

**Ham Radio Class Lecture Worksheet**  
**Created by Scott A. Brady, AC7OD**

**Name** \_\_\_\_\_

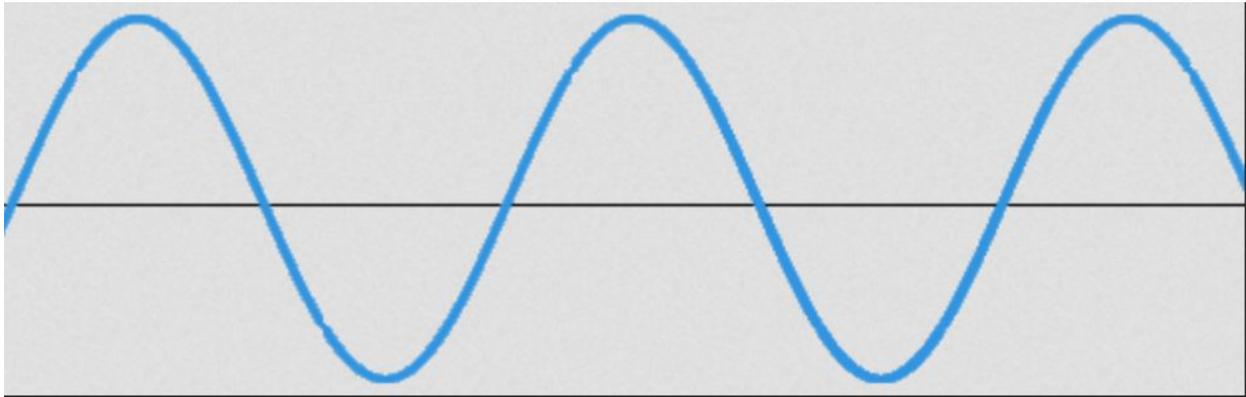
1. True False            I have to be an electronics expert to be a Ham Radio Operator.
2. An \_\_\_\_\_ is an experienced amateur radio operator who can help you with all things related to amateur radio, including helping you get your license.
3. \_\_\_\_\_ Radio is a slang term meaning Amateur Radio.
4. What are the three licenses granted by the Federal Communications Commission?
  - a.
  - b.
  - c.
5. True False            Morse code is no longer required to be a Ham.
6. According to the FCC Rules Part 97, what are the five purposes to Amateur Radio?
  - a.
  - b.
  - c.
  - d.
  - e.
7. For whom is the Amateur Radio Service unintended?
  - a. Persons who have messages to broadcast to the public.
  - b. Persons who need communications for the activities of their immediate family members, relatives and friends.
  - c. Persons who need two-way communications for personal reasons.
  - d. Persons who are interested in radio technique solely with a personal aim and without pecuniary interest.
8. Name activities that are considered to be illegal when using amateur radio.

9. True False In the event of a real emergency, just about anything goes when it comes to providing emergency communications.
10. A \_\_\_\_\_ is designated the licensee of a station and is responsible for all the transmissions from that station.
11. A message from the control operator of an amateur station to another amateur station control operator on behalf of another person is called \_\_\_\_\_ communications. Must have an agreement with that country to do this.
12. In general a technician may use up to \_\_\_\_\_ watts PEP power on HF bands, and \_\_\_\_\_ watts PEP power on other bands (with a few exceptions).
13. The FCC requires amateur stations to identify every \_\_\_\_\_ minutes and at the \_\_\_\_\_ of all transmissions.
14. Amateur call signs in the US begin with \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, or \_\_\_\_\_ and contain the numbers 0-9.
15. An Ham Radio License is good for \_\_\_\_\_ years with a 2 year grace period for renewal.
16. North America is in ITU Region \_\_\_\_\_ and Utah is in the ARRL Call District \_\_\_\_\_.
17. Fill in the band that a Technician amateur radio operator may use.

