ENGG104 Tutorial **1**0 extra **Problems** (revision)
(Solutions)

Name_____ Student Number_____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

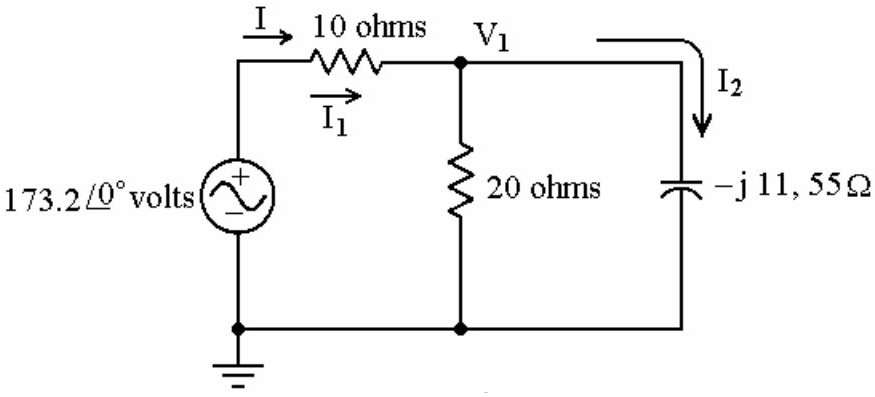

Figure 16.9

1) For the circuit shown in Figure 16.9, the current flowing through the 20 Ω resistor is 1) _____
A) 10 ∠30° B) 173.2 ∠0° C) 8.66 ∠60° D) 5 ∠–30°

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

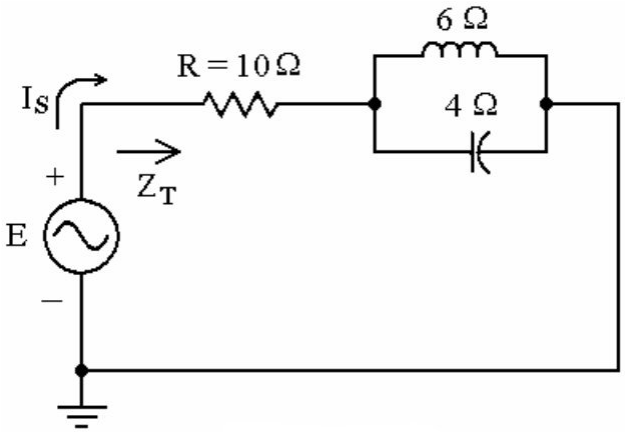

Figure 16.1

2) See Figure 16.1. The current divider rule can be applied to determine the current through the capacitor. 2) _____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

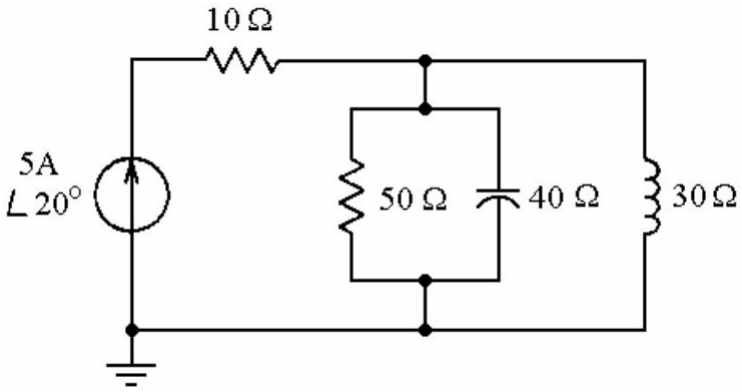

Figure 16.7

3) Describe how PSpice (Windows) can be used to solve for Z_T in the circuit shown in Figure 16.7. 3) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

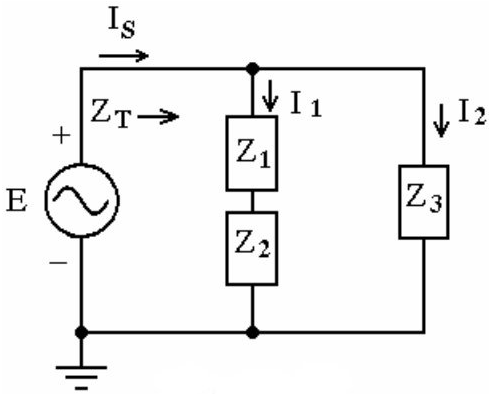

Figure 16.3

4) See Figure 16.3. Which one equation describes the total impedance Z_T for this circuit? 4) _____

