ENGG104 Tutorial 8 extra **Problems** (revision)
(solutions)

Name_____ Student Number_____

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

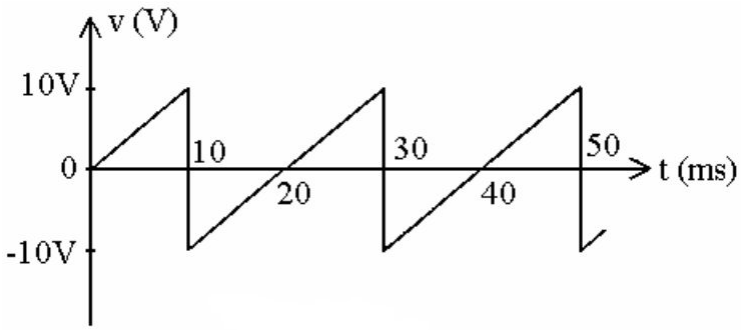

Figure 13.1

1) See Figure 13.1. What is the peak–to–peak voltage of this waveform? 1) A
A) +20 V B) +10 V C) 0 V D) –10 V

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

2) Increasing the frequency of a waveform increases the period. 2) False

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

3) Rotating an armature in a magnetic field produces what type of electricity? 3) ac

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

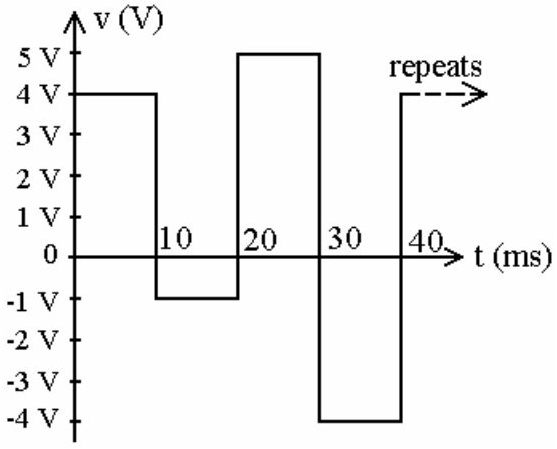

Figure 13.2

4) See Figure 13.2. What is the *average* value of this waveform? 4) _____
A) +3 V B) +4 V C) +1 V D) +2 V

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

5) Find the amplitude and frequency of 42.1 sin(377t + 30°) 5) 42.1, 60 Hz

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

6) What is the *effective* voltage if v = 10 sin(γt – 50°)? 6) D
A) 20 V B) 10 V C) 14.14 V D) 7.07 V

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

7) The effective value of any current or voltage is the value indicated on a dc meter. 7) False

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

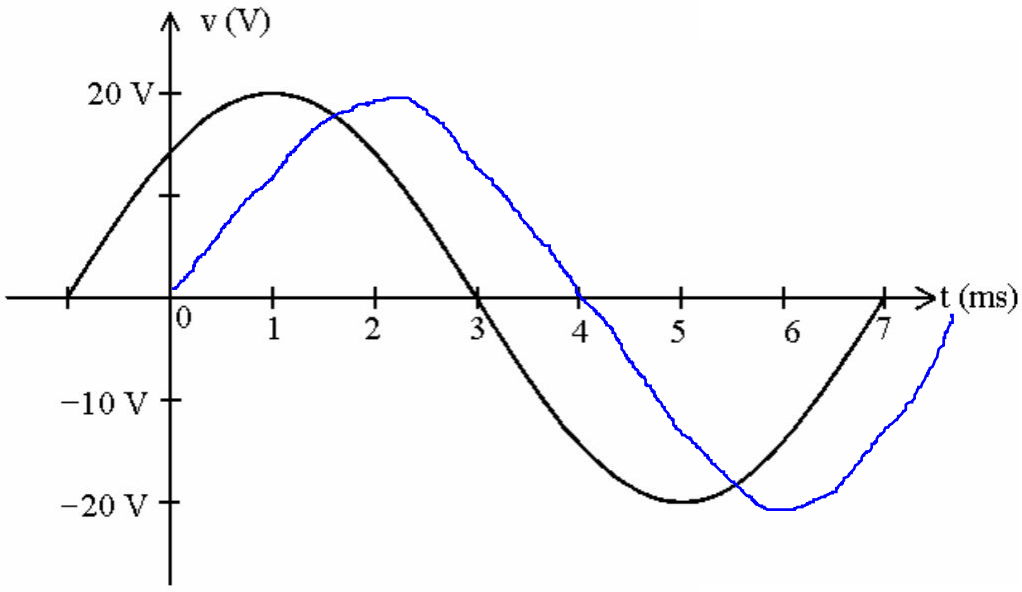

Figure 13.4

8) See Figure 13.4. Write the general voltage equation that describes this waveform. 8) 20 sin(250 pi)t +45

