



Second Class Radiotelegraph Operator's Certificate (t2)

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The unit of conductance is:

**Mho**

The prefix " kilo " means:

**To multiply by 1000 whatever quantity follows**

Direction of flow of DC electricity in a conductor can be determined by:

**A magnetic compass and the left hand rule**

**Connecting an ammeter with marked polarities in series with the circuit**

**A and C**

If the voltage to a circuit is doubled and the resistance is increased to three times the original value, what will be the final current?

**2/3 the original current**

How many capacitors of 400 volts and 2 microfarad each would be necessary to obtain a combination rated at 1600 volts and 1.5 microfarad?

**12**

The tendency of a tank circuit to keep oscillating for a time after the excitation energy has been removed is:

**Flywheel effect**

What is the total impedance of a series AC circuit having a resistance of 6 ohms, an inductive reactance of 17 ohms, and zero capacitive reactance?

**18 ohms**

Effectiveness of the grid in causing changes of plate current:

**Transconductance**

**Mutual conductance**

**A and B**

The approximate efficiency of a Class B vacuum tube amplifier:

**0.6**

A case in which the grid is held at an excessively negative value for a period of time thereby cutting off plate current:

**Blocked grid**

Operating conditions for determining that a tube is being used as a power detector:

**Bias at about cutoff**

**High input grid resistance**

**Plate circuit rectification**

**All of the above.**

"The temperature coefficient of a y-cut crystal is positive" means:

**The operating frequency of the crystal will decrease as the temperature decreases**

**The operating frequency of the crystal will increase as the temperature increases**

**A and B**

Given a solenoid with a resistance of 5 ohms and 0.34 through the winding when 1108 at 60 Hz is applied. What is the impedance?

**367 ohms**

A "choke" coil:

**Offers a relatively high impedance to AC currents**

**Has a high "Q" (low RF losses)**

**Offers a low resistance to DC currents**

**All of the above.**

An audio-transformer is seldom used as the output device in the plate circuit of a tetrode audio-amplifier stage:

**Because an ordinary transformer cannot supply enough impedance to the plate circuit**

A means of comparing the weight of a volume of liquid with the same volume of distilled water:

**Specific gravity**

You may measure the voltage of a battery under heavy load:

**To determine its condition of charge**

What capacity in amperes of storage battery is required to operate a 50 W emergency transmitter for 6 hr.? Assume a continuous transmitter load of 70% of the key-locked demand of 40 A, and an emergency light load of 1.5 A.

**A and B**

The principal function of the filter in a power supply:

**Either A or B**

Voltage regulation is \_\_\_\_ with a high resistance choke:

**Made worse**

When increased output is desired from a motor-generator, what is the usual procedure?

**Decrease the resistance after rheostat in series with the generator field**

The voltage of an alternator will:

**Decrease under load**

How can an R-F amplifier stage be neutralized?

**Vary the tuning of the plate tank circuit while observing the amp. meter**

A series-fed plate circuit of a vacuum tube amplifier has a short circuit of the plate bypass capacitor. What happened?

**It would short out the power supply**

**It would remove the plate voltage**

**It would possibly damage the power supply**

**All of the above.**

In a self-biased RF amplifier stage: plate voltage is 1250 V, plate current 150 ma, grid current 15 ma, grid-leak resistance of 4000 ohms, what is the operating grid bias?

**60 V**

Keying a simple-oscillator type of emergency transmitter may be accomplished by:

**Inserting the key in series with the primary of the high voltage plate transformer**

The correct formula for determining the surge impedance of a quarter wavelength matching line is:

**Impedance zero equal impedance of antenna times impedance of the line squared**

Communication at frequencies in the order of 15 kHz are usually accomplished by ground waves, and require generation of \_\_\_\_ power outputs for reliable and continuous operation:

**Extremely high power**

A form of regenerative receiver in which the detector breaks into and out of oscillation at a rate above audibility:

**Superregenerative receiver**

The sensitivity of a 3 circuit receiver is controlled by:

**The setting of the regeneration control**

In general, shielding between RF amplifier stages:

**Prevents electromagnetic coupling**

**Prevents electrostatic coupling**

**Improves the overall stability of a receiver**

**All of the above.**

If the vacuum tube heater in an approved auto-alarm system burns out:

**A pair of contacts close and energize the bell relay**

How may the range of a thermocouple ammeter be increased?

**Both A and B**

Approximately at what speed does the antenna of a navigational radar rotate?