A) $Z_T = (Z_1 \parallel Z_2) \parallel Z_3$
B) $Z_T = (Z_1 + Z_2) \parallel Z_3$
C) $Z_T = Z_1 + Z_2 + Z_3$
D) $Z_T = Z_1 + Z_2 - Z_3$

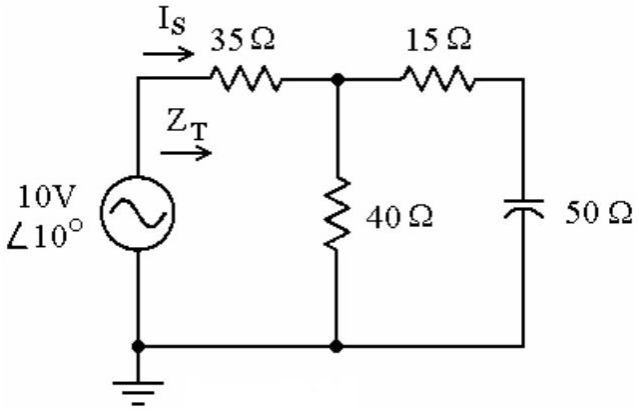

Figure 16.6

5) See Figure 16.6. What is the total impedance Z_T? 5) _____

A) 17.1 Ω ∠−33.2° B) 60.8 Ω ∠−13.8° C) 39.2 Ω ∠−30.7° D) 49.3 Ω ∠−9.4°

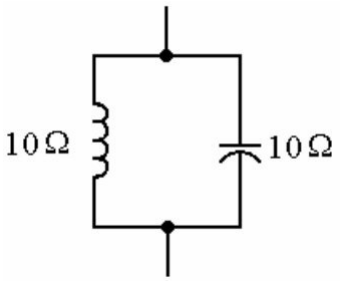

Figure 16.2

6) See Figure 16.2. What is the total impedance Z_T for this circuit? 6) _____

A) 5 Ω ≥0° B) 0 Ω ≥0° C) 100 Ω ≥0° D) infinity

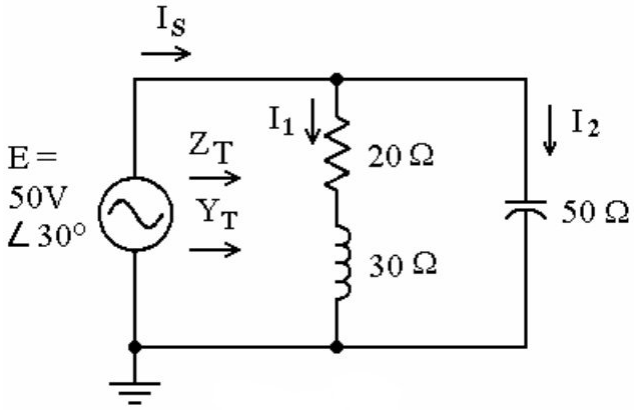

Figure 16.5

7) See Figure 16.5. What is the total admittance Y_T of this circuit? 7) _____

A) 0.028 S ∠−56.3° B) 0.02 S ∠90° C) 63.73 S ∠11.3° D) 0.016 S ∠−11.3°

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

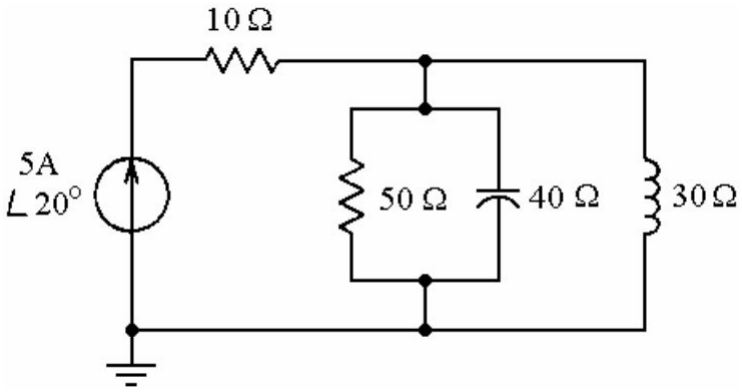

Figure 16.7

8) See Figure 16.7. Find the voltage across the coil. 8) _____

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

9) For parallel current sources, the equivalent current source is their sum or difference. 9) _____

