Test Question Pool – Technician V32–XX Class

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

1) Which of the following services are protected from interference by amateur signals under all circumstances?
   A) Citizens Radio Service
   B) Broadcast Service
   C) Land Mobile Radio Service
   D) Radionavigation Service

   Answer: D

2) Which of the following meets the 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 the Radio Regulations
   D) Static from lightning storms

   Answer: C

3) When is willful interference to other amateur radio stations permitted?
   A) Only if the station being interfered with is expressing extreme religious or political views
   B) At no time
   C) Only during a contest
   D) At any time, amateurs are not protected from willful interference

   Answer: B

4) Which frequency is within the 6 meter band?
   A) 49.00 MHz
   B) 52.525 MHz
   C) 28.50 MHz
   D) 222.15 MHz

   Answer: B

5) What amateur band are you using if you are transmitting on 223.50 MHz?
   A) 15 meter band
   B) 10 meter band
   C) 2 meter band
   D) 1.25 meter band

   Answer: D

6) Which of the bands above 30 MHz that are available to Technician Class operators have mode–restricted subbands?
   A) The 6 meter, 2 meter, and 70 cm bands
   B) The 2 meter and 13 cm bands
   C) The 6 meter, 2 meter, and 1.25 meter bands
   D) The 2 meter and 70 cm bands

   Answer: C

7) What emission modes are permitted in the mode–restricted sub–bands at 50.0 to 50.1 MHz and 144.0 to 144.1 MHz?
   A) CW only
   B) CW and RTTY
   C) SSB only
   D) CW and SSB

   Answer: A

8) What type of amateur station simultaneously retransmits the signal of another amateur station on a different channel or channels?
   A) Beacon station
   B) Earth station
   C) Repeater station
   D) Message forwarding station

   Answer: C

9) 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

Answer: B

10) What type of identification is being used when identifying a station on the air as Race Headquarters?

A) Tactical call sign
B) An official call sign reserved for RACES drills
C) SSID
D) Broadcast station

Answer: A

11) When using tactical identifiers such as "Race Headquarters" during a community service net operation, how often must your station transmit the station's PUC–assigned call sign?

A) Never, the tactical call is sufficient
B) Once during every hour
C) At the end of each communication and every ten minutes during a communication
D) At the end of every transmission

Answer: C

12) When is an amateur station required to transmit its assigned call sign?

A) At the beginning of each contact, and every 10 minutes thereafter
B) At least once during each transmission
C) At least every 15 minutes during and at the end of a communication
D) At least every 10 minutes during and at the end of a communication

Answer: D

13) Which of the following is an acceptable language to use for station identification when operating in a phone sub–band?

A) Any language recognized by the United Nations
B) Any language recognized by the ITU
C) The English language
D) English, French, or Spanish

Answer: C

14) Which of the following is a result of the fact that the amateur service is secondary in some portions of the 70 cm band?

A) Amateurs may find non–amateur stations in the bands, and must avoid interfering with them
B) Amateurs must give foreign amateur stations priority in those portions
C) International communications are not permitted on 70 cm
D) Digital transmissions are not permitted on 70 cm

Answer: A

15) What is the ITU?

A) An agency of the Government of Belize

B) A United Nations agency for information and communication technology issues

C) An independent frequency coordination agency

D) A department of the PUC

Answer: B

16) When are you allowed to operate your amateur station in a foreign country?

A) When the foreign country authorizes it

B) When there is a mutual agreement allowing third party communications

C) When authorization permits amateur communications in a foreign language

D) When you are communicating with non–licensed individuals in another country

Answer: A

17) From which of the following locations may a PUC–licensed amateur station transmit?

A) From within any country that belongs to the International Telecommunication Union

B) From within any country that is a member of the United Nations

C) From anywhere within in ITU Regions 2 and 3

D) From any vessel or craft located in international waters and documented or registered in Belize

Answer: D

18) When may an amateur station transmit without identifying?

A) When the transmissions are of a brief nature to make station adjustments

B) When the transmissions are unmodulated

C) When the transmitted power level is below 1 watt

D) When transmitting signals to control a model craft

Answer: D

19) What, if any, are the restrictions concerning transmission of language that may be considered indecent or obscene?

A) The PUC maintains a list of words that are not permitted to be used on amateur frequencies

B) Any such language is prohibited

C) The ITU maintains a list of words that are not permitted to be used on amateur frequencies

D) There is no such prohibition

Answer: B

20) In which of the following circumstances may the control operator of an amateur station receive compensation for operating the station?

A) When engaging in communications on behalf of their employer

B) When the communication is incidental to classroom instruction at an educational institution

C) When re–broadcasting weather alerts during a RACES net

D) When notifying other amateur operators of the availability for sale or trade of apparatus

Answer: B

21) When is the transmission of codes or ciphers that hide the meaning of a message allowed by an amateur station?

A) Only during contests

B) Only when operating mobile

C) Only when transmitting control commands to space stations or radio control craft

D) Only when frequencies above 1280 MHz are used

Answer: C

22) Under which of the following circumstances may an amateur radio station engage in broadcasting?

A) Under no circumstances

B) When transmitting code practice, information bulletins, or transmissions necessary to provide emergency communications

C) At any time as long as no music is transmitted

D) At any time as long as the material being transmitted did not originate from a commercial broadcast station

Answer: B

23) What is the only time an amateur station is authorized to transmit music?

A) When incidental to an authorized retransmission of manned spacecraft communications

B) When the music produces no spurious emissions

C) When the purpose is to interfere with an illegal transmission

D) When the music is transmitted above 1280 MHz

Answer: A

24) What types of amateur stations can automatically retransmit the signals of other amateur stations?

A) Auxiliary, beacon, or Earth stations

B) Auxiliary, repeater, or space stations

C) Beacon, repeater, or space stations

D) Earth, repeater, or space stations

Answer: B

25) What must an amateur operator do when making on–air transmissions to test equipment or antennas?

A) Properly identify the transmitting station

B) Make test transmissions only after 10:00 p.m. local time

C) Notify the PUC of the test transmission

D) State the purpose of the test during the test procedure

Answer: A

26) Which of the following is true when making a test transmission?

A) Station identification is not required if the transmission is less than 15 seconds

B) Station identification is not required if the transmission is less than 1 watt

C) Station identification is only required once an hour when the transmissions are for test purposes only

D) Station identification is required at least every ten minutes during the test and at the end of the test

Answer: D

27) Which of the following is an FCC rule regarding power levels used in the amateur bands, under normal, non–distress circumstances?

A) There is no limit to power as long as there is no interference with other services

B) No more than 200 watts PEP may be used

C) Up to 1500 watts PEP may be used on any amateur frequency without restriction

D) While not exceeding the maximum power permitted on a given band, use the minimum power necessary to carry out the desired communication

Answer: D

28) What happens when the deviation of a FM transmitter is increased?

A) Its signal occupies more bandwidth

B) Its output power increases

C) Its output power and bandwidth increases

D) Asymmetic modulation occurs

Answer: A

29) Which of the following applies when two stations transmitting on the same frequency interfere with each other?

A) Common courtesy should prevail, but no one has absolute right to an amateur frequency

B) Whoever has the strongest signal has priority on the frequency

C) Whoever has been on the frequency the longest has priority on the frequency

D) The station which has the weakest signal has priority on the frequency

Answer: A

30) Which of the following is true of the use of SSB phone in amateur bands above 50 MHz?

A) It is permitted only by holders of a General Class or higher license

B) It is permitted only on repeaters

C) It is permitted in at least some portion of all the amateur bands above 50 MHz

D) It is permitted only when power is limited to no more than 100 watts

Answer: C

31) 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) Multiplex communication

Answer: C

32) Under what circumstances should you consider communicating via simplex rather than a repeater?

A) When the stations can communicate directly without using a repeater

B) Only when you have an endorsement for simplex operation on your license

C) Only when third party traffic is not being passed

D) Only if you have simplex modulation capability

Answer: A

33) Which of the following describes the muting of receiver audio controlled solely by the presence or absence of an RF signal?

