

SUBELEMENT 6A - GENERAL - [100 EXAM QUESTIONS]

6A1

A

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:

- A.100 baud, 240 ms interval
- B.50 baud, 1000  $\mu$ s interval
- C.200 baud, 10 ms interval
- D.None of the above

6A2

D

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:

- A.Lines-per-inch (LPI), and primary scan direction (PSD)
- B.Frequency shift (FS), and phase response pattern (PRP)
- C.Black-mode signal (BMS), and frequency jitter tolerance (FJT)
- D.Index of cooperation (IOC), and revolutions per minute (RPM)

6A3

A

2182 kHz is the international radiotelephone distress frequency. It is also used for a calling channel. The authorized mode of emission is H3E (single-sideband full carrier). A3E (double-sideband full carrier) is only authorized for equipment:

- A.Solely intended for distress and safety communications
- B.Built and sold after the GMDSS implementation date
- C.Built and sold before the GMDSS implementation date
- D.Solely intended for ship-to-shore public correspondence

6A4

D

Ship's power is generated as 3-phase and is ungrounded. On a delta-wound transformer with 120 VAC line-to-line secondary, what is the voltmeter reading from line to ground:

- A.Approx 67 volts for a normal balanced system with no faults
- B.0 VAC for a system with that phase faulted to ground
- C.120 VAC when another phase is faulted to ground
- D.Any of the above

6A5

D

When passing through areas of static charge, high voltages can accumulate on antennas which are insulated from ground. What protects a connected receiver from damage?

- A.Lightning arresters and suppressors
- B.Protection diodes on receiver input
- C.Capacitive coupling and static dissipative circuits
- D.Any combination of the above

6A6

B

Vertical shipboard antennas for use in the MF band (410-525 kHz) are often fitted with top-hat loading sections. What is the purpose of these structures?

- A.Provides aerodynamic compensation for stress during high winds
- B.Permits a physically short antenna to appear electrically longer
- C.Improves the near-field radiated pattern at the expense of the far-field pattern
- D.Prevents salt build-up on antennas from shunting RF energy to ground

6A7

B

Modern reserve transmitters are solid-state designs and transmit using only A2 modulation. When measuring transmitter center frequency, what precaution must be taken:

- A.Antenna must be grounded to suppress spurious side-lobes
- B.Modulation must be reduced to zero to eliminate sidebands
- C.Voltage to the PA must be kept at half-value
- D.Antenna current must be reduced to about 2.5 uA

6A8

D

Voltage may be expressed by what other expression?

- A.Difference of potential
- B.IF drop
- C.Electromotive force
- D.All of the above

6A9

D

Amperage may also be known by:

- A.Electron flow
- B.Electron drift
- C.Electric current flow
- D.All of the above

6A10

D

Factors which determine the amplitude of the voltage induced in a conductor which is cutting magnetic lines of force:

- A.Flux density
- B.Velocity that the conductor cuts the magnetic lines of force
- C.The angle at which the conductor cuts through the magnetic lines of force
- D.All of the above

6A11

D

An electrical potential may be generated by:

- A.Varying a magnetic field through a circuit
- B.Chemical action
- C.Photo-electric action
- D.All of the above

6A12

D

Ohm's law is stated as:

- A.  $E = IR$
- B.  $I = E / R$
- C.  $R = E / I$
- D. All of the above

6A13

C

The unit of electrical power is:

- A. Watt
- B. Joule per second
- C. Both A & B
- D. None of the above

6A14

B

The unit of conductance is:

- A. Ohm
- B. Mho
- C. Henry
- D. Ampere

6A15

A

The unit of inductance is:

- A. Henry
- B. Joule
- C. Coulomb
- D. Ohm

6A16

B

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

- A. Inductance
- B. Conductance
- C. Resistance
- D. None of the above

6A17

A

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

- A. Ampere turns
- B. Joules per second
- C. Push-pull convergence
- D. Dissipation collection

6A18

B

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:

- A.Capacitance
- B.Inductance
- C.Conductance
- D.None of the above

6A19

A

The charge of electricity which passes a given point in one second when a current of one ampere is flowing is:

