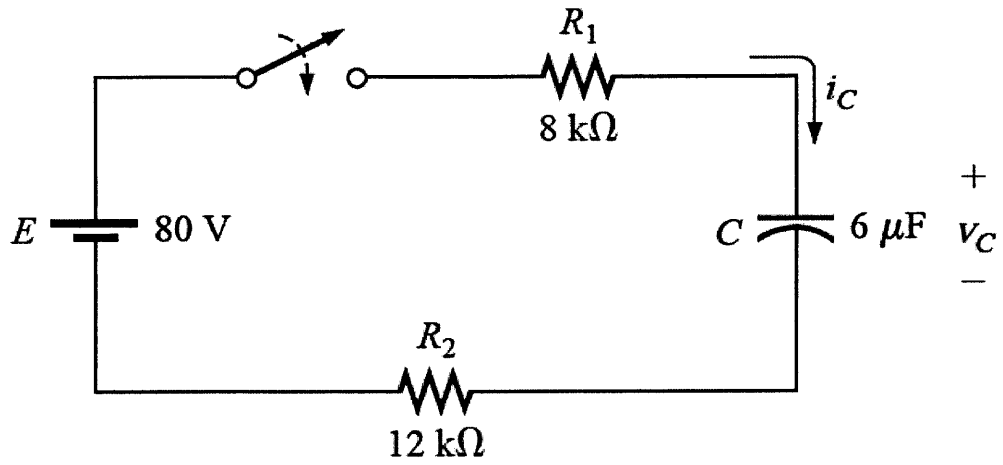


FIGURE Q4

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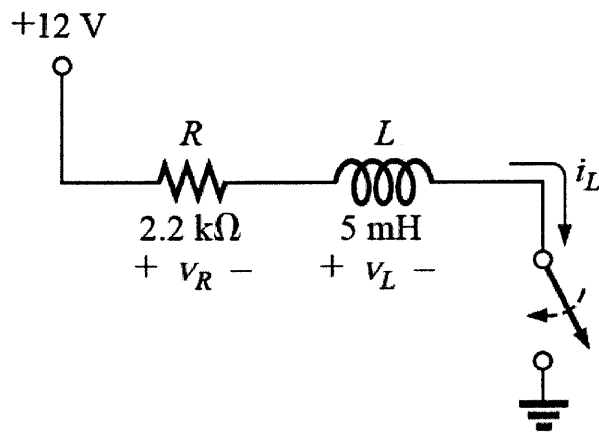