A) Tone squelch B) Carrier squelch C) CTCSS D) Modulated carrier

Answer: B

34) What determines the amount of deviation of an FM (as opposed to PM) signal?

A) Both the frequency and amplitude of the modulating signal

B) The frequency of the modulating signal

C) The amplitude of the modulating signal

D) The relative phase of the modulating signal and the carrier

Answer: C

35) What could cause your FM signal to interfere with stations on nearby frequencies?

A) Microphone gain too high, causing over–deviation

B) SWR too high

C) Incorrect CTCSS Tone

D) All of these choices are correct

Answer: A

36) What is one way to recharge a 12–volt lead–acid station battery if the commercial power is out?

A) Cool the battery in ice for several hours

B) Add acid to the battery

C) Connect the battery in parallel with a vehicle's battery and run the engine

D) All of these choices are correct

Answer: C

37) Why are UHF signals often more effective from inside buildings than VHF signals?

A) VHF signals lose power faster over distance

B) The shorter wavelength allows them to more easily penetrate the structure of buildings

C) This is incorrect; VHF works better than UHF inside buildings

D) UHF antennas are more efficient than VHF antennas

Answer: B

38) When using a directional antenna, how might your station be able to access a distant repeater if buildings or obstructions are blocking the direct line of sight path?

A) Change from vertical to horizontal polarization

B) Try to find a path that reflects signals to the repeater

C) Try the long path

D) Increase the antenna SWR

Answer: B

39) What antenna polarization is normally used for long–distance weak–signal CW and SSB contacts using the VHF and UHF bands?

A) Right–hand circular B) Left–hand circular C) Horizontal D) Vertical

Answer: C

40) What type of wave carries radio signals between transmitting and receiving stations?

A) Electromagnetic B) Electrostatic C) Surface acoustic D) Magnetostrictive

Answer: A

41) Which part of the atmosphere enables the propagation of radio signals around the world?

A) The stratosphere B) The troposphere C) The ionosphere D) The magnetosphere

Answer: C

42) What should you do if another operator reports that your station's 2 meter signals were strong just a moment ago, but now they are weak or distorted?

A) Change the batteries in your radio to a different type

B) Turn on the CTCSS tone

C) Ask the other operator to adjust his squelch control

D) Try moving a few feet or changing the direction of your antenna if possible, as reflections may be causing multi–path distortion

Answer: D

43) What can happen if the antennas at opposite ends of a VHF or UHF line of sight radio link are not using the same polarization?

A) The modulation sidebands might become inverted

B) Signals could be significantly weaker

C) Signals have an echo effect on voices

D) Nothing significant will happen

Answer: B

44) Which of the following is a likely cause of irregular fading of signals received by ionospheric reflection?

A) Frequency shift due to Faraday rotation

B) Interference from thunderstorms

C) Random combining of signals arriving via different paths

D) Intermodulation distortion

Answer: C

45) What term is commonly used to describe the rapid fluttering sound sometimes heard from mobile stations that are moving while transmitting?

A) Flip–flopping B) Picket fencing C) Frequency shifting D) Pulsing

Answer: B

46) What may occur if data signals propagate over multiple paths?

A) Transmission rates can be increased by a factor equal to the number of separate paths observed

B) Transmission rates must be decreased by a factor equal to the number of separate paths observed

C) No significant changes will occur if the signals are transmitting using FM

D) Error rates are likely to increase

Answer: D

47) What are the frequency limits of the VHF spectrum?

A) 30 to 300 kHz B) 30 to 300 MHz C) 300 to 3000 kHz D) 300 to 3000 MHz

Answer: B

48) What property of a radio wave is used to describe its polarization?

A) The orientation of the electric field

B) The orientation of the magnetic field

C) The ratio of the energy in the magnetic field to the energy in the electric field

D) The ratio of the velocity to the wavelength

Answer: A

49) What are the two components of a radio wave?

A) AC and DC B) Voltage and current

C) Electric and magnetic fields D) Ionizing and non–ionizing radiation

Answer: C

50) What frequency range is referred to as HF?

A) 300 to 3000 MHz B) 30 to 300 MHz C) 3 to 30 MHz D) 300 to 3000 kHz

Answer: C

51) What is the name for the distance a radio wave travels during one complete cycle?

A) Wave speed B) Waveform C) Wavelength D) Wave spread

Answer: C

52) How fast does a radio wave travel through free space?

A) At the speed of light

B) At the speed of sound

C) Its speed is inversley proportional to its wavelength

D) Its speed increases as the frequency increases

Answer: A

53) How does the wavelength of a radio wave relate to its frequency?

A) The wavelength gets longer as the 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

Answer: B

54) What property of radio waves is often used to identify the different frequency bands?

A) The approximate wavelength
B) The magnetic intensity of waves
C) The time it takes for waves to travel one mile
D) The voltage standing wave ratio of waves

Answer: A

55) What is the formula for converting frequency to approximate wavelength in meters?

A) Wavelength in meters equals frequency in hertz multiplied by 300
B) Wavelength in meters equals frequency in hertz divided by 300
C) Wavelength in meters equals frequency in megahertz divided by 300
D) Wavelength in meters equals 300 divided by frequency in megahertz

Answer: D

56) What is the approximate velocity of a radio wave as it travels through free space?

A) 3000 kilometers per second
B) 300,000,000 meters per second
C) 300,000 miles per hour
D) 186,000 miles per hour

Answer: B

57) What are the frequency limits of the UHF spectrum?

A) 30 to 300 kHz
B) 30 to 300 MHz
C) 300 to 3000 kHz
D) 300 to 3000 MHz

Answer: D

58) What is the radio horizon?

A) The distance over which two stations can communicate by direct path
B) The distance from the ground to a horizontally mounted antenna
C) The farthest point you can see when standing at the base of your antenna tower
D) The shortest distance between two points on the Earth's surface

Answer: A

59) What is a characteristic of VHF signals received via auroral reflection?

A) Signals from distances of 10,000 or more miles are common
B) The signals exhibit rapid fluctuations of strength and often sound distorted
C) These types of signals occur only during winter nighttime hours
D) These types of signals are generally strongest when your antenna is aimed west

Answer: B

60) Which of the following might be happening when VHF signals are being received from long distances?

A) Signals are being reflected from outer space
B) Signals are arriving by sub–surface ducting
C) Signals are being reflected by lightning storms in your area
D) Signals are being refracted from a sporadic E layer

Answer: D

61) What band is best suited for communicating via meteor scatter?

A) 10 meters B) 6 meters C) 2 meters D) 70 cm

Answer: B

62) Which of the following propagation types is most commonly associated with occasional strong over–the–horizon signals on the 10, 6, and 2 meter bands?

A) Backscatter B) Sporadic E

C) D layer absorption D) Gray–line propagation

Answer: B

63) Why are direct (not via a repeater) UHF signals rarely heard from stations outside your local coverage area?

A) They are too weak to go very far

B) PUC regulations prohibit them from going more than 50 miles

C) UHF signals are usually not reflected by the ionosphere

D) They collide with trees and shrubbery and fade out

Answer: C

64) What is generally the best time for long–distance 10 meter band propagation via the F layer?

A) From dawn to shortly after sunset during periods of high sunspot activity

B) From shortly after sunset to dawn during periods of high sunspot activity

C) From dawn to shortly after sunset during periods of low sunspot activity

D) From shortly after sunset to dawn during periods of low sunspot activity

Answer: A

65) Which of the following bands may provide long distance communications during the peak of the sunspot cycle?

A) Six or ten meters B) 23 centimeters

C) 70 centimeters or 1.25 meters D) All of these choices are correct

Answer: A

66) What causes tropospheric ducting?

A) Discharges of lightning during electrical storms B) Sunspots and solar flares

C) Updrafts from hurricanes and tornadoes D) Temperature inversions in the atmosphere

Answer: D

67) What mode is responsible for allowing over–the–horizon VHF and UHF communications to ranges of approximately 300 miles on a regular basis?

A) Tropospheric scatter B) D layer refraction C) F2 layer refraction D) Faraday rotation

Answer: A

68) Which of the following effects might cause radio signals to be heard despite obstructions between the transmitting and
receiving stations?