- A.Coulomb
- B.Joule
- C.Watt
- D.None of the above

6A20

A

C = capacity in farads. Q = the measure of the quantity of charge of electricity in Coulombs. E = the applied voltage. So  $Q = CE$ :

- A.Determines the quantity of charge in a capacitor
- B.Determines the Q of a circuit
- C.Both A & B
- D.None of the above

6A21

D

Resistance is:

- A.The quantity which determines power loss or dissipation
- B.The factor of proportionality between voltage and current
- C.Measured in ohms
- D.All of the above

6A22

A

The unit of AC impedance in a circuit is:

- A.Ohm
- B.Mho
- C.Joule
- D.None of the above

6A23

D

The unit of capacitance is:

- A.Farad
- B.Microfarad
- C.Coulomb
- D.A & B

6A24

C

Decibel is:

- A.The unit used to express the ratio between two sound power levels
- B.The unit used to express the ratio between two electrical power levels
- C.Both A & B
- D.None of the above

6A25

C

What factors determine the charge stored in a capacitor?

- A.Capacitance of the capacitor
- B.The applied voltage
- C.Both A & B
- D.None of the above

6A26

D

Ohm's law for AC circuits when I = amperes, E = volts, Z = impedance in volts is:

- A. $I = E/Z$
- B. $E = IZ$
- C. $Z = E/I$
- D.All of the above

6A27

A

The formula for determining the power in a DC circuit when the voltage and resistance are known is:

- A. $P = (E^2/R)$
- B. $P = EI$
- C. $P = (I^2 R)$
- D. $PF = W/IE$

6A28

B

The formula for finding power in a DC circuit when current and resistance are known:

- A. $P = IE$
- B. $P = (I^2 R)$
- C. $PF = W/IE$
- D.None of the above

6A29

A

The formula for finding power in a DC circuit when current and voltage are known:

- A. $P = EI$

$B.P = ( I \text{ squared } ) R$

$C.PF = W/IE$

D.None of the above

6A30

A

The prefix " kilo " means:

A.To multiply by 1000 whatever quantity follows

B.To divide by 1000 whatever quantity follows

C.To add 1000 to whatever quantity follows

D.None of the above

6A31

A

The prefix " micro " means:

A.Divide by 1,000,000 whatever quantity follows

B.Multiply by 1,000,000 whatever quantity follows

C.Add 1,000,000 to whatever quantity follows

D.Divide by 1,000 whatever quantity follows

6A32

A

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

A.Power factor

B.Apparent power

C.Phase angle

D.None of the above

6A33

A

The prefix " meg " means:

A.Multiply by 1,000,000 whatever quantity follows

B.Multiply by 100,000 whatever quantity follows

C.Multiply by 1,000 whatever quantity follows

D.Divide by 1,000,000 whatever quantity follows

6A34

D

Factors which influence the resistance of a conductor:

A.Cross-sectional area

B.Length

C.Temperature

D.All of the above

6A35

A

Halving the cross-sectional area of a conductor will:

A.Double the resistance

B.Half the resistance

- C. Not affect the resistance
- D. None of the above

6A36

B

Name four conducting materials in order of their conductivity.

- A. Gold, silver, copper, platinum
- B. Silver, gold, zinc, platinum
- C. Silver, copper, zinc, aluminum
- D. Aluminum, zinc, copper, platinum

6A37

D

Good insulators at radio frequencies are:

- A. Pyrex, mica
- B. Isolatite, steatite, polyethylene
- C. Rubber, porcelain
- D. A & B

6A38

A

A resistance across which a constant voltage is applied is doubled. What power dissipation will result?

- A. One half
- B. One fourth
- C. Doubled
- D. None of the above

6A39

D

The needle of a magnetic compass when placed within a coil carrying an electric current:

- A. Will tend to become parallel with the axis of the coil
- B. Will point to the north pole end of the coil
- C. Will point to the south pole end of the coil
- D. A & B

6A40

A

Electrical resistance is measured with:

- A. An ohmmeter
- B. A wattmeter
- C. An Ammeter
- D. A voltmeter

6A41

A

The sum of all voltage drops around a simple DC circuit, including the source, is:

- A. Zero
- B. Insignificant
- C. Infinite

D.None of the above

6A42

A

If a resistance to which a constant voltage is applied is halved, what power dissipation will result?