**At speeds ranging from about 6 to 15 RPM**

How frequently must an entry be made in a ship radiotelegraph log while a radio watch is being maintained?

**At least every 15 minutes**

**This is in addition to the entries referring to silent periods**

**Both A and B**

If you receive a distress call signed by a call signal composed of five letters, could you determine the type of craft which transmitted the signal?

**Five letter call signals are assigned to aircraft stations**

**Three letter call signals are assigned to land stations**

**Four letter call signals are assigned to ship stations**

**All of the above.**

What is the experience requirement of a First Class Radiotelegrapher?

**The applicant must have a background of sending or receiving radiotelegraph messages for one year**

What is the maximum authorized bandwidth of a high frequency radiotelegraphy signal, emission A1A, in the maritime service?

**0.4 kHz**

A capacitor's charge is stored:

**Upon the inner surface of the capacitor plates**

**As an electrostatic field which exists in the space between the plates**

**A and B**

See REF1887

The unit of inductance is:

**Henry**

The prefix " micro " means:

**Divide by 1,000,000 whatever quantity follows**

The difference between electrical power and electrical energy is:

**A and B**

If a vacuum tube with a filament rating of 0.25 A and 5 V is operated from a 6 volt battery, what value of resistor is necessary?

**4 ohms**

If a turn in an inductor is shorted:

**There will be an decrease of induction**

**There will be a decrease of Q**

**There will be overheating with possible burnout**

**All of the above.**

Power factor is defined as:

**Both A&B**

The total impedance of a series AC circuit with an inductive reactance of 24 ohms, a resistance of 16 ohms, and a capacitive reactance of 16 ohms is:

**16 ohms**

The maximum negative anode voltage with respect to the cathode. It equals the DC voltage at the input to the plus the peak AC voltage applied during the nonconducting portion of the cycle of operation of the tube:

**Maximum inverse plate voltage**

The approximate efficiency of a Class C vacuum tube amplifier:

**0.85**

The maximum power that can be safely and continuously dissipated in heat on the plate:

**Maximum plate dissipation**

Why is a center top usually provided for vacuum tube plate and grid return circuits when an AC filament supply is used?

**To prevent hum voltage from modulating the normal signals**

Two dissimilar metals joined together and producing a current between them when the junction is heated is:

**A thermocouple**

Use of a low pass filter network:

**Ripple filter in power supplies, harmonic suppression filters in antenna systems**

**Line noise filters, tone control systems**

**Crossover networks, output filters of detector circuits**

**All of the above.**

Why is correct grid bias necessary for audio frequency amplifier?

**To minimize distortion**

**To set the operating conditions for determining the class of amplifications**

**So as not to exceed the rated plate dissipation of the tube**

**All of the above.**

The chief advantage of Class A audio operation is compared to the other classes of audio-frequency amplifiers:

**Low distortion of the output signal**

Edison type batteries:

**Have plates up nickel**

**Have plates of iron**

**Have plates of compounds of nickel and iron**

**All of the above.**

If the voltage of some cells in a battery are found to be reversed, what is indicated?

**Polarity was reversed while charging**

If a receiver storage A battery could not be kept charged, and maintain the required watch period, what should you do?

**Increase the charging rate**

Advantages of capacitor input and choke-input filters when used with rectifiers:

**A and B**

Electrolyte capacitors are desirable over other types because:

**A large capacitance may be obtained with small physical dimensions**

**The wet-type electrolytic capacitor is "self-healing"**

**A and C**

A dynamotor is:

**A combination motor-generator which utilizes a common field winding**

**Usually run by battery power**

**A higher efficiency than a motor-generator**

**All of the above.**

What effect will high coupling between the plate and grid circuits of a quartz-crystal oscillator have?

**Overheating of the crystal and possible breakage**

What is the purpose of a speech amplifier in connection with the modulator of a transmitter?

**To raise the signal-to-noise ratio and the output voltage of microphones**

A shunt-fed plate circuit of a vacuum tube amplifier has a short circuit of the plate RF choke. What happens?

**The plate tank circuit would be effectively shorted**

**The DC plate current would increase, possibly to excess**

**No RF output could be expected**

**All of the above.**

How would you determine the cathode bias resistance necessary to provide correct grid bias for an amplifier?

**Bias is equal to IR drop across the cathode resistance**

The plate current of the final RF amplifier in a transmitter increases and radiation decreases, if the antenna circuit is in good order, what could be the cause?