A) Knife–edge diffraction
B) Faraday rotation
C) Quantum tunneling
D) Doppler shift

Answer: A

69) Why do VHF and UHF radio signals usually travel somewhat farther than the visual line of sight distance between two
stations?

A) Radio signals move somewhat faster than the speed of light
B) Radio waves are not blocked by dust particles
C) The Earth seems less curved to radio waves than to light
D) Radio waves are blocked by dust particles

Answer: C

70) Where should an in–line SWR meter be connected to monitor the standing wave ratio of the station antenna system?

A) In series with the feed line, between the transmitter and antenna
B) In series with the station's ground
C) In parallel with the push–to–talk line and the antenna
D) In series with the power supply cable, as close as possible to the radio

Answer: A

71) Where must a filter be installed to reduce harmonic emissions from your station?

A) Between the transmitter and the antenna
B) Between the receiver and the transmitter
C) At the station power supply
D) At the microphone

Answer: A

72) Which type of conductor is best to use for RF grounding?

A) Round stranded wire
B) Round copper–clad steel wire
C) Twisted–pair cable
D) Flat strap

Answer: D

73) Where should the negative return connection of a mobile transceiver's power cable be connected?

A) At the battery or engine block ground strap
B) At the antenna mount
C) To any metal part of the vehicle
D) Through the transceiver□s mounting bracket

Answer: A

74) Which of the following could you use to cure distorted audio caused by RF current flowing on the shield of a microphone cable?

A) Band–pass filter
B) Low–pass filter
C) Preamplifier
D) Ferrite choke

Answer: D

75) What is the source of a high–pitched whine that varies with engine speed in a mobile transceiver's receive audio?

A) The ignition system
B) The alternator
C) The electric fuel pump
D) Anti–lock braking system controllers

Answer: B

76) What could be happening if another operator reports a variable high–pitched whine on the audio from your mobile transmitter?

A) Your microphone is picking up noise from an open window
B) You have the volume on your receiver set too high
C) You need to adjust your squelch control
D) Noise on the vehicle's electrical system is being transmitted along with your speech audio

Answer: D

77) Which is a good reason to use a regulated power supply for communications equipment?

A) It prevents voltage fluctuations from reaching sensitive circuits
B) A regulated power supply has PUC approval
C) A fuse or circuit breaker regulates the power
D) Power consumption is independent of load

Answer: A

78) How is a computer's sound card used when conducting digital communications using a computer?

A) The sound card communicates between the computer CPU and the video display
B) The sound card records the audio frequency for video display
C) The sound card provides audio to the microphone input and converts received audio to digital form
D) All of these choices are correct

Answer: C

79) Which of the following would be connected between a transceiver and computer in a packet radio station?

A) Transmatch
B) Mixer
C) Terminal node controller
D) Antenna

Answer: C

80) How might a computer be used as part of an amateur radio station?

A) For logging contacts and contact information
B) For sending and/or receiving CW
C) For generating and decoding digital signals
D) All of these choices are correct

Answer: D

81) Which of the following is true concerning the microphone connectors on amateur transceivers?

A) All transceivers use the same microphone connector type
B) Some connectors include push–to–talk and voltages for powering the microphone
C) All transceivers using the same connector type are wired identically
D) Un–keyed connectors allow any microphone to be connected

Answer: B

82) Which of the following can be used to enter the operating frequency on a modern transceiver?

A) The keypad or VFO knob
B) The CTCSS or DTMF encoder
C) The Automatic Frequency Control
D) All of these choices are correct

Answer: A

83) What is the function of automatic gain control or AGC?

A) To keep received audio relatively constant
B) To protect an antenna from lightning
C) To eliminate RF on the station cabling
D) An asymmetric goniometer control used for antenna matching

Answer: A

84) Which of the following is an appropriate receive filter bandwidth to select in order to minimize noise and interference for SSB reception?

A) 500 Hz
B) 1000 Hz
C) 2400 Hz
D) 5000 Hz

Answer: C

85) Which of the following is an appropriate receive filter bandwidth to select in order to minimize noise and interference for CW reception?

A) 500 Hz
B) 1000 Hz
C) 2400 Hz
D) 5000 Hz

Answer: A

86) What is the advantage of having multiple receive bandwidth choices on a multimode transceiver?

A) Permits monitoring several modes at once
B) Permits noise or interference reduction by selecting a bandwidth matching the mode
C) Increases the number of frequencies that can be stored in memory
D) Increases the amount of offset between receive and transmit frequencies

Answer: B

87) Which of the following would reduce ignition interference to a receiver?

A) Change frequency slightly
B) Decrease the squelch setting
C) Turn on the noise blanker
D) Use the RIT control

Answer: C

88) Which of the following controls could be used if the voice pitch of a single–sideband signal seems too high or low?

A) The AGC or limiter
B) The bandwidth selection
C) The tone squelch
D) The receiver RIT or clarifier

Answer: D

89) What does the term "RIT" mean?

A) Receiver Input Tone
B) Receiver Incremental Tuning
C) Rectifier Inverter Test
D) Remote Input Transmitter

Answer: B

90) What is the purpose of the squelch control on a transceiver?
A) To set the highest level of volume desired
B) To set the transmitter power level
C) To adjust the automatic gain control
D) To mute receiver output noise when no signal is being received
Answer: D

91) What may happen if a transmitter is operated with the microphone gain set too high?
A) The output power might be too high
B) The output signal might become distorted
C) The frequency might vary
D) The SWR might increase
Answer: B

92) What is a way to enable quick access to a favorite frequency on your transceiver?
A) Enable the CTCSS tones
B) Store the frequency in a memory channel
C) Disable the CTCSS tones
D) Use the scan mode to select the desired frequency
Answer: B

93) What term describes the number of times per second that an alternating current reverses direction?
A) Pulse rate
B) Speed
C) Wavelength
D) Frequency
Answer: D

94) How much voltage does a mobile transceiver usually require?
A) About 12 volts
B) About 30 volts
C) About 120 volts
D) About 240 volts
Answer: A

95) Electrical current is measured in which of the following units?
A) Volts
B) Watts
C) Ohms
D) Amperes
Answer: D

96) What is the name for the flow of electrons in an electric circuit?
A) Voltage
B) Resistance
C) Capacitance
D) Current
Answer: D

97) What is the electrical term for the electromotive force (EMF) that causes electron flow?
A) Voltage
B) Ampere–hours
C) Capacitance
D) Inductance
Answer: A

98) What is the basic unit of electromotive force?
A) The volt
B) The watt
C) The ampere
D) The ohm
Answer: A

99) Which of the following is a good electrical conductor?
A) Glass
B) Wood
C) Copper
D) Rubber
Answer: C

100) Which of the following is a good electrical insulator?
A) Copper B) Glass C) Aluminum D) Mercury
Answer: B

101) Electrical power is measured in which of the following units?
A) Volts B) Watts C) Ohms D) Amperes
Answer: B

102) Which term describes the rate at which electrical energy is used?
A) Resistance B) Current C) Power D) Voltage
Answer: C

103) What is the name for a current that flows only in one direction?
A) Alternating current B) Direct current C) Normal current D) Smooth current
Answer: B

104) What is the name for a current that reverses direction on a regular basis?
A) Alternating current B) Direct current C) Circular current D) Vertical current
Answer: A

105) How many milliamperes is 1.5 amperes?
A) 15 milliamperes B) 150 milliamperes C) 1,500 milliamperes D) 15,000 milliamperes
Answer: C

106) How many microfarads are 1,000,000 picofarads?
A) 0.001 microfarads B) 1 microfarad
C) 1000 microfarads D) 1,000,000,000 microfarads
Answer: B

107) Which of the following frequencies is equal to 28,400 kHz?
A) 28.400 MHz B) 2.800 MHz C) 284.00 MHz D) 28.400 kHz
Answer: A

108) If a frequency readout shows a reading of 2425 MHz, what frequency is that in GHz?
A) 0.002425 GHz B) 24.25 GHz C) 2.425 GHz D) 2425 GHz
Answer: C

109) What is the ability to store energy in an electric field called?
A) Inductance B) Resistance C) Tolerance D) Capacitance
Answer: D

110) What is a usual name for electromagnetic waves that travel through space?
A) Gravity waves B) Sound waves C) Radio waves D) Pressure waves
Answer: C

111) What is the unit of frequency?