- A.Doubled
- B.Halved
- C.Tripled
- D.Same

6A43

D

The diameter of a conductor six inches long is doubled, what will be the effect on the resistance?

- A.One-fourth the original value
- B.One-half the original value
- C.The resistance varies inversely with the cross-sectional area of the conductor
- D.A & C

6A44

A

A minute subdivision of matter having the smallest known unit of negative electrical charge is:

- A.Electron
- B.Ion
- C.Gilbert
- D.Joule

6A45

D

Conductors differ from nonconductors, i.e.:

- A.There are a large number of free electrons in a good conductor
- B.There is a small number of free electrons in a non-conductor
- C.There is an equal amount of free electrons in a good conductor and in a non-conductor
- D.A & B

6A46

D

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

- A.A magnetic compass and the left hand rule
- B.A magnetic compass and the right hand rule
- C.Connecting an ammeter with marked polarities in series with the circuit
- D.A & C



6A47

C

The difference between electrical power and electrical energy is:

- A. Electrical power is the rate of doing work by electricity
- B. Electrical energy is the ability to accomplish work by electricity
- C. A & B
- D. None of the above

6A48

C

A positive temperature coefficient means:

- A. Resistance increases as the temperature increases
- B. Resistance decreases as the temperature decreases
- C. Both A & B
- D. None of the above

6A49

A

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

- A. An electrolyte
- B. A ferromagnetic material under the influence of a magnetizing force
- C. Equal to the ohmic resistance of the circuit
- D. None of the above

6A50

A

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

- A. The same
- B. Effective value divided by two equals the heating value
- C. Effective value multiplied by two equals the heating value
- D. None of the above

6A51

D

One horsepower is:

- A. 746 Watts
- B. Roughly 3/4 kilowatt
- C. Corresponds to lifting 550 pounds at the rate of one foot per second
- D. All of the above

6A52

C

What factors determine the heat generated in a conductor?

- A. It is directly proportional to the resistance
- B. It is directly proportional to the square of the current
- C. Both A & B
- D. None of the above

6A53

D

What is the ratio of peak to average value of a sine wave?

- A.1.57 to 1
- B.1 to 0.636
- C.1 to 1
- D.A & B

6A54

A

When the current sine wave in a circuit reaches its peak value before the voltage wave:

- A.It is said to have a leading power factor
- B.It is said to have a lagging power factor
- C.It is said to be in phase
- D.None of the above

6A55

A

An "harmonic" is:

- A.A whole multiple of an original frequency
- B.The heating value of an RF current
- C.The internal impedance of a power source
- D.A multiple of the power factor

6A56

A

Assuming a power source to have a fixed value of internal impedance, maximum power will be transferred to the load when:

- A.The load impedance equals the internal impedance of the source
- B.The load impedance is higher than the source impedance
- C.The load impedance is lower than the source impedance
- D.None of the above

6A57

D

When two sine waves of the same frequency do not reach their maximum or minimum values simultaneously:

- A.A phase difference exists
- B.A phase difference does not exist
- C.The sine waves are out of phase
- D.A & C

6A58

C

Which method may be used to obtain more than one value of voltage from a fixed DC source?

- A.Use a resistance type voltage divider
- B.Connect voltage regulator tubes of suitable values and tap off the desired output voltage
- C.Both A & B
- D.None of the above

6A59

A

The conductance (G) of a circuit if 6 A flows when 12 VDC is applied is:

- A.0.5 mho
- B.1.0 mho
- C.0.25 mho
- D.None of the above

6A60

A

Two 10 W, 500 ohm resistors in parallel will dissipate how many watts?

- A.20 watts
- B.10 watts
- C.30 watts
- D.40 watts

6A61

D

A 20 ohm resistor with a current of 0.25 A passing through it will dissipate how many watts?

- A.10 watts
- B.20 watts
- C.0.025 watts
- D.1.25 watts

6A62

B

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?

- A.1/3 the original current
- B.2/3 the original current
- C.3 times the original current
- D.None of the above

6A63

A

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?