<b>UHF</b>	<b>Privileges</b>
23 cm	
33 cm	
70 cm	
<b>VHF</b>	<b>Privileges</b>
1.25 m	
2 m	
6 m	
<b>HF</b>	<b>Privileges</b>
10 m	
15 m	

40 m	
80 m	

18. Label the following using these words: Frequency, Wavelength, and Amplitude.



19. What is the formula for determining the wavelength of a given frequency?

Wavelength/Band = \_\_\_\_\_

20. Use the equation in #19 to find the bands from the following frequencies:

3.975 Mhz \_\_\_\_\_ meter band

21.25 Mhz \_\_\_\_\_ meter band

154.21 Mhz \_\_\_\_\_ meter band

7,233 Mhz \_\_\_\_\_ meter band

28.350 Mhz \_\_\_\_\_ meter band

21. What is an amateur station control point?

- A. The location of the station's transmitting antenna
- B. The location of the station transmitting apparatus
- C. The location in which the control operation function is performed
- D. The mailing address of the station licensee

22. How soon may you operate a transmitter on an Amateur radio service frequency after you pass the examination required for your first amateur radio license?

- A. Immediately
- B. 30 days after the test date
- C. As soon as your name and call sign appear in the FCC's ULS database
- D. You must wait until you receive your license in the mail from the FCC

23. Which of the following types of transmissions are prohibited?

- A. Transmissions that contain obscene or indecent words or language
- B. Transmissions to establish one-way communications
- C. Transmission to establish model aircraft control
- D. Transmissions for third party communications

24. What amount of transmitter power should be used on the uplink frequency of an amateur satellite or space station?

- A. The maximum power of your transmitter
- B. The minimum amount of power needed to complete the contact
- C. No more than half the rating of your linear amplifier
- D. No more than 1 watt

25. A \_\_\_\_\_ is an amateur station that simultaneously retransmits the transmission of another amateur station on a different channel, and greatly increases the effective range of the transmission.

26. A \_\_\_\_\_ circuit keeps the radio speaker turned off until sufficient RF energy is present at the receiver. This keeps the radio quiet until a signal is received. In a repeater, the squelch also turns on the transmitter.

27. A \_\_\_\_\_ Tone is a sub-audible tone that is sent by a radio to "trigger" a repeater.

28. What is an Autopatch and what can you do with one?

29. The best practice when using any frequency is to \_\_\_\_\_ first before transmitting.

30. Using the RST system, how would you report that the person you are talking to has an excellent signal?

31. \_\_\_\_\_ signals are a type of ham radio shorthand. What does QRZ mean?

32. Using the ITU Phonetic Alphabet, write out AC7OD below:

33. What are the “No-No’s” when transmitting on ham radio bands?

A.

B.

C.

D.

E.

F.

G.

H.

I.

34. Who polices the ham radio bands?

35. What is the term used to describe an amateur station that is transmitting and receiving on the same frequency?

- A. Full duplex communication
- B. Diplex communication
- C. Simplex communication
- D. Half duplex communication

36. What is the FCC Part 97 definition of a space station?

- A. Any multi-stage satellite
- B. An Earth satellite that carries one or more amateur operators
- C. An amateur station located less than 25 km above the Earth’s surface
- D. An amateur station located more than 50 km above the Earth’s surface

37. Which of the following meets the FCC definition of harmful interference?
- A. Radio transmissions that annoy users of a repeater.
  - B. Unwanted radio transmissions that cause costly harm to radio station apparatus.
  - C. That which seriously degrades, obstructs or repeatedly interrupts a radio communication service operating in accordance with Radio Regulations.
  - D. Static from lightning storms.
38. What is the term for an FCC-issued primary station/operator license grant?
- A. Five years
  - B. Life
  - C. Ten years
  - D. Twenty years
39. What is the most common repeater frequency offset in the 2 meter band?
- A. plus 500 khz
  - B. Plus or minus 600 khz
  - C. Minus 500 khz
  - D. Only plus 600 khz
40. What is an appropriate way to call another station on a repeater if you know the other station's call sign?
- A. Say "break, break" then say the station's call sign
  - B. Say the station's call sign then identify your call sign
  - C. Say "CQ" three times then the other station's call sign
  - D. Wait for the station to call "CQ" then answer it
41. What part of the atmosphere allows for long-distance radio communications using Skywave Propagation?
42. The Sun goes the \_\_\_\_\_ - year cycles. The (more/less) the sunspot count, the (more/less) the atmosphere is ionized.
43. Write one pro and one con of VHF/UHF Propagation.
- Pro:
- Con:
44. How does the wavelength of a radio wave relate to its frequency?
- A. The wavelength gets longer as its frequency increases
  - B. The wavelength gets shorter as the frequency increases
  - C. There is no relationship between wavelength and frequency
  - D. The wavelength depends on the bandwidth of the signal