A) Hertz B) Henry C) Farad D) Tesla

Answer: A

112) What is the basic unit of capacitance?

A) The farad B) The ohm C) The volt D) The henry

Answer: A

113) What is the ability to store energy in a magnetic field called?

A) Admittance B) Capacitance C) Resistance D) Inductance

Answer: D

114) What is the basic unit of inductance?

A) The coulomb B) The farad C) The henry D) The ohm

Answer: C

115) What does the abbreviation "RF" refer to?

A) Radio frequency signals of all types

B) The resonant frequency of a tuned circuit

C) The real frequency transmitted as opposed to the apparent frequency

D) Reflective force in antenna transmission lines

Answer: A

116) What is the formula used to calculate electrical power in a DC circuit?

A) Power (P) equals voltage (E) multiplied by current (I)

B) Power (P) equals voltage (E) divided by current (I)

C) Power (P) equals voltage (E) minus current (I)

D) Power (P) equals voltage (E) plus current (I)

Answer: A

117) How much power is being used in a circuit when the applied voltage is 13.8 volts DC and the current is 10 amperes?

A) 138 watts B) 0.7 watts C) 23.8 watts D) 3.8 watts

Answer: A

118) How much power is being used in a circuit when the applied voltage is 12 volts DC and the current is 2.5 amperes?

A) 4.8 watts B) 30 watts C) 14.5 watts D) 0.208 watts

Answer: B

119) How many amperes are flowing in a circuit when the applied voltage is 12 volts DC and the load is 120 watts?

A) 0.1 amperes B) 10 amperes C) 12 amperes D) 132 amperes

Answer: B

120) What are the units of impedance?

A) Volts B) Amperes C) Coulombs D) Ohms

Answer: D

121) What is meant by the term impedance?

A) It is a measure of the opposition to AC current flow in a circuit

B) It is the inverse of resistance

C) It is a measure of the Q or Quality Factor of a component

D) It is a measure of the power handling capability of a component

Answer: A

122) What formula is used to calculate current in a circuit?

A) Current (I) equals voltage (E) multiplied by resistance (R)

B) Current (I) equals voltage (E) divided by resistance (R)

C) Current (I) equals voltage (E) added to resistance (R)

D) Current (I) equals voltage (E) minus resistance (R)

Answer: B

123) What is the resistance of a circuit in which a current of 3 amperes flows through a resistor connected to 90 volts?

A) 3 ohms B) 30 ohms C) 93 ohms D) 270 ohms

Answer: B

124) What is the voltage across a 10–ohm resistor if a current of 2 amperes flows through it?

A) 8 volts B) 0.2 volts C) 12 volts D) 20 volts

Answer: D

125) What formula is used to calculate voltage in a circuit?

A) Voltage (E) equals current (I) multiplied by resistance (R)

B) Voltage (E) equals current (I) divided by resistance (R)

C) Voltage (E) equals current (I) added to resistance (R)

D) Voltage (E) equals current (I) minus resistance (R)

Answer: A

126) What formula is used to calculate resistance in a circuit?

A) Resistance (R) equals voltage (E) multiplied by current (I)

B) Resistance (R) equals voltage (E) divided by current (I)

C) Resistance (R) equals voltage (E) added to current (I)

D) Resistance (R) equals voltage (E) minus current (I)

Answer: B

127) What electrical component is used to oppose the flow of current in a DC circuit?

A) Inductor B) Resistor C) Voltmeter D) Transformer

Answer: B

128) Which of the following battery types is rechargeable?
A) Nickel–metal hydride
B) Lithium–ion
C) Lead–acid gel–cell
D) All of these choices are correct
Answer: D

129) Which of the following battery types is not rechargeable?
A) Nickel–cadmium
B) Carbon–zinc
C) Lead–acid
D) Lithium–ion
Answer: B

130) What type of component is often used as an adjustable volume control?
A) Fixed resistor
B) Power resistor
C) Potentiometer
D) Transformer
Answer: C

131) What electrical parameter is controlled by a potentiometer?
A) Inductance
B) Resistance
C) Capacitance
D) Field strength
Answer: B

132) What electrical component stores energy in an electric field?
A) Resistor
B) Capacitor
C) Inductor
D) Diode
Answer: B

133) What type of electrical component consists of two or more conductive surfaces separated by an insulator?
A) Resistor
B) Potentiometer
C) Oscillator
D) Capacitor
Answer: D

134) What type of electrical component stores energy in a magnetic field?
A) Resistor
B) Capacitor
C) Inductor
D) Diode
Answer: C

135) What electrical component is usually composed of a coil of wire?
A) Switch
B) Capacitor
C) Diode
D) Inductor
Answer: D

136) What electrical component is used to protect other circuit components from current overloads?
A) Fuse
B) Capacitor
C) Inductor
D) All of these choices are correct
Answer: A

137) What electrical component is used to connect or disconnect electrical circuits?
A) Magnetron
B) Switch
C) Thermistor
D) All of these choices are correct
Answer: B

138) What electronic component allows current to flow in only one direction?
A) Resistor B) Fuse C) Diode D) Driven Element
Answer: C

139) What are the names of the two electrodes of a diode?
A) Plus and minus B) Source and drain C) Anode and cathode D) Gate and base
Answer: C

140) How is the cathode lead of a semiconductor diode usually identified?
A) With the word cathode B) With a stripe
C) With the letter C D) All of these choices are correct
Answer: B

141) What class of electronic components is capable of using a voltage or current signal to control current flow?
A) Capacitors B) Inductors C) Resistors D) Transistors
Answer: D

142) Which of the following electronic components can amplify signals?
A) Transistor B) Variable resistor
C) Electrolytic capacitor D) Multi–cell battery
Answer: A

143) What is the term that describes a transistor's ability to amplify a signal?
A) Gain B) Forward resistance
C) Forward voltage drop D) On resistance
Answer: A

144) What does the abbreviation FET stand for?
A) Field Effect Transistor B) Fast Electron Transistor
C) Free Electron Transition D) Field Emission Thickness
Answer: A

145) Which of the following components can be made of three layers of semiconductor material?
A) Alternator B) Transistor C) Triode D) Pentagrid converter
Answer: B

146) What are the three electrodes of a PNP or NPN transistor?
A) Emitter, base, and collector B) Source, gate, and drain
C) Cathode, grid, and plate D) Cathode, drift cavity, and collector
Answer: A

147) What are the three electrodes of a field effect transistor?
A) Emitter, base, and collector B) Source, gate, and drain
C) Cathode, grid, and plate D) Cathode, gate, and anode
Answer: B

148) Which of these components can be used as an electronic switch or amplifier?

A) Oscillator B) Potentiometer C) Transistor D) Voltmeter

Answer: C

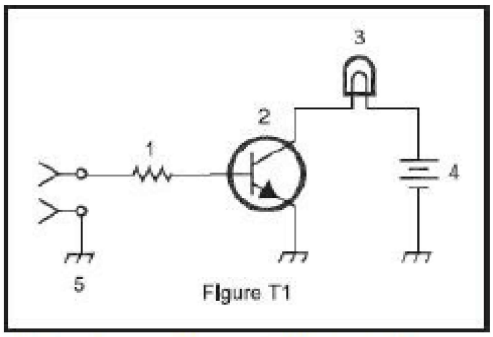

Figure T1

149) What is the name for standardized representations of components in an electrical wiring diagram?

A) Electrical depictions B) Grey sketch C) Schematic symbol D) Component callouts

Answer: C

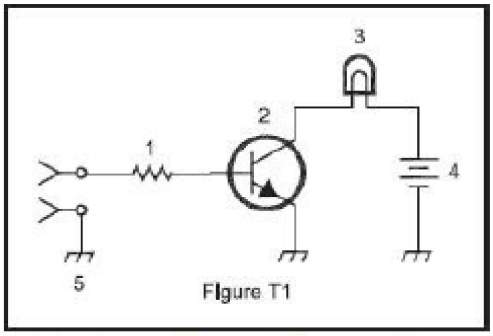

Figure T1

150) What is component 1 in figure T1?