- A.4 ohms
- B.5 ohms
- C.10 ohms
- D.2 ohms

6A64

A

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

- A.25 watts
- B.12.5 watts
- C.15 watts
- D.None of the above

6A65

A

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

- A.20 watts
- B.10 watts
- C.5 watts
- D.None of the above

6A66

A

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

- A.20 watts
- B.40 watts
- C.5 watts
- D.None of the above

6A67

A

What is the maximum current carrying capacity of a resistor of 5000 ohms, 200 watts?

- A.0.2 A
- B.1 A
- C.1.2 A
- D.None of the above

6A68

D

What is the total resistance of a parallel circuit consisting of a 10 ohm branch and a 25 ohm branch?

- A.@ ohms
- B.10.3 ohms
- C.7.0 ohms
- D.7.14 ohms

6A69

A

The current through two resistors in series is 3 A. Resistance #1 is 50 ohms, resistance #2 drops 50 V across its terminals. What is the total voltage?

- A.200 V
- B.220 V
- C.110 V
- D.180 V

6A70

A

An 18 ohm and a 15 ohm resistor are connected in parallel; a 36 ohm resistor is connected in series with this combination; a 22 ohm resistor is connected in parallel with this total combination. The total current is 5 A. What current is flowing in the 15 ohm resistor?

- A.0.908 A
- B.1.000 A
- C.1.908 A
- D.0.809 A

6A71

A

A circuit passes 3 A. The internal resistance of the source is 2 ohms. The total resistance is 50 ohms. What is the terminal voltage of the source?

- A.150 V
- B.100 V
- C.110 V
- D.240 V

6A72

A

A relay coil has 500 ohms resistance, and operates on 125 mA. What value of resistance should be connected in series with it to operate from 110 VDC?

- A.380 ohms
- B.400 ohms
- C.200 ohms
- D.None of the above

6A73

C

Given: Input power to a receiver is 75 watts. How much power does the receiver consume in 24 hours of continuous operation?

- A.1800 watthours
- B.1.80 kilowatthours
- C.A & B
- D.None of the above

6A74

B

The total reactance when two capacitances of equal value are connected in series is:

- A.The product of the two individual reactances in ohms
- B.The sum of the two individual reactances in ohms
- C.The difference of the two individual reactances in ohms
- D.None of the above

6A75

C

A capacitor's charge is stored:

- A. Upon the inner surface of the capacitor plates
- B. As an electrostatic field which exists in the space between the plates
- C. A & B
- D. None of the above

6A76

D

The voltage drop across an individual capacitor of a group of capacitors connected in series across an AC source is:

- A. Inversely proportional to the ratio of the capacitance of the capacitor being considered
- B. Inversely proportional to the total capacitance of the combination
- C. Directly proportional to the applied voltage across the series combination
- D. All of the above

6A77

B

What is the total capacitance of the capacitors of 3, 5, and 7 microfarad connected in series?

- A. 14.79 microfarad
- B. 1.479 microfarad
- C. 15 microfarad
- D. None of the above

6A78

A

If capacitors of 3, 5, and 7 microfarad are connected in parallel, what is the total capacitance?

- A. 9 microfarad
- B. 15 microfarad
- C. 10 microfarad
- D. 3 microfarad

6A79

B

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?

- A. 10
- B. 12
- C. 14
- D. 16

6A80

D

If a turn in an inductor is shorted:

- A. There will be an decrease of induction
- B. There will be a decrease of Q
- C. There will be overheating with possible burnout
- D. All of the above

6A81

A

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

- A.The inductance varies approximately as the square of the number of turns
- B.The inductance varies approximately as the square root of the number of turns
- C.Both A & B
- D.None of the above

6A82

C

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

- A. $f = 1/(2 \pi \text{ times the square root of } LC)$
- B. $f = 0.159/(\text{the square root of } LC)$
- C.Both A & B
- D.None of the above

6A83

D

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

- A.Wavelength =  $300,000/ f \text{ kHz}$
- B.Wavelength =  $300,000,000/ f \text{ Hz}$
- C.Wavelength =  $300/ f \text{ MHz}$
- D.All of the above

6A84

A

The wavelength of the period of one complete cycle of a radio wave of 0.000,001 second is:

- A.300 M
- B.3000 M
- C.30 M
- D.70 cm

6A85

B

The efficiency of a radio device is:

- A.The ratio of the power input to the power output
- B.The ratio of the useful power output to the power input
- C.The ratio of the minimum power output to the maximum power output
- D.None of the above

6A86

D

What is the total impedance of a parallel capacitor and inductor with equal values of reactance?