10) The higher the frequency, the better the short–circuit approximation for X_C for ac conditions. 10) _____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

11) For many single source, series–parallel networks, the analysis is one that works back to the source, determines the _____, and then finds its way to the desired unknown. 11) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

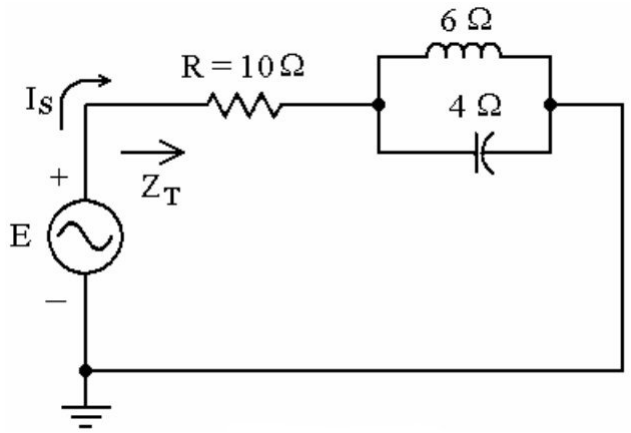

Figure 16.1

12) A 1 kHz signal E is applied in the circuit shown in Figure 16.1. What is the value of inductor L? 12) _____
A) 1910 μH B) 26.5 μH C) 1047 μH D) 955 μH

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

13) Series–parallel ac networks may contain any number of elements whose impedance is dependent on the applied _____. 13) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

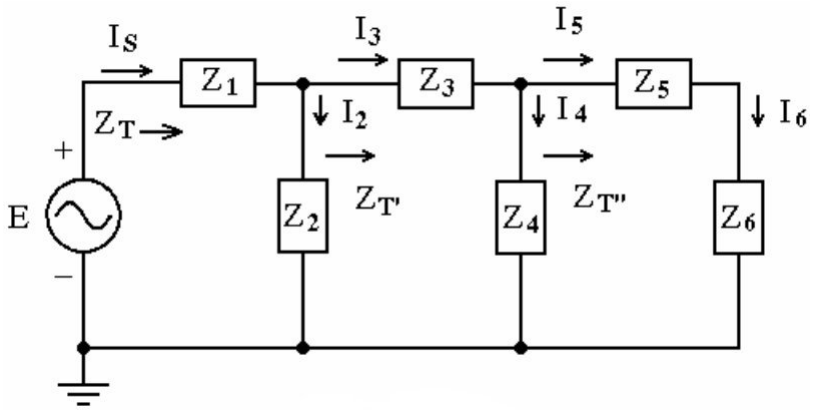

Figure 16.4

14) See Figure 16.4. Which one equation describes the total impedance Z_T? 14) _____

A) $Z_T = Z_1 + Z_T'$
B) $Z_T = Z_1 + (Z_2 \parallel Z_T')$
C) $Z_T = Z_1 \parallel Z_2$
D) $Z_T = Z_1 + Z_3 + Z_5 + Z_6'$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

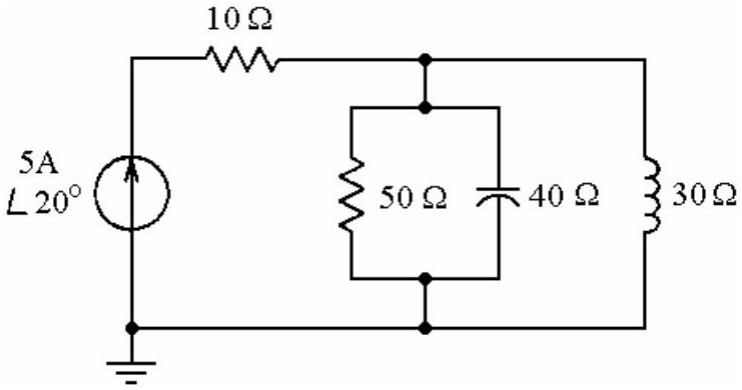

Figure 16.7

15) See Figure 16.7. Compute the total circuit impedance Z_T. 15) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

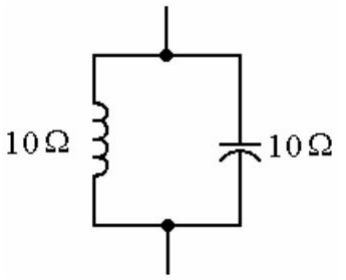

Figure 16.2

16) See Figure 16.2. As the frequency increases, the total impedance Z_T of this circuit 16) _____

A) increases, approaching infinity. B) becomes more inductive.
C) becomes more capacitive. D) becomes more resistive.