**Neutralization may have been upset**

**The plate circuit may have been detuned, bias may have been lost**

**Grid excitation may have decreased, there may be a faulty tube, or there may be parasitic oscillations**

**All of the above.**

What are the three factors to consider when figuring the surge impedance of a non-resonant transmission line?

**Diameter of the conductor, space between conductors, dielectric constant of insulating material**

Frequencies with substantially line propagations:

**A and B**

A tuned RF amplifier stage ahead of the mixer stage in a super heterodyne receiver:

**Improves receiver sensitivity, improves image rejection**

**Improves selectivity, improves stability**

**Improves signal-to-noise ratio, reduced interference**

**All of the above.**

A regenerative, oscillating-detector receives directly coupled to an antenna:

**May radiate energy that can beat with other carrier frequencies and cause heterodyning interference in a number of receivers**

Minimizes transfer of harmonic frequencies between two inductively coupled circuits:

**\*\*\*<This answer left blank by the FCC>**

**Induces magnetic shielding between two coils**

**Transfers energy between two coils**

**None of the above**

Unused portions of inductances in receivers are \_\_\_\_\_ to reduce any losses that might occur in these unused windings:

**Shorted**

By what factor must the voltage of an ac circuit, as indicated on the scale of an AC voltmeter, be multiplied to obtain the average voltage value?

**By the factor of 0.9**

How should a radar set be adjusted by the operator to reduce "sea return"?

**The operator should manually adjust the "suppressor" control or sensitivity time control, STC**

At what time(s) are routine transmissions forbidden in the bands of 480 to 515 kHz?

**Routine transmissions are forbidden during the international silent period**

While the vessel is in the open sea, how frequently must the specific gravity of the emergency battery be taken?

**Once daily**

What examination requirements are necessary to obtain a Second Class Radiotelegraph Operator's Certificate?

**Successful completion of written test Elements 1, 5 and 6 on basic radio law and operating practices plus telegraphy Elements 1 and 2**

What is the maximum transmitter power that a ship station may radiate using radiotelegraphy emissions on frequencies below 27500 kHz?

**3 kW**

A capacitor is sometimes placed in series with the primary of a power transformer:

**To improve the power factor**

See REF1887

The ratio of current through a conductor to the voltage which produces it is:

**Conductance**

The factor by which the product of volts and amperes must be multiplied to obtain true power is:

**Power factor**

A positive temperature coefficient means:

**Both A and B**

See REF1080

The minimum power dissipation rating of a resistor of 20,000 ohms across a potential of 500 V should be:

**25 watts**

The relationship between the number of turns and the inductance of a coil may be expressed by:

**The inductance varies approximately as the square of the number of turns**

High or low frequency oscillations occurring in circuits other than the original tank desired output frequencies are:

**Parasitic oscillations**

Essentials for making a good solder connection are:

**Bright, clean parts**

**Plenty of heat with the minimum amount of solder used**

**Discontinue operating on high power**

**None of the above**

What is the primary purpose of the control grid of the triode?

**To provide a means of obtaining amplification**

A charge due to the accumulation of negative electrons because the plate potential cannot attract all of the electrons leaving the emitter:

**Space charge**

Occurs when plate current equals electron emission for any given filament or cathode temperature \_\_\_\_\_.

**Plate saturation**

How would you determine the cathode-bias resistance necessary to provide correct grid bias for an amplifier?

**Bias equals the IR drop across the cathode**

**Bias is found by dividing the desired DC bias voltage by the total no-signal cathode current**

**For a tetrode or pentode, the screen current must be added to the plate current**

**All of the above.**

Waveguides:

**A type of transmission line**

**Hollow rectangular or circular pipe**

**Fine application as transmission lines**

**All of the above.**

A special type of power supply filter choke whose inductance is inversely proportioned to values of DC within specified limits is:

**Swinging choke**

When a tube is used as a Class B amplifier what portion of the excitation voltage cycle does plate current flow?

**Slightly more than 180 degrees**

Which is not the principle advantage of transformer coupling compared to resistance coupling in audio-frequency amplifiers?

