Attribution Nidhal Abdulaziz

ENGG104 Lecture 7 Problems

Name_____ Student Number_____

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

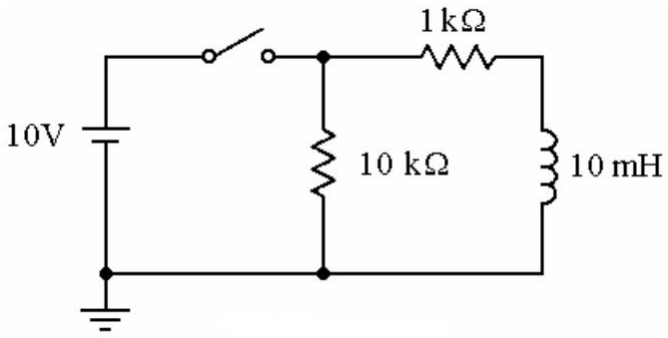

Figure 11.3

1) See Figure 11.3. What is the steady–state current through the coil after the switch closes? 1) 10 mA

2) See Figure 11.3. Assume that the 10 kΩ resistor is changed to a 10 MΩ resistor and that steady–state conditions are present before the change. What will the maximum coil voltage reach after the switch opens? 2) 100 kV

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

3) See Figure 11.3. After the closing of the switch, what will the current through the inductor be after the circuit voltages and currents have reached steady–state values? Assume that the inductor is an ideal (lossless) device. 3) **B**

A) 0 mA B) 10 mA C) 9.1 mA D) 11 mA

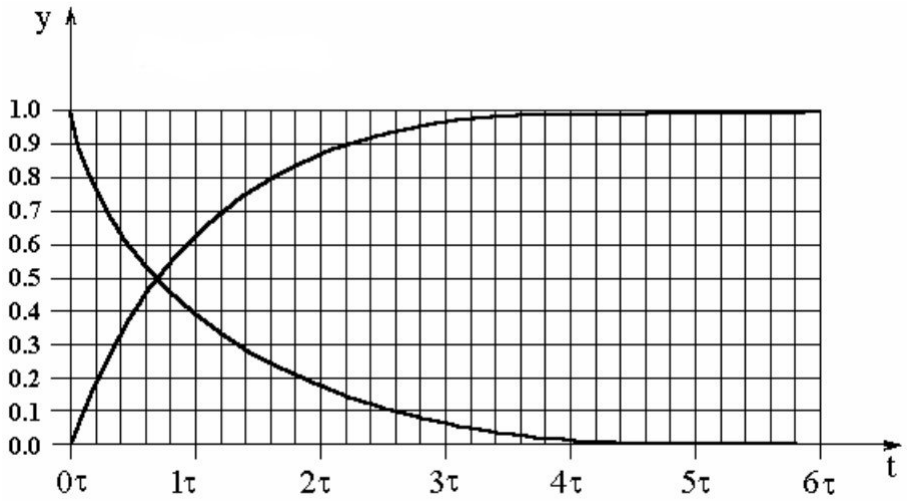

Figure 11.5

4) See Figure 11.5. The point at which the two curves cross is the *only* point at which 4) **C**
A) the current through the coil is the same as the current through the resistor.
B) the voltage across the coil has the same numeric value as the current through the coil.
C) the voltage across the coil is the same as the voltage across the resistor.
D) the steady–state conditions exist.

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

5) In an RL circuit, the time constant is the time required for the induced current to reach what percentage of its final value? 5) **63%**

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

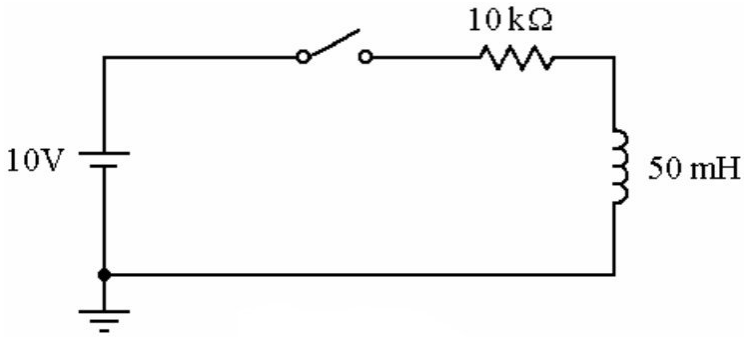

Figure 11.1

6) See Figure 11.1. What is the time constant $_X$ in this circuit? 6) **D**
A) 500 s B) 2×10^5 s C) 50 ms D) 5 μs

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

7) Because the energy of a coil is stored in the form of a magnetic field, the inductor can continue to store energy after current is removed. 7) **FALSE**

8) The steady–state level of the inductor current can be found by substituting its short–circuit equivalent and finding the resulting current through the element. 8) **True**

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

9) The notation $\frac{di}{dt}$ in an inductor refers to 9) **D**

A) the ratio of current to number of turns.
B) the magnetizing force applied per turn.
C) the coil permeability as a function of temperature.
D) the rate of change of current with respect to time.