45. Name three ways that ham radio may be harmful or fatal to the practitioner.

A.

B.

C.

46. What part of electricity can be particularly fatal?

47. One of the most important things to do when using any kind of high voltage, is to make sure that all equipment is properly \_\_\_\_\_.

48. What is the best practice when using ham radio during severe thunderstorms?

49. In a 120 Volt AC Outlet, label the leads with their function.

A. Green is \_\_\_\_\_.

B. Black is \_\_\_\_\_.

C. White is \_\_\_\_\_.

50. What are the following devices:

\_\_\_\_\_ An older meter that can measure voltage, resistance, and current.

\_\_\_\_\_ A modern meter than can measure voltage, resistance, and current.

\_\_\_\_\_ A meter that the gives relative signal strength of a received signal.

\_\_\_\_\_ Measures transmitter output power and reflected power.

\_\_\_\_\_ A fancy device measures forward and reflected power.

\_\_\_\_\_ A device that lets you tune up a transmitter off the air.

\_\_\_\_\_ A device that removes harmonic radiation from your signals.

51. What reading on an SWR meter indicates a perfect impedance match between the antenna and the feedline?

- A. 2 to 1
- B. 1 to 3
- C. 1 to 1
- D. 10 to 1

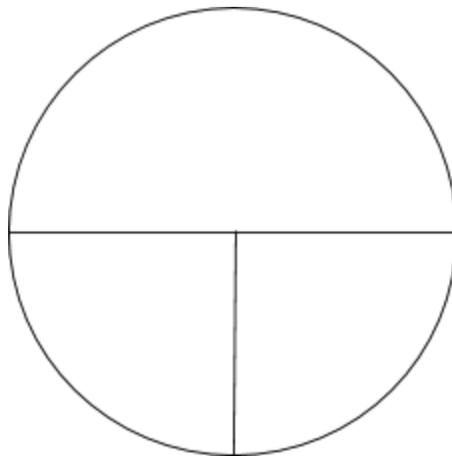
52. What is connected to the green wire in a three-wire electrical AC plug?

- A. Neutral
- B. Hot
- C. Safety ground
- D. The white wire

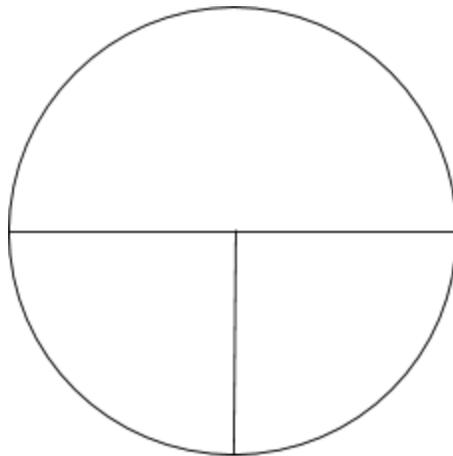
53. Match the following:

- |               |                        |
|---------------|------------------------|
| _____ Hertz   | A. Inductors           |
| _____ Volts   | B. Power               |
| _____ Amps    | C. Frequency           |
| _____ Ohms    | D. Resistance          |
| _____ Farads  | E. Electrical Current  |
| _____ Henries | F. Electromotive Force |
| _____ Watts   | G. Capacitance         |