**A transformer is expensive, heavy, and bulky**

The electrolyte of a lead-acid storage cell:

**Dilute sulfuric acid**

**Has a specific gravity about 1.3 fully charged**

**B and C**

See REF2563

Distilled water should be added to a lead-acid storage cell:

**To keep the electrolyte 1/4 inch above the top of the plates**

**To keep the useful plate area sufficient to maintain the full capacity of the cell**

**A and B**



Abnormally low input power terminal voltage of a lifeboat radiotelegraph transmitter while in operation could be caused by:

**Excessive overload**

**A partially discharged battery**

**B and C**

A high-resistance fixed resistor is shunted across each unit of a high voltage series capacitor bank in the power-supply filter circuit to:

**Insure that the correct voltage appears across each unit**

The most common values of chokes range from:

**5 H to 30 H**

Output voltage of a dynamotor may be regulated:

**Either A or B**

The operation of a dynatron oscillator depends on what?

**The secondary emission from the anode**

When the first speech-amplifier of a transmitter were overexcited, but the modulation capabilities were not exceeded what would be the effect on the output?

**The output would be distorted**

The total bandwidth of a transmitter using A-2 emission with a modulating frequency of 800 Hz and a carrier frequency of 500 kHz is:

**1600 Hz**

What is a method of link coupling between two R-F amplifier stages?

**The coupling together of two circuits which may be separated by a relatively large distance with low-impedance**

When hoisting a shipboard antenna, to avoid damage to the wire and insulators:

**A and B**

If the output frequency after passing through three doubler stages is 16,800 kHz, give the crystal frequency of a transmitter:

**2110 kHz**

On an average yearly basis the received Trans-Atlantic signals increased in strength in proportion to the degree of \_\_\_\_.

Made on the basis of the 11 year cycle:

**Sun spot activity**

What is the "mixer" tube in the superheterodyne receiver?

**The first detector**

Low sensitivity of a 3 circuit regenerative receiver might be caused by:

**Faulty tube**

**Out of phase feedback**

**Insufficient feedback**

**All of the above.**

An auxiliary receiving antenna on a ship with a radio direction finder:

**Enables the radio operator to maintain watch on 500 kHz whether or not the direction finder is in use**

Harmonic radiation by a transmitter may be prevented:

**By using a Faraday shield between the final amplifier and antenna circuit**

**By using suitable tuned filters in the transmission line system**

**B and C**

By what factor must the voltage of an AC circuit, as indicated on the scale of an AC voltmeter, be multiplied to obtain the peak value?

**The multiplying factor is 414**

In determining a "fix" position by a marine LORAN system, what is the minimum number of land transmitters involved?

**Four, or two pairs of "master and "slave" stations**

What time system shall be used in making log entries with respect to the observance of the international silent period?

**Greenwich Mean Time according to the 24 hour system**

How frequently must the quantity of fuel in the supply tank for use with an oil or gas driven emergency generator be checked while the vessel is in the open sea?

**Once daily**

How does an applicant qualify for a Third Class Radiotelegraph Operator's Certificate?

**By passing the appropriate written examinations and receiving by ear code groups and plain text for a period of one minute without error at the appropriate speed**

Where must ship station logs be kept during a voyage?

**At the principal radiotelephone operating position or radiotelegraph operating room**

SITOR-ARQ is a common mode of data communications in the maritime service. It is a system based on transmission bursts and acknowledgements. What is the baud, and interval between the burst transmissions:

**100 baud, 240 ms interval**

The product of the number of turns and the current in amperes used to describe relative magnitude is:

**Ampere turns**

The prefix " meg " means:

**Multiply by 1,000,000 whatever quantity follows**

A liquid which is capable of conducting electricity, but undergoes decomposition while doing so is:

**An electrolyte**

The total power dissipation capability of two 10 watt, 500 ohm resistors connected in series is:

**20 watts**

The formula for determining the resonant frequency of a circuit when the inductance and capacitance are known is:

**Both A and B**

What are effects of parasitic oscillations?

**Change of bias**

**Reduced efficiency of the amplifier tube**

**Distortion of the modulated wave**

**All of the above.**

For protection of personnel handling a transmitter:

**Ground all exposed metal parts**

What is the primary purpose of the screen grid of the tetrode?

**Both A and B**

A material flashed by the application of heat after the tube is evacuated that absorbs any gases remaining inside the tube:

**Getter**

The most desirable factor in the choice of a vacuum tube for a voltage amplifier:

**A high value of transconductance**

Given the following vacuum tube constants:  $G_p = 1000 \text{ V}$ ,  $I_p = 150 \text{ mA}$ ,  $I_g = 10 \text{ mA}$ , Grid leaks = 5000 ohms. What would be the grid bias voltage?