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

17) The advantage of ladder networks is that it is not necessary to know total impedance to be able to determine total current. 17) _____

18) Combining the impedance of more than one element can be of value in determining the total voltage across a series combination. 18) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

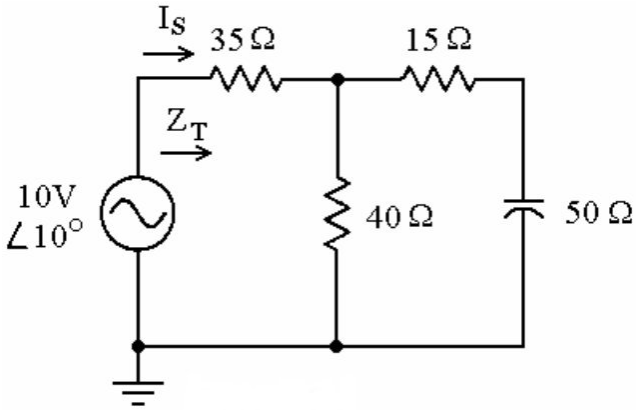

Figure 16.6

19) See Figure 16.6. What is the total current I_S? 19) _____

A) 5.0 A ∠23.8° B) 502 A ∠−10.7° C) 5.0 A ∠−10.7° D) 0.164 A ∠23.8°

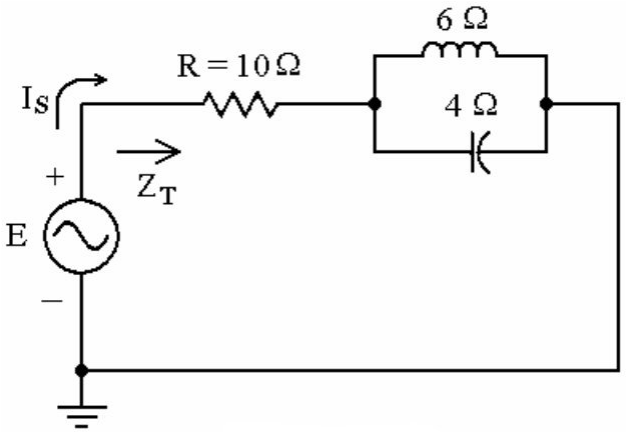

Figure 16.1

20) See Figure 16.1. What is the total impedance Z_T of this circuit? 20) _____

A) 10 Ω – j2.4 Ω B) 10 Ω + j12 Ω C) 10 Ω – j2 Ω D) 10 Ω – j12 Ω

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

21) Unknown voltages in series–parallel ac networks can be across only passive elements. 21) _____

22) The fundamental concept for solving series–parallel ac networks is different from solving series–parallel dc networks. 22) _____

23) The equivalent circuit is used in determining the source current in series–parallel ac networks. 23) _____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

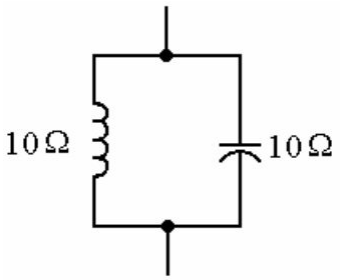

Figure 16.2

24) See Figure 16.2. If L = 10 mH, what is the applied frequency? What is the value of the capacitor? 24) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

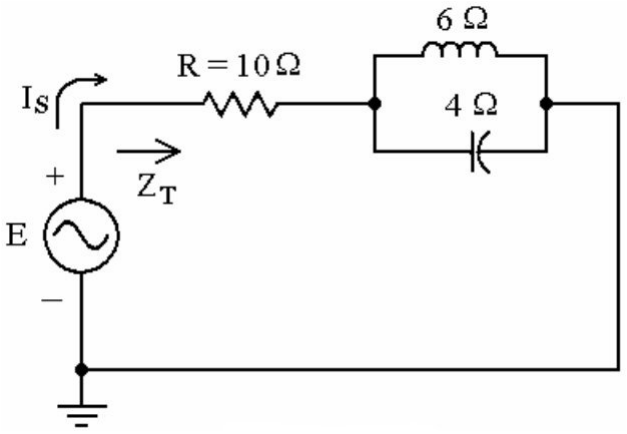

Figure 16.1

25) See Figure 16.1. If $I_S = 1$ A $\angle 80°$, what is the current through the coil? 25) _____