A) Resistor B) Transistor C) Battery D) Connector

Answer: A

151) What do the symbols on an electrical circuit schematic diagram represent?

A) Electrical components B) Logic states

C) Digital codes D) Traffic nodes

Answer: A

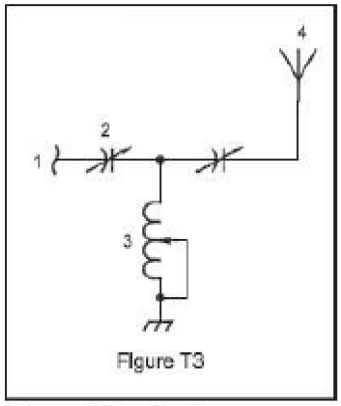

Figure T3

152) What is component 4 in figure T3?

A) Antenna B) Transmitter C) Dummy load D) Ground

Answer: A

153) Which of the following is accurately represented in electrical circuit schematic diagrams?

A) Wire lengths B) Physical appearance of components

C) The way components are interconnected D) All of these choices are correct

Answer: C

154) What component is commonly used to change 120V AC house current to a lower AC voltage for other uses?

A) Variable capacitor B) Transformer C) Transistor D) Diode

Answer: B

155) Which of the following is a common reason to use shielded wire?

A) To decrease the resistance of DC power connections

B) To increase the current carrying capability of the wire

C) To prevent coupling of unwanted signals to or from the wire

D) To couple the wire to other signals

Answer: C

156) What type of circuit controls the amount of voltage from a power supply?

A) Regulator B) Oscillator C) Filter D) Phase inverter

Answer: A

157) What best describes a relay?

A) A switch controlled by an electromagnet B) A current controlled amplifier

C) An optical sensor D) A pass transistor

Answer: A

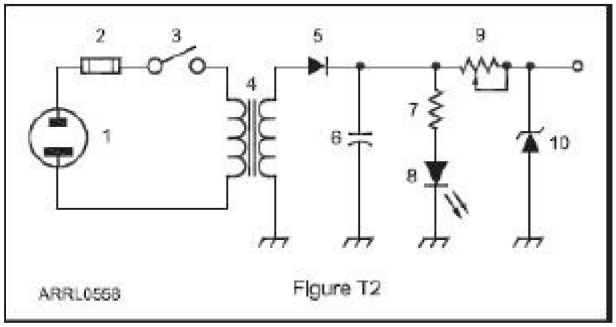

Figure T2

158) What type of switch is represented by component 3 in figure T2?

A) Single–pole single–throw
B) Single–pole double–throw
C) Double–pole single–throw
D) Double–pole double–throw

Answer: A

159) Which of the following can be used to display signal strength on a numeric scale?

A) Potentiometer
B) Transistor
C) Meter
D) Relay

Answer: C

160) Which of the following is used together with an inductor to make a tuned circuit?

A) Resistor
B) Zener diode
C) Potentiometer
D) Capacitor

Answer: D

161) What is a simple resonant or tuned circuit?

A) An inductor and a capacitor connected in series or parallel to form a filter
B) A type of voltage regulator
C) A resistor circuit used for reducing standing wave ratio
D) A circuit designed to provide high fidelity audio

Answer: A

162) What is the name of a device that combines several semiconductors and other components into one package?

A) Transducer
B) Multi–pole relay
C) Integrated circuit
D) Transformer

Answer: C

163) Which of the following devices or circuits changes an alternating current into a varying direct current signal?

A) Transformer
B) Rectifier
C) Amplifier
D) Reflector

Answer: B

164) Which of the following is commonly used as a visual indicator?

A) LED
B) FET
C) Zener diode
D) Bipolar transistor

Answer: A

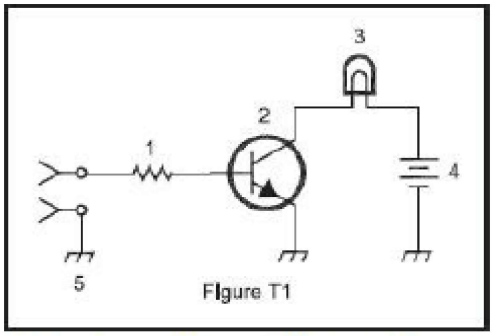

Figure T1

165) What is the function of component 2 in Figure T1?

A) Give off light when current flows through it
B) Supply electrical energy
C) Control the flow of current
D) Convert electrical energy into radio waves

Answer: C

166) What is a transceiver?

A) A type of antenna switch
B) A unit combining the functions of a transmitter and a receiver
C) A component in a repeater which filters out unwanted interference
D) A type of antenna matching network

Answer: B

167) What device increases the low-power output from a handheld transceiver?

A) A voltage divider
B) An RF power amplifier
C) An impedance network
D) All of these choices are correct

Answer: B

168) What is meant by the term "PTT"?

A) Pre-transmission tuning to reduce transmitter harmonic emission
B) Precise tone transmissions used to limit repeater access to only certain signals
C) A primary transformer tuner use to match antennas
D) The push to talk function which switches between receive and transmit

Answer: D

169) What is the name of a circuit that generates a signal of a desired frequency?

A) Reactance modulator
B) Product detector
C) Low-pass filter
D) Oscillator

Answer: D

170) Which of the following describes combining speech with an RF carrier signal?

A) Impedance matching
B) Oscillation
C) Modulation
D) Low-pass filtering

Answer: C

171) What device takes the output of a low–powered 28 MHz SSB exciter and produces a 222 MHz output signal?

A) High–pass filter B) Low–pass filter C) Transverter D) Phase converter

Answer: C

172) Which of the following is used to convert a radio signal from one frequency to another?

A) Phase splitter B) Mixer C) Inverter D) Amplifier

Answer: B

173) Which term describes the ability of a receiver to detect the presence of a signal?

A) Linearity B) Sensitivity

C) Selectivity D) Total Harmonic Distortion

Answer: B

174) Where is an RF preamplifier installed?

A) Between the antenna and receiver

B) At the output of the transmitter's power amplifier

C) Between a transmitter and antenna tuner

D) At the receiver's audio output

Answer: A

175) Which term describes the ability of a receiver to discriminate between multiple signals?

A) Discrimination ratio B) Sensitivity

C) Selectivity D) Harmonic Distortion

Answer: C

176) 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

Answer: D

177) Which of the following actions should you take if a neighbor tells you that your station's transmissions are interfering with their radio or TV reception?

A) Make sure that your station is functioning properly and that it does not cause interference to your own radio or television when it is tuned to the same channel

B) Immediately turn off your transmitter and contact the PUC for assistance

C) Tell them that your license gives you the right to transmit and nothing can be done to reduce the interference

D) Install a harmonic doubler on the output of your transmitter and tune it until the interference is eliminated

Answer: A

178) What should you do if something in a neighbor's home is causing harmful interference to your amateur station?

A) Work with your neighbor to identify the offending device

B) Politely inform your neighbor about the rules that prohibit the use of devices which cause interference

C) Check your station and make sure it meets the standards of good amateur practice

D) All of these choices are correct

Answer: D

179) What is a symptom of RF feedback in a transmitter or transceiver?

A) Excessive SWR at the antenna connection

B) The transmitter will not stay on the desired frequency

C) Reports of garbled, distorted, or unintelligible transmissions

D) Frequent blowing of power supply fuses

Answer: C

180) Which of the following is a way to reduce or eliminate interference by an amateur transmitter to a nearby telephone?

A) Put a filter on the amateur transmitter

B) Reduce the microphone gain

C) Reduce the SWR on the transmitter transmission line

D) Put a RF filter on the telephone

Answer: D

181) What would cause a broadcast AM or FM radio to receive an amateur radio transmission unintentionally?

A) The receiver is unable to reject strong signals outside the AM or FM band

B) The microphone gain of the transmitter is turned up too high

C) The audio amplifier of the transmitter is overloaded

D) The deviation of an FM transmitter is set too low

Answer: A

182) How can overload of a non–amateur radio or TV receiver by an amateur signal be reduced or eliminated?