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

9) The magnitude of a waveform at any instant of time is called the? 9) A
A) Instantaneous value B) Peak value
C) Average value D) Peak–to–peak value

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

10) The equivalent dc value of a sinusoidal current or voltage is 70.7% of its peak value. 10) True

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

11) Find the period of a periodic wave that has a frequency of 0.2 Hz. 11) B
A) 50 seconds B) 5 seconds C) 5 milliseconds D) 0.5 seconds

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

12) If a waveform crosses the horizontal axis with a positive–going slope of 90° sooner than the other waveform, it is said to lag by 90°. 12) False

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

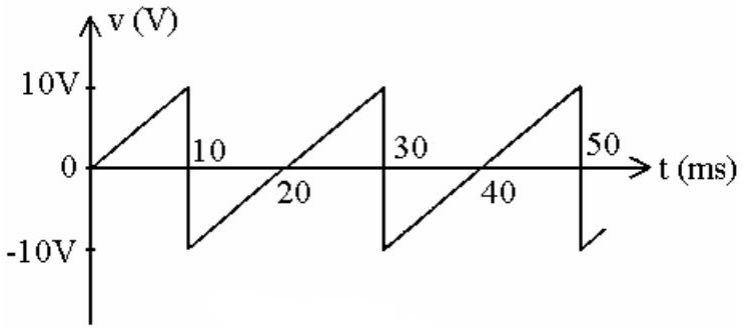

Figure 13.1

13) See Figure 13.1. What is the frequency of this waveform? 13) C
A) 33 Hz B) 100 Hz C) 50 Hz D) 20 Hz

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

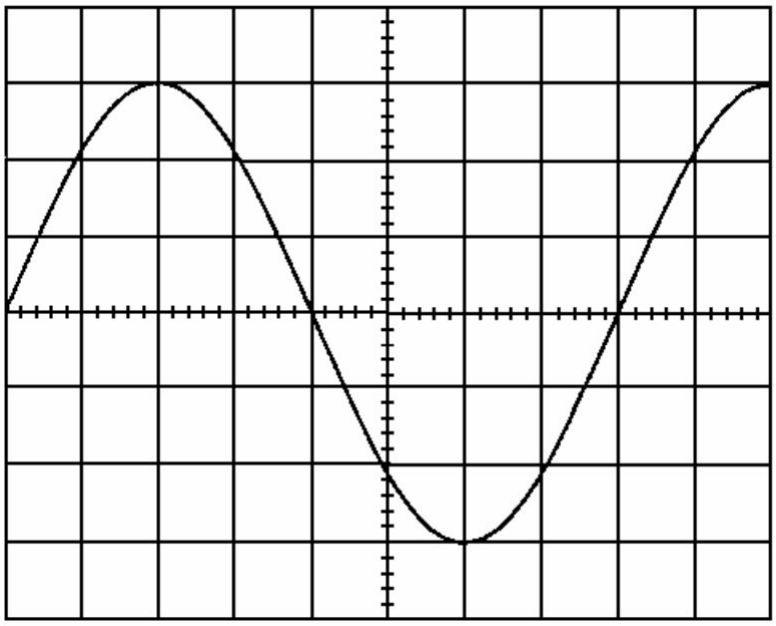

Figure 13.3

14) See Figure 13.3. An oscilloscope screen produces the waveform shown. The vertical sensitivity control is set to 20 volts per major division, and the horizontal sensitivity is set at 100 μs per major division. What is the frequency of the displayed waveform? 14) 1.25 kHz

15) What is the phase relationship between voltage v and current i if
$v = 15 \sin(\gamma t + 30°)$ and
$i = 20 \sin(\gamma t - 10°)$? 15) v leads i by 40°

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

16) What is the frequency of a waveform that has a period of 8 ms? 16) B
A) 12.5 Hz B) 125 Hz C) 1.25 Hz D) 1.25 KHz

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

17) R, L and C elements have response characteristics that affect all alternating waveforms. 17) False

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

18) If i = 10 sin α,what is i at $\alpha = 30°$? 18) D
A) +10 V B) –9.88 V C) 0 V D) +5 V

19) Which of the following will be necessary to increase the frequency of a sinusoidal waveform? 19) D
A) Increase the time period between successive repetitions
B) Reverse polarity
C) Increase the amplitude
D) Decrease the time period between successive repetitions

20) The opposition to the flow of current which results in the continual interchange of energy between source and magnetic field is known as? 20) B
A) Inductive phase shift B) Inductive reactance
C) Resistor influence D) Inactive causes

21) What is the inductive reactance at 800 Hz of a 1 mH inductor with an internal resistance of 20 Ω? 21) B
A) 0.2 Ω B) 5.0 Ω C) 20 Ω D) 12 Ω

22) Which one of the following polar values is equivalent to 30 + j40? 22) A
A) 50 ∠53.1° B) 70 ∠53.1° C) 70 ∠36.9° D) 50 ∠36.9°