A) 2 A $\angle -100°$ B) 2 A $\angle 100°$ C) 0.5 A $\angle -100°$ D) 0.5 A $\angle 100°$

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

26) Determining the source current is the most critical step in solving series–parallel ac networks. 26) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

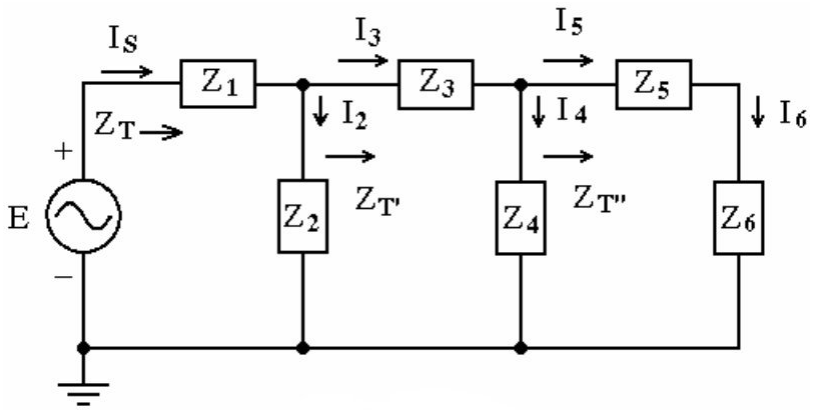

Figure 16.4

27) See Figure 16.4. Which one of these statements is true? 27) _____

A) $I_4 = I_6$ B) $I_3 = I_2 + I_5$ C) $I_S = I_3$ D) $I_3 = I_4 + I_6$

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

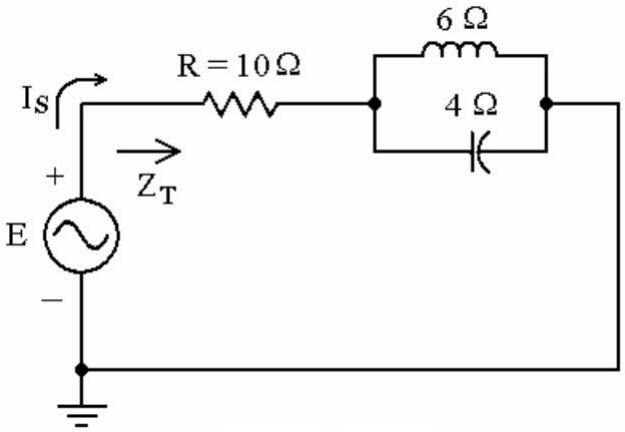

Figure 16.1

28) See Figure 16.1. The total impedance Z_T of this circuit is independent of the applied frequency. 28) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

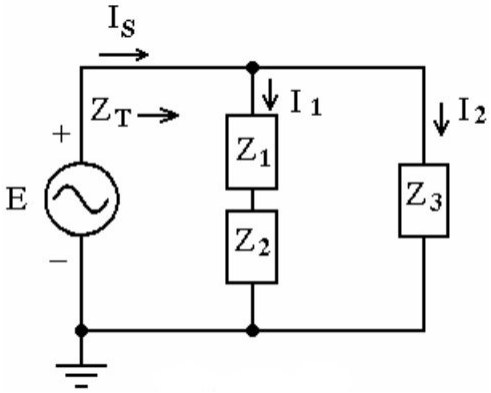

Figure 16.3

29) See Figure 16.3. Which one equation describes source voltage E? 29) _____

A) $E = I_S^2 Z_T$ B) $E = I_S Z_T$ C) $E = I_S \div Z_T$ D) $E = Z_T \div I_S$

Answer Key

1) D
2) TRUE
3) Set I to 1 A ∠0°, find voltage V ∠θ° across current source. The answer has the same value as Z ∠θ°
4) B
5) B
6) D
7) D
8) 231 V ∠42.6°
9) FALSE
10) TRUE
11) source current
12) D
13) frequency
14) B
15) 55.5 ∠18.6°
16) C
17) FALSE
18) TRUE
19) D
20) D
21) FALSE
22) FALSE
23) TRUE
24) 159 Hz, 100 μF
25) A
26) TRUE
27) D
28) FALSE
29) B