A) Block the amateur signal with a filter at the antenna input of the affected receiver

B) Block the interfering signal with a filter on the amateur transmitter

C) Switch the transmitter from FM to SSB

D) Switch the transmitter to a narrow–band mode

Answer: A

183) What might be the first step to resolve cable TV interference from your ham radio transmission?

A) Add a low pass filter to the TV antenna input

B) Add a high pass filter to the TV antenna input

C) Add a preamplifier to the TV antenna input

D) Be sure all TV coaxial connectors are installed properly

Answer: D

184) Which of the following may be a cause of radio frequency interference?

A) Fundamental overload
B) Harmonics
C) Spurious emissions
D) All of these choices are correct

Answer: D

185) Which of the following may be useful in correcting a radio frequency interference problem?

A) Snap–on ferrite chokes
B) Low–pass and high–pass filters
C) Band–reject and band–pass filters
D) All of these choices are correct

Answer: D

186) What happens to power lost in a feed line?

A) It increases the SWR
B) It comes back into your transmitter and could cause damage
C) It is converted into heat
D) It can cause distortion of your signal

Answer: C

187) What is the primary purpose of a dummy load?

A) To prevent the radiation of signals when making tests
B) To prevent over–modulation of your transmitter
C) To improve the radiation from your antenna
D) To improve the signal to noise ratio of your receiver

Answer: A

188) What does a dummy load consist of?

A) A high–gain amplifier and a TR switch
B) A non–inductive resistor and a heat sink
C) A low voltage power supply and a DC relay
D) A 50 ohm reactance used to terminate a transmission line

Answer: B

189) What instrument other than an SWR meter could you use to determine if a feed line and antenna are properly matched?

A) Voltmeter
B) Ohmmeter
C) Iambic pentameter
D) Directional wattmeter

Answer: D

190) Which of the following instruments can be used to determine if an antenna is resonant at the desired operating frequency?

A) A VTVM
B) An antenna analyzer
C) A Q meter
D) A frequency counter

Answer: B

191) What is a disadvantage of air core coaxial cable when compared to foam or solid dielectric types?

A) It has more loss per foot

B) It cannot be used for VHF or UHF antennas

C) It requires special techniques to prevent water absorption

D) It cannot be used at below freezing temperatures

Answer: C

192) Why should the outer jacket of coaxial cable be resistant to ultraviolet light?

A) Ultraviolet resistant jackets prevent harmonic radiation

B) Ultraviolet light can increase losses in the cable's jacket

C) Ultraviolet and RF signals can mix together, causing interference

D) Ultraviolet light can damage the jacket and allow water to enter the cable

Answer: D

193) Which of the following is the most common cause for failure of coaxial cables?

A) Moisture contamination B) Gamma rays

C) The velocity factor exceeds 1.0 D) Overloading

Answer: A

194) What is the approximate SWR value above which the protection circuits in most solid–state transmitters begin to reduce transmitter power?

A) 2 to 1 B) 1 to 2 C) 6 to 1 D) 10 to 1

Answer: A

195) What, in general terms, is standing wave ratio (SWR)?

A) A measure of how well a load is matched to a transmission line

B) The ratio of high to low impedance in a feed line

C) The transmitter efficiency ratio

D) An indication of the quality of your station's ground connection

Answer: A

196) What reading on an SWR meter indicates a perfect impedance match between the antenna and the feed line?

A) 2 to 1 B) 1 to 3 C) 1 to 1 D) 10 to 1

Answer: C

197) What does an SWR reading of 4:1 indicate?

A) Loss of ±4 dB B) Good impedance match

C) Gain of +4 dB D) Impedance mismatch

Answer: D

198) Which of the following is a common use of coaxial cable?

A) Carrying dc power from a vehicle battery to a mobile radio

B) Carrying RF signals between a radio and antenna

C) Securing masts, tubing, and other cylindrical objects on towers

D) Connecting data signals from a TNC to a computer

Answer: B

199) Which instrument is used to measure electric current?

A) An ohmmeter B) A wavemeter C) A voltmeter D) An ammeter

Answer: D

200) What instrument is used to measure resistance?

A) An oscilloscope B) A spectrum analyzer

C) A noise bridge D) An ohmmeter

Answer: D

201) Which of the following precautions should be taken when measuring high voltages with a voltmeter?

A) Ensure that the voltmeter has very low impedance

B) Ensure that the voltmeter and leads are rated for use at the voltages to be measured

C) Ensure that the circuit is grounded through the voltmeter

D) Ensure that the voltmeter is set to the correct frequency

Answer: B

202) Which instrument would you use to measure electric potential or electromotive force?

A) An ammeter B) A voltmeter C) A wavemeter D) An ohmmeter

Answer: B

203) What is the correct way to connect a voltmeter to a circuit?

A) In series with the circuit B) In parallel with the circuit

C) In quadrature with the circuit D) In phase with the circuit

Answer: B

204) How is an ammeter usually connected to a circuit?

A) In series with the circuit B) In parallel with the circuit

C) In quadrature with the circuit D) In phase with the circuit

Answer: A

205) Which of the following measurements are commonly made using a multimeter?

A) SWR and RF power B) Signal strength and noise

C) Impedance and reactance D) Voltage and resistance

Answer: D

206) What is probably happening when an ohmmeter, connected across an unpowered circuit, initially indicates a low resistance and then shows increasing resistance with time?

A) The ohmmeter is defective
B) The circuit contains a large capacitor
C) The circuit contains a large inductor
D) The circuit is a relaxation oscillator

Answer: B

207) Which of the following might damage a multimeter?

A) Measuring a voltage too small for the chosen scale
B) Leaving the meter in the milliamps position overnight
C) Attempting to measure voltage when using the resistance setting
D) Not allowing it to warm up properly

Answer: C

208) Which of the following precautions should be taken when measuring circuit resistance with an ohmmeter?

A) Ensure that the applied voltages are correct
B) Ensure that the circuit is not powered
C) Ensure that the circuit is grounded
D) Ensure that the circuit is operating at the correct frequency

Answer: B

209) Which of the following is a form of amplitude modulation?

A) Spread–spectrum
B) Packet radio
C) Single sideband
D) Phase shift keying

Answer: C

210) Which type of modulation is most commonly used for VHF and UHF voice repeaters?

A) AM
B) SSB
C) PSK
D) FM

Answer: D

211) Which type of voice mode is most often used for long–distance (weak signal) contacts on the VHF and UHF bands?

A) FM
B) DRM
C) SSB
D) PM

Answer: C

212) Which sideband is normally used for 10 meter HF, VHF and UHF single–sideband communications?

A) Upper sideband
B) Lower sideband
C) Suppressed sideband
D) Inverted sideband

Answer: A

213) What is the primary advantage of single sideband over FM for voice transmissions?

A) SSB signals are easier to tune
B) SSB signals are less suseptible to interference
C) SSB signals have narrower bandwidth
D) All of these choices are correct

Answer: C

214) What type of modulation is most commonly used for VHF packet radio transmissions?

A) FM B) SSB C) AM D) Spread Spectrum

Answer: A

215) Which of the following types of emission has the narrowest bandwidth?

A) FM voice B) SSB voice C) CW D) Slow–scan TV

Answer: C

216) What is the approximate bandwidth of a single sideband voice signal?

A) 1 kHz B) 3 kHz C) 6 kHz D) 15 kHz

Answer: B

217) What is the approximate maximum bandwidth required to transmit a CW signal?

A) 2.4 kHz B) 150 Hz C) 1000 Hz D) 15 kHz

Answer: B

218) With regard to satellite communications, what is Doppler shift?

A) A change in the satellite orbit

B) A mode where the satellite receives signals on one band and transmits on another

C) An observed change in signal frequency caused by relative motion between the satellite and the earth station

D) A special digital communications mode for some satellites

Answer: C

219) Which of the following are provided by satellite tracking programs?

A) Maps showing the real–time position of the satellite track over the earth

B) The time, azimuth, and elevation of the start, maximum altitude, and end of a pass

C) The apparent frequency of the satellite transmission, including effects of Doppler shift

D) All of these answers are correct

Answer: D

220) What is meant by the statement that a satellite is operating in mode U/V?