- A.Infinite total reactance
- B.Zero total reactance
- C.Parallel impedance is resistive and infinite
- D.B & C

6A87

A

The total inductance of two coils in parallel without any mutual coupling is:

- A.Equal to the product of the two inductances divided by their sum
- B.The sum of the individual inductances

- C.Zero
- D.None of the above

6A88

D

What is the total reactance of a series AC circuit, with no resistance and equal inductance and capacitive reactances?

- A.The two reactances cancel being equal and opposite
- B.Net impedance is purely resistive and contains no reactive component
- C.The total reactance is zero at the resonant frequency
- D.All of the above

6A89

A

The total inductance of two coils in series without any mutual coupling is:

- A.The sum of the individual inductances
- B.The product of the individual inductances divided by their sum
- C.Infinite
- D.None of the above

6A90

C

One wave-length is:

- A.The distance a wave will travel in the time for one cycle
- B.Centimeter wavelength =  $30,000 / \text{frequency MHz}$
- C.A and B
- D.Neither A or B

6A91

A

In an AC circuit, a series inductance acting alone:

- A.Causes the current to lag the applied voltage by 90 degrees
- B.Causes the current to lead the applied voltage by 90 degrees
- C.Causes the current to lag the applied voltage by 45 degrees
- D.Causes the current to lead the applied voltage by 45 degrees

6A92

D

Shock excitation into an L-C circuit is the result of:

- A.A voltage being momentarily introduced
- B.The capacitor may be charged
- C.The inductor may have a voltage induced
- D.All of the above

6A93

A

The term cathode ray usually applies to:

- A.A fairly high velocity electron beam
- B.Background noise
- C.The logarithm gain of an electron beam



D.None of the above

6A94

D

Shielding an RF inductance:

- A.Increases the losses of the inductance
- B.Lowers the inductance value and the Q
- C.Increases the coil capacity to the shield
- D.All of the above

6A95

B

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

- A.Push-pull effect
- B.Flywheel effect
- C.Polarizing effect
- D.Parasitic oscillation

6A96

C

Power factor is defined as:

- A.The ratio between the resistance and the impedance in a circuit
- B.The ratio between the true power and the apparent power of a circuit
- C.Both A&B
- D.None of the above

6A97

B

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

- A.Harmonics
- B.Parasitic oscillations
- C.Hysteresis
- D.Eddy currents

6A98

D

What are effects of parasitic oscillations?

- A.Change of bias
- B.Reduced efficiency of the amplifier tube
- C.Distortion of the modulated wave
- D.All of the above

6A99

D

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

- A.300,000 meters / second
- B.186,284 miles / second
- C.The same as the velocity of light in free space

D.All of the above

6A100

B

To double the resonant frequency of a resonant circuit:

A.Make C one third of its original value

B.Make L and C both half their original values

C.Decreasing the value of both L and C in any proportion so that their product will be one-half of the original values

D.None of the above

6A101

C

How may the Q of a parallel resonant circuit be increased?

A.Increasing coupling to the resonant circuit

B.Using coil and capacitor supports of special low - loss materials

C.Both A and B

D.Decreasing coupling to the resonant circuit

6A102

C

If L and C in a parallel resonant circuit resonants at 1000 kHz are so varied that their product remains constant, what will be the resulting resonant frequency?

A.10,000 kHz

B.100 kHz

C.1 MHz

D.None of the above

6A103

A

What is the resonant frequency of a tuned circuit consisting of a 500 picofarad capacitor, a 150 microfarad tuning coil, and 10 ohms resistance?

A.581 kHz

B.753 kHz

C.498 kHz

D.None of the above

6A104

A

What is voltage regulation as applied to power supplies?