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

23) For a purely resistive element, the voltage and the current through the element are in phase. 23) True

24) Inductive reactance increases directly in proportion to frequency. 24) True

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

25) The voltage across a 100 mH coil is v = 100 sin 50t. Which of these expressions describes the current? 25) C
A) 20 sin 50t B) 2000 sin(50t – 90°)
C) 20 sin(50t – 90°) D) 20 sin(50t + 90°)

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

26) The derivative of a sine wave is a maximum at the peak amplitude of the waveform. 26) False

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

27) Perform the operation, (1 + j)(1 – j2)/(3 + j), and express the answer in polar rectangular form. 27) 0.80 - j0.60

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

28) The voltage across a capacitor is v = 100 sin(377t + 50°) and the current through it is 18.8 sin(377t + 140°). What is the value of the capacitance? 28) C
A) 377 μF B) 5.3 μF C) 499 μF D) 1880 μF

29) The average power, or real power is the power delivered to and dissipated by the _____. 29) B
A) Capacitor B) Load C) Resistor D) Inductor

30) A capacitor or an inductor will change characteristics and begin to act like each other when they are exposed to _____. 30) B
A) Very low current B) Very high frequencies
C) Very low frequencies D) Very high voltage

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

31) Determine the frequency at which the reactance of a 10 μF capacitor equals that of a 0.5 H coil. 31) 71.2 Hz

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

32) Which one of the following is the derivative of 12 cos(30t – 15°)? 32) D
A) –360 cos(30t – 15°) B) +360 cos(30t – 15°)
C) +360 sin(30t – 15°) D) –360 sin(30t – 15°)

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

33) The derivative of a sine wave is a cosine wave. 33) True

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

34) Which relationship is true of *power factor*? 34) A
A) The more resistive the total impedance, the closer the power factor is to 1.
B) The power factor will be lagging in a capacitive circuit.
C) The more resistive the total impedance, the closer the power factor is to 0.
D) The power factor is the ratio of the total power in a circuit to the circuit current.

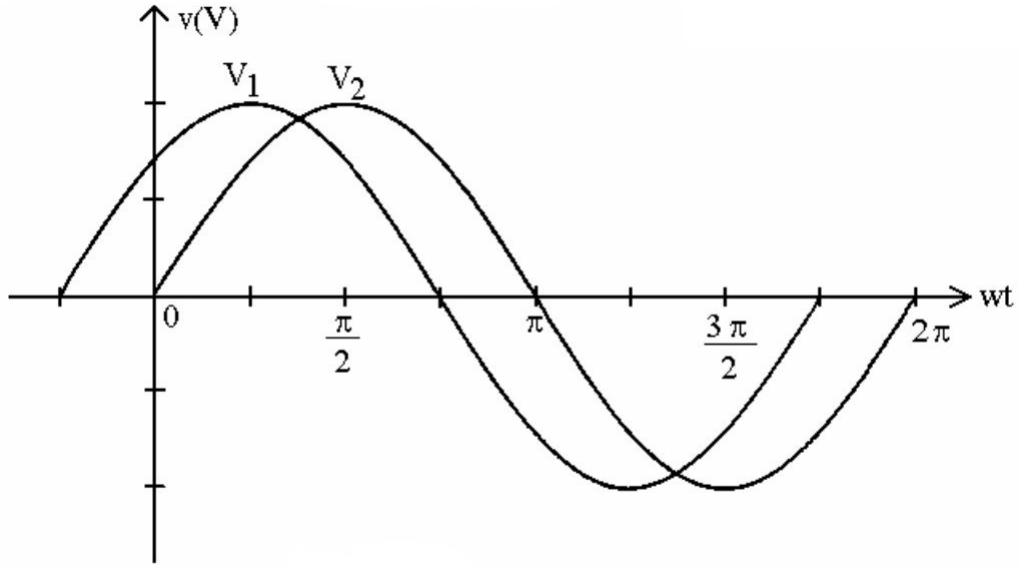

Figure 14.3

35) See Figure 14.3. What relationship exists between voltages v_1 and v_2? 35) A

A) v_1 leads v_2 by 45°. B) v_1 lags v_2 by 45°.
C) v_1 leads v_2 by $(\pi/4)$°. D) v_1 lags v_2 by $(\pi/4)$°.

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

36) For an inductor the voltage lags the current through it by 90 degrees. 36) False

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

37) Which one of the following values is equivalent to (5 + j3)(4 – j6)? 37) B

A) 38 + j18 B) 38 – j18 C) 2 – j18 D) 2 + j18

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

38) The current i = 0.5 sin 377t passes through a 10 μF capacitor. Find the sinusoidal expression for the voltage across the capacitor. 38) v = 133 sin(377t - 90°)

39) Express the rms phasor voltage V = 25 ∠30° as a peak sine wave if the frequency is 1000 Hz. 39) 35.4 sin(2000πt + 30°)