**50 V**

Transistors may be compared to a conventional triode vacuum tube functionally:

**Emitter corresponds to the cathode**

**Collector corresponds to the plate**

**Base corresponds to the grid**

**All of the above.**

The best suited material for use as an antenna strain insulator exposed to the elements:

**Glazed porcelain**

A properly operated Class A audio amplifier:

**Produces no serious modification of the input waveform**

Efficiency of a power transformer is determined by:

**Eddy current losses**

**Hysteresis losses**

**Copper losses**

**All of the above.**

The negative plate of a lead-acid storage cell:

**Is composed of pure spongy lead**

Local action in a lead-acid storage cell:

**Causes a slow discharge in the cell**

**Forms a very hard sulfate on the plates**

**May be reduced by trickle charging when the battery is not in actual use**

**All of the above.**

If a battery has 12.4 V on open circuit and 12.2 V when its charging circuit is closed:

**Could have polarity reversed**

Part of the secondary winding of a transmitters power transformer is accidentally shorted. What should be the immediate effect?

**The current would rise to an excessive value and trip the circuit breaker**

The power transformer and rectifier of a radio receiver are designed to supply a plate voltage of 250 V when operating from a 110 V 60 Hz supply, if the transformer is connected to 110 VDC what will happen?

**The secondary would burn out**

**The primary would overheat and burn out**

**Either A or B**

What disadvantage is there to a dynamotor?

**Its output voltage is dependent on the source voltage stability**

To provide additional feedback voltage in a crystal oscillator what is sometimes needed?

**An additional plate grid feedback capacitor**

The bias of a grid-modulated R-F stage is adjusted:

**1 and half to 3 times plate current cutoff value**

Given a vacuum tube of the following characteristics: plate voltage 1000 V, plate current 127 ma, filament current 5.4 amp, mutual conductance 8000 microvolts, and amplification factor of 25. What is the correct volume of negative grid bias for Class B amplifier?

**40 V**

Which type of amplifier circuit is used in a link coupling R-F?

**Push-pull**

If a field strength is 100 microvolts per meter at 100 miles, what is the field strength at 200 miles?

**50 microvolts**

Adding an inductor in series with an antenna will have what effect on the resonant frequency?

**Decrease**

Harmonic radiation is:

**Radiation occurring on frequencies that are whole multiples of the original frequency**

**Is always higher than the fundamental frequency**

**Reduced by proper tuning of the transmitter**

**All of the above.**

An incoming signal causing image interference is \_\_\_\_\_ the IF above or below the frequency to which the receiver is tuned:

**Twice**

Some components of a three-circuit regenerative circuit tested in troubleshooting:

**All tubes, power supply voltage, continuity of coils**

**Proper contacting of each position of tapped switches, pigtail connections, shorted variable capacitor**

**Grid leak for open circuit, grid capacitor for short, audio transformer for continuity, jacks & cords, antenna and ground connections**

**All of the above.**

Feeding back into the control grids of the IF and RF amplifiers a negative DC bias which is proportioned to the average magnitude of the received carrier wave accomplished:

**Automatic volume control**

The keying circuit of the ships transmitter is disconnected:

**When the auto-alarm antenna switch is placed in the auto-alarm operating position**

What is the meaning of "zero beat" as used in connection with frequency measuring equipment?

**Zero beat occurs when two frequencies are being mixed together and have no difference frequency between them**

What is the relationship between a master and a slave station in reference to LORAN navigation systems?

**A master station originates the RF pulse which then travels in all directions and is intercepted by the slave station**

See REF012

What is the international radiotelegraph distress frequency for stations in the mobile service?

**500 kHz**

While a vessel is in port, how frequently should the emergency equipment be tested?

**Only when the vessel is ready to leave port**

What examination credit is accorded Amateur Extra Class operators?

**Commercial radio operator telegraphy Elements 1 and 2**

How often must compulsory radiotelegraph installations on passenger vessels be inspected?

**Equipment inspections are required at least once every 12 months**

Weather information is commonly sent by radio in map form by one-way facsimile transmission. Two common parameters which must be set by the receiving station are:

**Index of cooperation (IOC), and revolutions per minute (RPM)**

The property of a conductor or coil which causes a voltage to be developed across its terminals when the number of magnetic lines of force in the circuit or coil is changed is:

**Inductance**

Factors which influence the resistance of a conductor:

**Cross-sectional area**

**Length**

**Temperature**

**All of the above.**

The effective value of an RF current and the heating value of the current are:

**The same**

What is the total power dissipation capability of two 10 watt 500 ohm resistors connected in parallel?