54. Write the formula for Ohms Law and the meaning of each term.



55. Write the formula for Power and the meaning of each term.



56. Using the Power equation in #55, calculate the following:

What is the amps of a circuit that is running on 12 volts with a 4 ohms resistor? \_\_\_\_\_

What is the power (in watts) in a 12 volt circuit with a 4 ohms resistor? \_\_\_\_\_

57. Fun with Metric Units:

A. How many watts in a kilowatt?

B. How many milliamps in an amp?

58. If an ammeter calibrated in amperes is used to measure a 3000-milliampere current, what reading would it show?

A. 0.003 amperes

B. 0.3 amperes

C. 3 amperes

D. 3,000,000 amperes

59. Which is a commonly accepted value for the lowest voltage that can cause a dangerous electric shock?

A. 12 volts

B. 30 volts

C. 120 volts

D. 300 volts

60. Which of the following is a good electrical conductor?
- A. Glass
  - B. Wood
  - C. Copper
  - D. Rubber
61. Which instrument would you use to measure electric potential or electromotive force?
- A. An ammeter
  - B. A voltmeter
  - C. A wavemeter
  - D. An ohmmeter
62. Electrical power is measured in which of the following units?
- A. Volts
  - B. Watts
  - C. Ohms
  - D. Amperes
63. \_\_\_\_\_ limit or oppose the flow of current through a circuit.
64. The unit of measure for resistance is the \_\_\_\_\_.
65. \_\_\_\_\_ store electrical energy in a magnetic field.
66. \_\_\_\_\_ store electrical energy in an electrostatic field.
67. Capacitance is measured in \_\_\_\_\_.
68. What electrical component is used to protect other circuit components from current overloads?
- A. Fuse
  - B. Capacitor
  - C. Shield
  - D. Inductor
69. What does an antenna tuner do?
- A. It matches the antenna system impedance to the transceiver's output impedance
  - B. It helps a receiver automatically tune in weak stations
  - C. It allows an antenna to be used on both transmit and receive
  - D. It automatically selects the proper antenna for the frequency band being used

70. What is another name for CW?

71. \_\_\_\_\_ is used for any voice transmission.

72. Name one advantage of AM bands and one advantage of SSB?

A. AM -

B. SSB -

73. True      False      It is possible to send images over radio waves.

74. What does RTTY stand for and what role has it played in modern communications?

75. What are some advantages of modern data systems over RTTY?

76. What is IRLP and what can you do with it?

77. What method of call sign identification is required for a station transmitting phone signals?

A. Send the call sign followed by the indicator RPT

B. Send the call sign using CW or phone emission

C. Send the call sign followed by the indicator R

D. Send the call sign using only phone emission

78. Which type of modulation is most commonly used for VHF and UHF voice repeaters?

A. AM

B. SSB

C. PSK

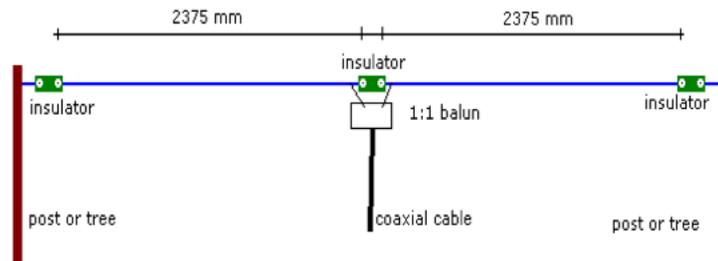
D. FM

79. What can you do if you are told your FM handheld or mobile transceiver is over deviating?
- A. Talk louder into the microphone
  - B. Let the transceiver cool off
  - C. Change to a higher power level
  - D. Talk farther away from the microphone