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

10) The greater the change in current through the coil, the smaller the induced voltage. 10) **False**

11) The total inductance for inductors in series and parallel can be found the same way as resistors in series and parallel. 11) **True**

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

12) If an air–core coil has an inductance of 2 μH, what will the inductance become if an iron core is inserted? Assume that the iron core has a relative permeability μ_T, of 1000. 12) **B**

A) 2×10^{-9} H B) 2000 μH C) 63 μH D) 2 μH

13) Coils of various dimensions designed to introduce specified amounts of inductance into a circuit are called? 13) **A**

A) Inductors B) Electromagnets
C) Changed coils D) Semiconductors

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

14) Inductance is directly proportional to the area of the magnetic core and inversely proportional to the core length. 14) **True**

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

15) An air–core coil consists of 100 turns of wire wrapped on a 1 cm diameter coil form 4 cm long. What is the approximate inductance of this coil? 15) **D**

A) 250 μH B) 5 μH C) 3 mH D) 25 μH

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

16) The larger the inductance, the more the circuit will oppose a rapid buildup in current level. 16) **True**

17) Voltage across the coil is determined by the magnitude of the inductance of the coil and by the rate of change of current through the coil. 17) **True**

18) An increase in the number of turns and a decrease in the current through a wire will always result in an increase for magnetomotive force. 18) **False**

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

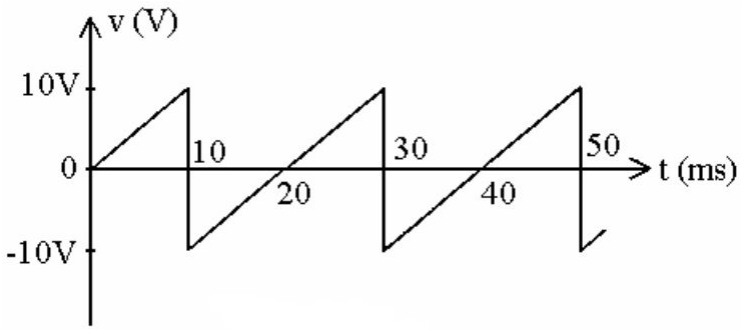

Figure 13.1

19) See Figure 13.1. What is the *average* value of this waveform? 19) **C**
A) +5 V B) +10 V C) 0 V D) +7.07 V

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

21) Which of the following will be necessary to increase the frequency of a sinusoidal waveform? 21) **A**
A) Decrease the time period between successive repetitions
B) Increase the time period between successive repetitions
C) Increase the amplitude
D) Reverse polarity

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

22) The cosine curve leads the sine curve by 180°. 22) **False**

23) The average value of a sine wave is zero. 23) **True**

24) The SI unit of frequency is called a hertz. 24) **True**

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

25) Find the amplitude and frequency of 42.1 sin(377t + 30°) 25) **42.1, 60 Hz**

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

26) Find the period of a periodic wave that has a frequency of 0.2 Hz. 26) **C**
A) 5 milliseconds B) 0.5 seconds C) 5 seconds D) 50 seconds

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

27) There are 57.3 degrees in one radian. 27) **True**

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

28) Find the frequency of a periodic wave that has a period of one hour. 28) **C**
A) 2.78 mHz B) 27.8 mHz C) 0.278 mHz D) 278 mHz

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

29) What is the phase relationship between voltage v and current i if $v = 15 \sin(\gamma t + 30°)$ and $i = 20 \sin(\gamma t - 10°)$? 29) **v leads i by 40°**

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

30) What is the period of a 50 kHz sine wave? 30) **D**

A) 5 μs B) 5×10^4 s C) 50 μs D) 20 μs

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

31) Increasing the frequency of a waveform increases the period. 31) **False**

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

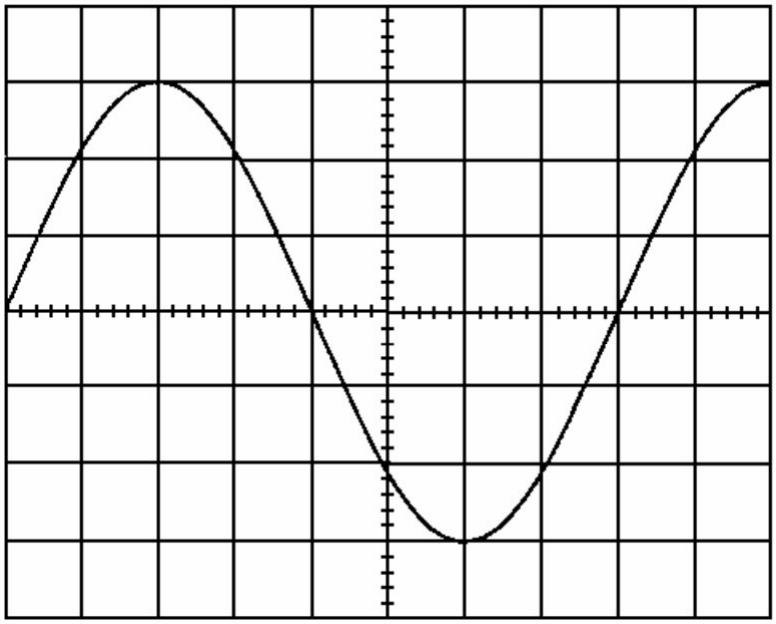

Figure 13.3

32) 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. Write the general voltage equation that describes this waveform. 32) **60 sin(2500πt)**

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

33) The peak value of a waveform is the maximum instantaneous value as measured from the zero–volt level. 33) **True**

34) 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°. 34) **False**

35) The SI unit of radian frequency is radians per second. 35) **True**