A) The satellite uplink is in the 15 meter band and the downlink is in the 10 meter band

B) The satellite uplink is in the 70 cm band and the downlink is in the 2 meter band

C) The satellite operates using ultraviolet frequencies

D) The satellite frequencies are usually variable

Answer: B

221) How much 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) Never more than 1 watt

Answer: B

222) Which amateur stations may make contact with an amateur station on the International Space Station using 2 meter and 70 cm band amateur radio frequencies?

A) Only members of amateur radio clubs at NASA facilities

B) Any amateur holding a Technician or higher class license

C) Only the astronaut's family members who are hams

D) You cannot talk to the ISS on amateur radio frequencies

Answer: B

223) With regard to satellite communications, what is Doppler shift?

A) A change in the satellite orbit

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D) A special digital communications mode for some satellites

Answer: C

224) What do the initials LEO tell you about an amateur satellite?

A) The satellite battery is in Low Energy Operation mode

B) The satellite is performing a Lunar Ejection Orbit maneuver

C) The satellite is in a Low Earth Orbit

D) The satellite uses Light Emitting Optics

Answer: C

225) What causes spin fading when referring to satellite signals?

A) Circular polarized noise interference radiated from the sun

B) Rotation of the satellite and its antennas

C) Doppler shift of the received signal

D) Interfering signals within the satellite uplink band

Answer: B

226) What is a commonly used method of sending signals to and from a digital satellite?

A) USB AFSK B) PSK31 C) FM Packet D) WSJT

Answer: C

227) Which of the following are inputs to a satellite tracking program?

A) The weight of the satellite B) The Keplerian elements

C) The last observed time of zero Doppler shift D) All of these answers are correct

Answer: B

228) What name is given to an amateur radio station that is used to connect other amateur stations to the Internet?

A) A gateway B) A repeater C) A digipeater D) A beacon

Answer: A

229) Which of the following can be used to transmit CW in the amateur bands?

A) Straight Key
B) Electronic Keyer
C) Computer Keyboard
D) All of these choices are correct

Answer: D

230) Which of the following is an application of APRS (Automatic Packet Reporting System)?

A) Providing real time tactical digital communications in conjunction with a map showing the locations of stations
B) Showing automatically the number of packets transmitted via PACTOR during a specific time interval
C) Providing voice over Internet connection between repeaters
D) Providing information on the number of stations signed into a repeater

Answer: A

231) Which of the following devices provides data to the transmitter when sending automatic position reports from a mobile amateur radio station?

A) The vehicle speedometer
B) A WWV receiver
C) A connection to a broadcast FM sub–carrier receiver
D) A Global Positioning System receiver

Answer: D

232) What does the abbreviation PSK mean?

A) Pulse Shift Keying
B) Phase Shift Keying
C) Packet Short Keying
D) Phased Slide Keying

Answer: B

233) What does the term "APRS" mean?

A) Automatic Packet Reporting System
B) Associated Public Radio Station
C) Auto Planning Radio Set–up
D) Advanced Polar Radio System

Answer: A

234) What is PSK31?

A) A high–rate data transmission mode
B) A method of reducing noise interference to FM signals
C) A method of compressing digital television signals
D) A low–rate data transmission mode

Answer: D

235) Which of the following is an example of a digital communications method?

A) Packet
B) PSK31
C) MFSK
D) All of these choices are correct

Answer: D

236) What is an ARQ transmission system?

A) A special transmission format limited to video signals

B) A system used to encrypt command signals to an amateur radio satellite

C) A digital scheme whereby the receiving station detects errors and sends a request to the sending station to retransmit the information

D) A method of compressing the data in a message so more information can be sent in a shorter time

Answer: C

237) Which of the following may be included in packet transmissions?

A) A check sum which permits error detection

B) A header which contains the call sign of the station to which the information is being sent

C) Automatic repeat request in case of error

D) All of these choices are correct

Answer: D

238) Which of the following is true regarding vertical antennas?

A) The magnetic field is perpendicular to the Earth

B) The electric field is perpendicular to the Earth

C) The phase is inverted

D) The phase is reversed

Answer: B

239) What type of antennas are the quad, Yagi, and dish?

A) Non–resonant antennas

B) Loop antennas

C) Directional antennas

D) Isotropic antennas

Answer: C

240) What is a beam antenna?

A) An antenna built from aluminum I–beams

B) An omnidirectional antenna invented by Clarence Beam

C) An antenna that concentrates signals in one direction

D) An antenna that reverses the phase of received signals

Answer: C

241) 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

Answer: A

242) What is a good reason not to use a "rubber duck" antenna inside your car?

A) Signals can be significantly weaker than when it is outside of the vehic

B) It might cause your radio to overheat

C) The SWR might decrease, decreasing the signal strength

D) All of these choices are correct

Answer: A

243) What is a reason to use a properly mounted 5.8 wavelength antenna for VHF or UHF mobile service?

A) It offers a lower angle of radiation and more gain than a 1.4 wavelength antenna and usually provides improved coverage

B) It features a very high angle of radiation and is better for communicating via a repeater

C) The 5.8 wavelength antenna completely eliminates distortion caused by reflected signals

D) The 5.8 wavelength antenna offers a 10–times power gain over a 1.4 wavelength design

Answer: A

244) Which of the following terms describes a type of loading when referring to an antenna?

A) Inserting an inductor in the radiating portion of the antenna to make it electrically longer

B) Inserting a resistor in the radiating portion of the antenna to make it resonant

C) Installing a spring at the base of the antenna to absorb the effects of collisions with other objects

D) Making the antenna heavier so it will resist wind effects when in motion

Answer: A

245) Why are VHF or UHF mobile antennas often mounted in the center of the vehicle roof?

A) Roof mounts have the lowest possible SWR of any mounting configuration

B) Only roof mounting can guarantee a vertically polarized signal

C) A roof mounted antenna normally provides the most uniform radiation pattern

D) Roof mounted antennas are always the easiest to install

Answer: C

246) 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 capacitive loading to the ends of the radiating wires

Answer: C

247) What is the approximate length, in inches, of a quarter–wavelength vertical antenna for 146 MHz?

A) 112 B) 50 C) 19 D) 12

Answer: C

248) 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

Answer: C

249) Which of the following describes a simple dipole mounted so the conductor is parallel to the Earth's surface?

A) A ground wave antenna
B) A horizontally polarized antenna
C) A rhombic antenna
D) A vertically polarized antenna

Answer: B

250) In which direction is the radiation strongest from a half–wave dipole antenna in free space?

A) Equally in all directions
B) Off the ends of the antenna
C) Broadside to the antenna
D) In the direction of the feed line

Answer: C

251) What is meant by the gain of an antenna?

A) The additional power that is added to the transmitter power
B) The additional power that is lost in the antenna when transmitting on a higher frequency
C) The increase in signal strength in a specified direction when compared to a reference antenna
D) The increase in impedance on receive or transmit compared to a reference antenna

Answer: C

252) 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

Answer: C

253) What generally happens as the frequency of a signal passing through coaxial cable is increased?

A) The apparent SWR increases
B) The reflected power increases
C) The characteristic impedance increases
D) The loss increases

Answer: D

254) Why should coax connectors exposed to the weather be sealed against water intrusion?

A) To prevent an increase in feed line loss
B) To prevent interference to telephones
C) To keep the jacket from becoming loose
D) All of these choices are correct

Answer: A

255) Which of the following connectors is most suitable for frequencies above 400 MHz?

A) A UHF (PL–259/SO–239) connector
B) A Type N connector
C) An RS–213 connector
D) A DB–25 connector

Answer: B

256) Which of the following is true of PL–259 type coax connectors?

A) They are preferred for microwave operation
B) They are water tight
C) They are commonly used at HF frequencies
D) They are a bayonet type connector

Answer: C

257) What electrical difference exists between the smaller RG–58 and larger RG–8 coaxial cables?

A) There is no significant difference between the two types

B) RG–58 cable has less loss at a given frequency

C) RG–8 cable has less loss at a given frequency

D) RG–58 cable can handle higher power levels

Answer: C

258) What might cause erratic changes in SWR readings?