**20 watts**

The formula for determining the wavelength when the frequency is known is:

**Wavelength = 300,000/ f kHz**

**Wavelength = 300,000,000/ f Hz**

**Wavelength = 300/ f MHz**

**All of the above.**

The velocity of propagation of radio frequency waves in free space is:

**300,000 meters / second**

**186,284 miles / second**

**The same as the velocity of light in free space**

**All of the above.**

See REF1024

The ratio of peak-to-effective voltage values of a sign wave are:

**Both A and B**

What is the primary purpose of the suppressor grid of a pentode?

**Is highly negative with respect to the plate and returns secondary emission to the plate, increasing the permissible gain and the tube efficiency**

What types of vacuum tube filaments are reactivated:

**Thoriated tungsten**

Lack of requirement for neutralizing, except at ultra high frequencies, is an advantage of a tetrode over \_\_\_\_\_.

**A Triode**

What currents will be indicated by a milliammeter connected between the center top of the filament transformer of a tetrode and negative high voltage?

**Combined plate and screen grid currents**

Types of transistors:

**Both A and B**

Materials frequently used for relay contacts:

**Tungsten**

**Silver**

**Gold**

**All of the above.**

What is the main advantage obtained by using two triodes in push-pull in a Class a audio frequency amplifier?

**Increased power output**

**Cancellation of even harmonic distortion in the output**

**Elimination of DC saturation, elimination of cathode by-pass capacitor**

**All of the above.**

The ratios of primary and secondary currents in a power transformer:

**Are approximately in inverse ratio to the turns ratio**

**Is to some extent affected by the diameter of the primary and secondary wire**

**The current ratio is in inverse proportion to the voltage ratio**

**All of the above.**

The positive plate of a lead-acid storage cell:

**Is composed of lead peroxide**

To maintain a group of storage cells in good operating condition:

**Observe correct charge and discharge rates**

**Overcharge about once a month to remove sulfation**

**Keep all terminal connections clean and tight**

**All of the above.**

The tops of lead-acid batteries should be kept dry:

**To prevent slow discharge of the battery**

**To reduce the formation of terminal corrosion**

**A and C**

Bleeder resistors are used in power supplies:

**Either A or B**

A shunt-wound DC motor:

**Has a practically constant speed under widely varying load conditions**

Causes of excessive sparking at the brushes of a DC motor or generator include:

**Brushes not properly set at neutral point, dirt on commutator, motor overloaded**

**Weak spring tension on brushes, brushes worn, commutator worn eccentric**

**High mica-insulation between bars, commutator bars of uneven height**

**All of the above.**

What is the primary reason for the use of a crystal controlled oscillator for use as a transmitter?

**Frequency stability**

Given the following: (1) audio power for 100% modulation equals 50% of DC input power to RF modulated amplifier, (2) load presented to the modulated tube consists of the DC plate impedance of the modulated amplifier, (3) constant grid excitation voltage, very lot distortion, what type of modulation?

**Plate**

When the relative amplitudes of the positive and negative modulation peaks are unsymmetrical:

**Carrier shift**

An advantage of link coupling between RF amplifier stages is:

**Both A and B**

Field intensity is:

**Directly proportional to the antenna current**

Adding a capacitor in series with an antenna will have what effect on resonant frequency?

**Increase**

Harmonic radiation from a transmitter may cause interference:

**A and B**

A super heterodyne receiver is adjusted to 2738 kHz. The IF is 475 kHz. What is the grid circuit of the second detector tuned to?

**475 kHz**

Noisy operation of a regenerative, 3-circuit receiver with two stages of AF amplification may be caused by:

**Defective tubes, poor connections**

**Defective audio transformers**

**Defective grid resistance of grid-capacitor, or defective elements in the power supply**

**All of the above.**

The center-tap connection in a filament supply transformer:

**A and B**

Normal undistorted modulation is indicated by:

**An increase in antenna current without carrier shift**

What is the directional reception pattern of a loop antenna?

**A vertical loop antenna has a bidirectional pattern which is maximum in the directions in the plane of the loop, and minimum in the directions broadside to the loop**

**A horizontal loop antenna is nondirectional along the plane of the loop. It has minimum radiation or reception vertically**

**Both A and B**

How can the operator of a LORAN receiver on shipboard identify the transmitting stations that are being received?

**By their pulse recurrence rate**

**By reference to their frequency of transmission**

**Both A and B**

Describe how a distress call should be made:

**The distress call shall include the distress signal transmitted three times, the word DE, and the call signal of the mobile station in distress transmitted three times**