A.The ratio of change in voltage between no load and full load to the full-load voltage output

B.The ratio of output to input voltage

C.Voltage output of the power supply under full load

D.The ratio of input to output voltage

6A105

D

An EMF may be generated by sound waves by what principle?

- A.Electrostatic
- B.Piezo-electric
- C.Resistance change
- D.All of the above

6A106

D

How can you correct power factor in an electrical circuit?

- A.Inductance is used to correct a leading angle
- B.Capacitance is used to correct a lagging angle
- C.Neither A or B
- D.Both A and B

6A107

B

Permeability is:

- A.The magnetic field created by a conductor wound on a laminated core and carrying any electric current
- B.The ratio of magnetic flux density in a substance to the magnetizing force which produces it
- C.Polarized molecular alignment in a ferromagnetic material while under the influence of a magnetizing force
- D.Both A and C

6A108

C

The time in seconds for a capacitor to attain 63.2 % of the applied voltage across its terminals is:

- A.Twice the natural period of oscillation of the circuit
- B.Varactance
- C.Time constant
- D.Equal to the ohmic resistance of the circuit

6A109

B

What is the reactance of a 2-henry choke at 3000 Hz?

- A.5300 ohms
- B.37,680 ohms
- C.376,800 ohms
- D.53,000 ohms

6A110

B

If there is no resistance in either leg of a circuit with an inductance of 5 henrys in parallel with a capacitance of 1 microfarad, what is the equivalent impedance of the parallel network circuit?

- A.Zero
- B.Infinite
- C.Median

D.None of the above

6A111

C

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?

- A.15 ohms
- B.27 ohms
- C.18 ohms
- D.5 ohms

6A112

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:

- A.20 ohms
- B.16 ohms
- C.10 ohms
- D.None of the above

6A113

D

Essentials for making a good solder connection are:

- A.Bright, clean parts
- B.Plenty of heat with the minimum amount of solder used
- C.Discontinue operating on high power
- D.None of the above

6A114

A

For protection of personnel handling a transmitter:

- A.Ground all exposed metal parts
- B.Transmitter is equipped to shunt grounded faults
- C.Discontinue operating on high power
- D.None of the above

6A115

C

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

- A.1.414 to 1
- B.1 to 0.707
- C.Both A and B
- D.Neither A or B

6A116

A

The opposition to the creation of magnetic lines of force in a magnetic circuit is known as:

- A.Reluctance
- B.Hysteresis
- C.Permeability
- D.Eddy currents

6A117

B

The ratio of magnetic flux density to the field strength is known as:

- A.Residual magnetism
- B.Permeability
- C.Reluctance
- D.None of the above

6A118

B

The magnetic force which remains in a substance after the original magnetizing force has been removed is known as:

- A.Reluctance
- B.Residual magnetism
- C.Permeability
- D.Hysteresis

6A119

A

The direction of electron flow through a coil and the manner of winding the turns:

- A.Influence the direction of magnetic line of force generated by an electromagnet
- B.Are determined by the left-hand status rule
- C.Are determined by the diameter of the wire and length
- D.Both A and C

6A120

A

Adding an iron core to an air-core inductance:

- A.Increases the inductance
- B.Decreases the inductance
- C.Does not affect the inductance
- D.Causes parasitic oscillations in the inductor

6A121

D

Electromagnets are used in:

- A.loudspeakers
- B.meters
- C.motors
- D.All of the above

6A122

C

What will be the effect of a small increase in the number of turns upon the field strength of a single layer solenoid?

- A.Decrease in field strength if the coil length is increased
- B.Unchanged if the spacing is reduced to keep the length constant
- C.Both A and B
- D.None of the above

6A123

C

Can a transformer be used with direct current?