A) The transmitter is being modulated

B) A loose connection in an antenna or a feed line

C) The transmitter is being over–modulated

D) Interference from other stations is distorting your signal

Answer: B

259) Why is it important to have a low SWR in an antenna system that uses coaxial cable feed line?

A) To reduce television interference

B) To allow the efficient transfer of power and reduce losses

C) To prolong antenna life

D) All of these choices are correct

Answer: B

260) What is the impedance of the most commonly used coaxial cable in typical amateur radio installations?

A) 8 ohms B) 50 ohms C) 600 ohms D) 12 ohms

Answer: B

261) Which of the following types of feed line has the lowest loss at VHF and UHF?

A) 50–ohm flexible coax B) Multi–conductor unbalanced cable

C) Air–insulated hard line D) 75–ohm flexible coax

Answer: C

262) Why is coaxial cable used more often than any other feed line 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 feed line

C) It can handle more power than any other type of feed line

D) It is less expensive than any other types of feed line

Answer: A

263) What is the purpose of a fuse in an electrical circuit?

A) To prevent power supply ripple from damaging a circuit

B) To interrupt power in case of overload

C) To limit current to prevent shocks

D) All of these choices are correct

Answer: B

264) Which of these precautions should be taken when installing devices for lightning protection in a coaxial cable feed line?

A) Include a parallel bypass switch for each protector so that it can be switched out of the circuit when running high power

B) Include a series switch in the ground line of each protector to prevent RF overload from inadvertently damaging the protector

C) Keep the ground wires from each protector separate and connected to station ground

D) Ground all of the protectors to a common plate which is in turn connected to an external ground

Answer: D

265) 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

Answer: C

266) What safety equipment should always be included in home–built equipment that is powered from 120V AC power circuits?

A) A fuse or circuit breaker in series with the AC hot conductor

B) An AC voltmeter across the incoming power source

C) An inductor in series with the AC power source

D) A capacitor across the AC power source

Answer: A

267) What is a good way to guard against electrical shock at your station?

A) Use three–wire cords and plugs for all AC powered equipment

B) Connect all AC powered station equipment to a common safety ground

C) Use a circuit protected by a ground–fault interrupter

D) All of these choices are correct

Answer: D

268) How does current flowing through the body cause a health hazard?

A) By heating tissue B) It disrupts the electrical functions of cells

C) It causes involuntary muscle contractions D) All of these choices are correct

Answer: D

269) What kind of hazard might exist in a power supply when it is turned off and disconnected?

A) Static electricity could damage the grounding system

B) Circulating currents inside the transformer might cause damage

C) The fuse might blow if you remove the cover

D) You might receive an electric shock from the charge stored in large capacitors

Answer: D

270) What can happen if a lead–acid storage battery is charged or discharged too quickly?
A) The battery could overheat and give off flammable gas or explode
B) The voltage can become reversed
C) The memory effect will reduce the capacity of the battery
D) All of these choices are correct

Answer: A

271) What kind of hazard is presented by a conventional 12–volt storage battery?
A) It emits ozone which can be harmful to the atmosphere
B) Shock hazard due to high voltage
C) Explosive gas can collect if not properly vented
D) All of these choices are correct

Answer: C

272) Why is it unwise to install a 20–ampere fuse in the place of a 5–ampere fuse?
A) The larger fuse would be likely to blow because it is rated for higher current
B) The power supply ripple would greatly increase
C) Excessive current could cause a fire
D) All of these choices are correct

Answer: C

273) Which of the following is true concerning grounding conductors used for lightning protection?
A) Only non–insulated wire must be used
B) Wires must be carefully routed with precise right–angle bends
C) Sharp bends must be avoided
D) Common grounds must be avoided

Answer: C

274) When should members of a tower work team wear a hard hat and safety glasses?
A) At all times except when climbing the tower
B) At all times except when belted firmly to the tower
C) At all times when any work is being done on the tower
D) Only when the tower exceeds 30 feet in height

Answer: C

275) What is a good precaution to observe before climbing an antenna tower?
A) Make sure that you wear a grounded wrist strap
B) Remove all tower grounding connections
C) Put on a climbing harness and safety glasses
D) All of the these choices are correct

Answer: C

276) Which of the following is an important safety rule to remember when using a crank–up tower?

A) This type of tower must never be painted

B) This type of tower must never be grounded

C) This type of tower must never be climbed unless it is in the fully retracted position

D) All of these choices are correct

Answer: C

277) What is the purpose of a gin pole?

A) To temporarily replace guy wires

B) To be used in place of a safety harness

C) To lift tower sections or antennas

D) To provide a temporary ground

Answer: C

278) Under what circumstances is it safe to climb a tower without a helper or observer?

A) When no electrical work is being performed

B) When no mechanical work is being performed

C) When the work being done is not more than 20 feet above the ground

D) Never

Answer: D

279) What is considered to be a proper grounding method for a tower?

A) A single four–foot ground rod, driven into the ground no more than 12 inches from the base

B) A ferrite–core RF choke connected between the tower and ground

C) Separate eight–foot long ground rods for each tower leg, bonded to the tower and each other

D) A connection between the tower base and a cold water pipe

Answer: C

280) Why should you avoid attaching an antenna to a utility pole?

A) The antenna will not work properly because of induced voltages

B) The utility company will charge you an extra monthly fee

C) The antenna could contact high–voltage power wires

D) All of these choices are correct

Answer: C

281) 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

Answer: D

282) Which of the following is an important safety precaution to observe when putting up an antenna tower?

A) Wear a ground strap connected to your wrist at all times

B) Insulate the base of the tower to avoid lightning strikes

C) Look for and stay clear of any overhead electrical wires

D) All of these choices are correct

Answer: C

283) Which of the following is good practice when installing ground wires on a tower for lightning protection?

A) Put a loop in the ground connection to prevent water damage to the ground system

B) Make sure that all bends in the ground wires are clean, right angle bends

C) Ensure that connections are short and direct

D) All of these choices are correct

Answer: C

284) How does RF radiation differ from ionizing radiation (radioactivity)?

A) RF radiation does not have sufficient energy to cause genetic damage

B) RF radiation can only be detected with an RF dosimeter

C) RF radiation is limited in range to a few feet

D) RF radiation is perfectly safe

Answer: A

285) Which of the following actions might amateur operators take to prevent exposure to RF radiation in excess of established limits?

A) Relocate antennas

B) Relocate the transmitter

C) Increase the duty cycle

D) All of these choices are correct

Answer: A

286) If the averaging time for exposure is 6 minutes, how much power density is permitted if the signal is present for 3 minutes and absent for 3 minutes rather than being present for the entire 6 minutes?

A) 3 times as much

B) 1.2 as much

C) 2 times as much

D) There is no adjustment allowed for shorter exposure times

Answer: C

287) Why is duty cycle one of the factors used to determine safe RF radiation exposure levels?

A) It affects the average exposure of people to radiation

B) It affects the peak exposure of people to radiation

C) It takes into account the antenna feed line loss

D) It takes into account the thermal effects of the final amplifier

Answer: A

288) What is the definition of duty cycle during the averaging time for RF exposure?

A) The difference between the lowest power output and the highest power output of a transmitter

B) The difference between the PEP and average power output of a transmitter

C) The percentage of time that a transmitter is transmitting

D) The percentage of time that a transmitter is not transmitting

Answer: C

289) Which of the following frequencies has the lowest value for Maximum Permissible Exposure limit?

A) 3.5 MHz B) 50 MHz C) 440 MHz D) 1296 MHz

Answer: B

290) Why do exposure limits vary with frequency?

A) Lower frequency RF fields have more energy than higher frequency fields

B) Lower frequency RF fields do not penetrate the human body

C) Higher frequency RF fields are transient in nature

D) The human body absorbs more RF energy at some frequencies than at others

Answer: D

291) 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

Answer: B

292) What type of radiation are VHF and UHF radio signals?

A) Gamma radiation B) Ionizing radiation

C) Alpha radiation D) Non–ionizing radiation

Answer: D