FIGURE Q5

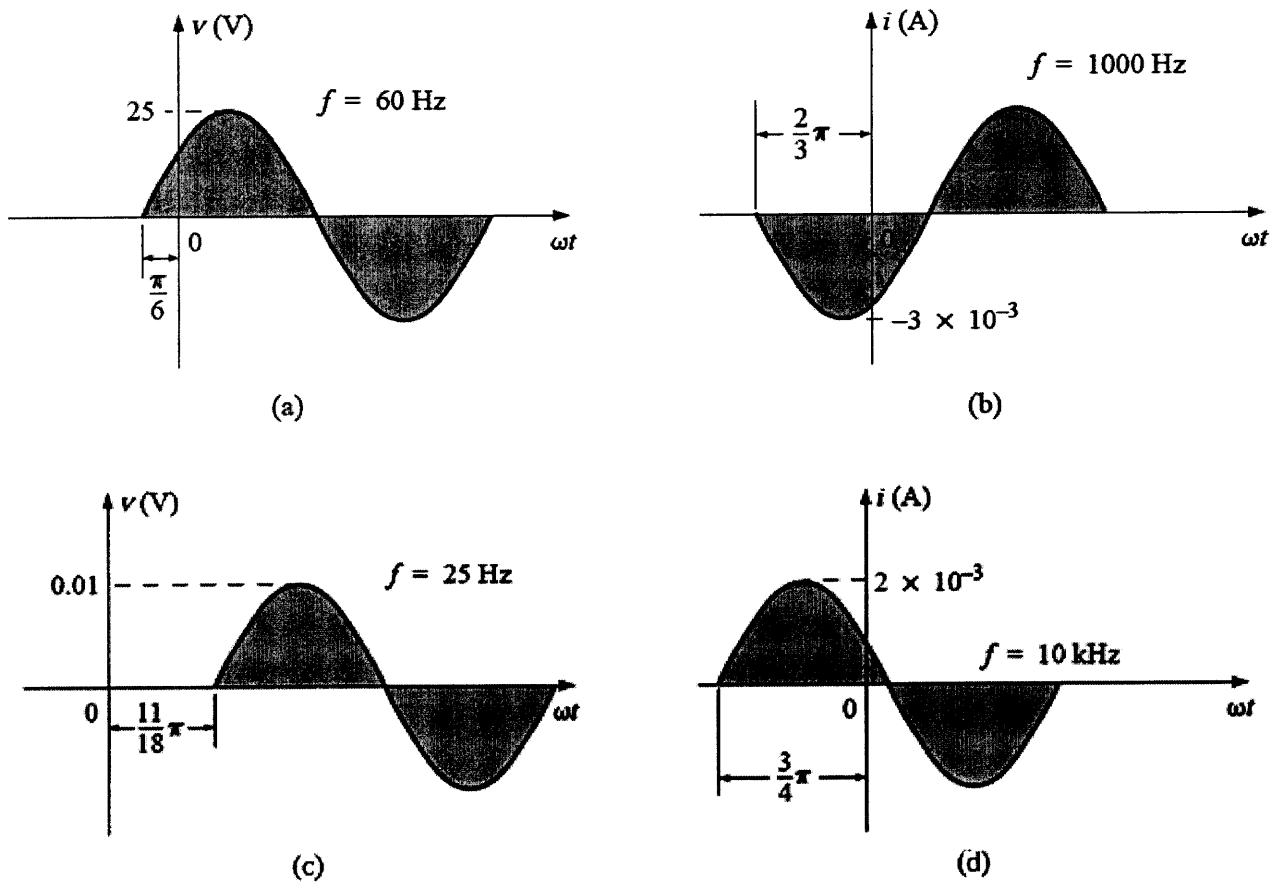


FIGURE Q6

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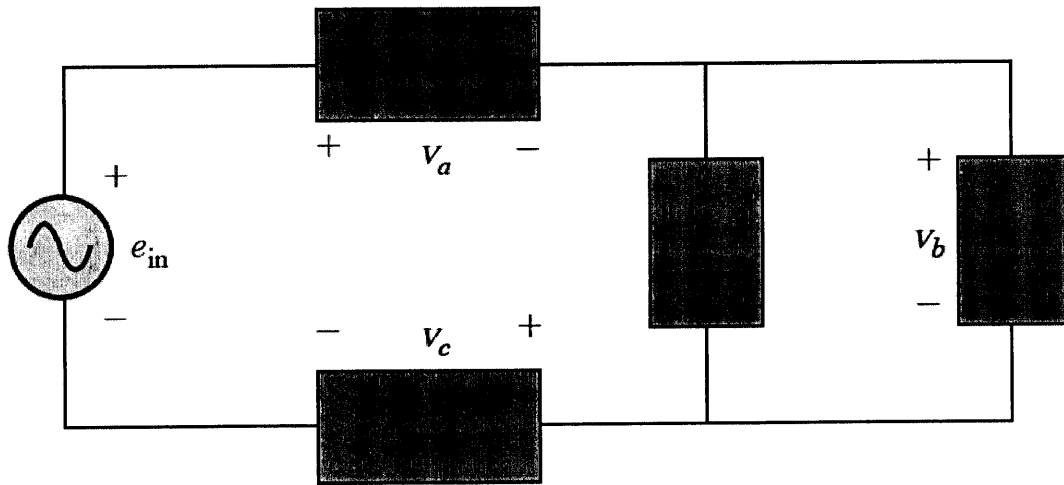


FIGURE Q7(a)

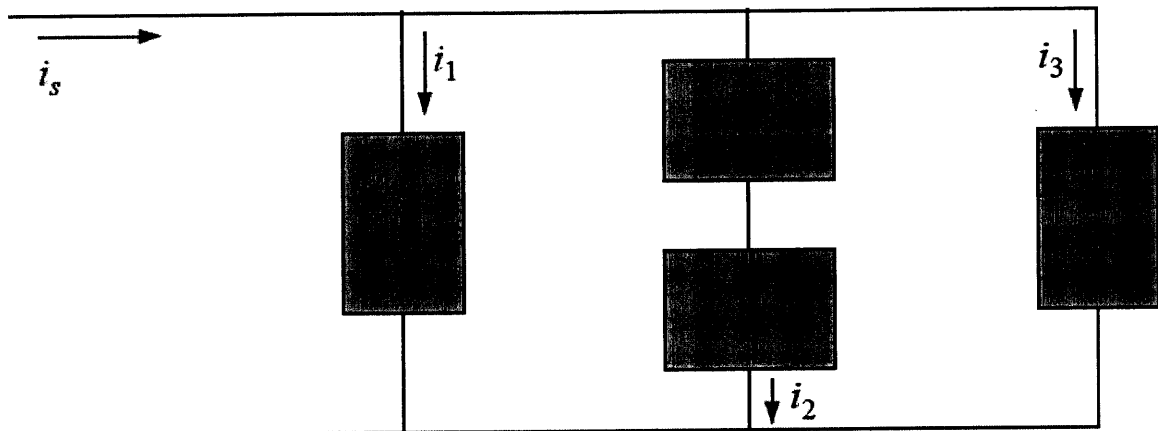


FIGURE Q7(b)