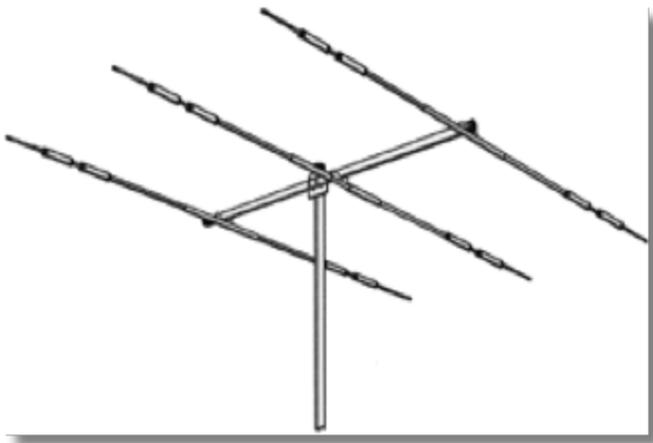
80. In a perfect universe, and Isotropic Radiator antenna would transmit radio energy in \_\_\_\_\_ directions.

81. Antennas work because the materials they are made out of \_\_\_\_\_.

82. Label the antennae types below:



NOT TO SCALE



83. A \_\_\_\_\_ line connects your radio to the antenna.

84. \_\_\_\_\_ line is balanced because neither side is grounded.



85. \_\_\_\_\_ cable is unbalanced because one side is grounded, and is the most popular type of feed line.



86. Why is coaxial cable used more often than any other feedline for amateur radio antenna systems?

- A. It is easy to use and requires few special installation considerations
- B. It has less loss than any other type of feedline
- C. It can handle more power than any other type of feedline
- D. It is less expensive than any other types of feedline

87. A \_\_\_\_\_ converts from a BALanced feed line to an UNbalanced feed line.



88. The best possible SWR is a forward/reflected ratio of \_\_\_\_\_.

89. An antenna \_\_\_\_\_ provides in impedance match between the transmitter and the antenna system in order to make the best “match” possible.

$$\text{Length of dipole in feet} = \frac{468}{f \text{ (MHz)}}$$

90. What is the approximate length, in inches, of a 6 meter 1/2-wavelength wire dipole antenna?

- A. 6
- B. 50
- C. 112
- D. 236

$$\text{Length of vertical in feet} = \frac{234}{f \text{ (MHz)}}$$

91. What is the approximate length, in inches, of a quarter-wavelength vertical antenna for 146 MHz?

- A. 112
- B. 50
- C. 19
- D. 12

92. How would you change a dipole antenna to make it resonant on a higher frequency?

- A. Lengthen it
- B. Insert coils in series with radiating wires
- C. Shorten it
- D. Add capacity hats to the ends of the radiating wires

93. What type of antennas are the quad, Yagi, and dish?

- A. Non-resonant antennas
- B. Loop antennas
- C. Directional antennas
- D. Isotropic antennas

94. What is a disadvantage of the "rubber duck" antenna supplied with most handheld radio transceivers?

- A. It does not transmit or receive as effectively as a full-sized antenna
- B. It transmits a circularly polarized signal
- C. If the rubber end cap is lost it will unravel very quickly
- D. All of these choices are correct

95. (Ionizing/Non-ionizing) radiation can cause damage to DNA, whereas (Ionizing/Non-ionizing) radiation can cause heating of biological tissues.

96. Radio waves can heat up tissues just like a \_\_\_\_\_. The \_\_\_\_\_ is an area of the body that is most easily injured due to RF energy.

97. What is the minimum safe distance from a power line to allow when installing an antenna?

- A. Half the width of your property.
- B. The height of the power line above ground.
- C. 1/2 wavelength at the operating frequency.
- D. So that if the antenna falls unexpectedly, no part of it can come closer than 10 feet to the power wires.

98. What is the maximum power level that an amateur radio station may use at VHF frequencies before an RF exposure evaluation is required?

- A. 1500 watts PEP transmitter output
- B. 1 watt forward power
- C. 50 watts PEP at the antenna
- D. 50 watts PEP reflected power

99. What could happen if a person accidentally touched your antenna while you were transmitting?

- A. Touching the antenna could cause television interference
- B. They might receive a painful RF burn
- C. They might develop radiation poisoning
- D. All of these choices are correct

100. Please write a paragraph in response to the following question:

**With a new ham radio license, what are some ways that you will use that new license to benefit yourself, and those who live in your community?**