- A.In general, no
- B.If the DC current is periodically interrupted it would be possible to use an original DC voltage source
- C.Both A and B
- D.None of the above

6A124

A

A tube containing either a filament or cathode structure, grid, and a plate is a:

- A.Triode
- B.Tetrode
- C.Pentode
- D.Diode

6A125

B

A tube similar to a triode with the addition of a spirally wound screen grid between the plate and control grid is a:

- A.Diode
- B.Tetrode
- C.Pentode
- D.Triode

6A126

A

Theoretical gain of a tube. The ratio of a small change in plate voltage to give a certain small change in plate current to a change in grid which would cause the same current:

- A.Amplification factor
- B.Power factor
- C.Maximum inverse plate voltage
- D.None of the above

6A127

D

Effectiveness of the grid in causing changes of plate current:

- A.Transconductance
- B.Mutual conductance
- C.Plate resistance
- D.A & B

6A128

A

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:

- A.Maximum inverse plate voltage
- B.Mutual conductance
- C.Both A & B
- D.None of the above

6A129

A

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

- A.To provide a means of obtaining amplification
- B.To neutralize RF amplifiers
- C.Blocks passage of electrons
- D.None of the above

6A130

C

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

- A.Reduces the grid to plate capacitance, making it unnecessary to neutralize RF amplifiers except at very high frequencies
- B.Makes the plate current substantially independent of plate voltage, permitting much higher values of amplification
- C.Both A & B
- D.None of the above

6A131

A

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

- A.Is highly negative with respect to the plate and returns secondary emission to the plate, increasing the permissible gain and the tube efficiency
- B.Reduces interelectrode capacitance between control grid and plate making plate efficiency about 10% greater than a triode
- C.Both A & B
- D.Neither of the above

6A132

A

Thoriated tungsten is usually used to make:

- A.Filaments
- B.Heaters
- C.Cathodes
- D.None of the above

6A133

C

In what types of circuits do beam power vacuum tubes find application?

- A.As audio amplifier in the output and power stages of circuits having low to moderately high output ratings
- B.As an RF power amplifier
- C.Both A & B
- D.None of the above

6A134

B

When free electrons in a conductor acquire sufficient energy to leave the conductor and pass into the surrounding space, it is expressed as:

- A.Secondary emission
- B.Electron emission
- C.Primary electron release
- D.None of the above

6A135

B

The emission of electrons from a material due to the impact of high-velocity electrons on its surface is:

- A.Primary electron emission
- B.Secondary emission
- C.Mimetic emission
- D.None of the above

6A136

A

Characteristics of a vacuum tube operating as a class A amplifier:

- A.Low plate circuit efficiency, about 25%; practically no grid driving power; plate current flowing for 360 degrees of each cycle; practically no distortion of the output waveshape
- B.Plate circuit efficiency, about 50-60%; plate current flows slightly more than 180 degrees of each cycle, medium power output
- C.High efficiency, up to 80%; plate current drawn in bursts; great distortion of output waveshape
- D.None of the above

6A137

B

Characteristics of a vacuum tube operating as a class B amplifier:

- A.Low plate circuit efficiency, about 25%; practically no grid driving power; plate current flowing for 360 degrees of each cycle; practically no distortion of the output waveshape
- B.Plate circuit efficiency, about 50-60%; plate current flows slightly more than 180 degrees of each cycle, medium power output
- C.High efficiency, up to 80%; plate current drawn in bursts; great distortion of output waveshape
- D.None of the above



6A138

D

Factors which determine bias voltage of a vacuum tube:

- A. Class of operation, plate supply voltage, permissible distortion
- B. Grid signal magnitude, permissible plate dissipation, desired amplification factor
- C. The no-signal plate current desired, the desirability of drawing grid current
- D. All of the above

6A139

A

In the usual Class A amplifier:

- A. There is no grid current
- B. Plate current flows slightly more than 180 degrees of each cycle
- C. Biased to twice
- D. None of the above

6A140

A

The DC bias in a Class A amplifier:

- A. Usually is negative as measured at the grid with respect to cathode
- B. Usually is positive as measured at the grid with respect to cathode
- C. Cannot be determined
- D. None of the above

6A141

C

What is the effect of incorrect grid bias in a Class A amplifier?

- A. Distortion of the output waveshape
- B. Possible excessive plate dissipation if the bias is too low
- C. Both A & B
- D. None of the above

6A142

A

The approximate efficiency of a Class A vacuum tube amplifier:

- A. 20%-30%
- B. 60%
- C. 85%
- D. 100%

6A143

B

The approximate efficiency of a Class B vacuum tube amplifier:

- A. 20%-30%

- B.60%
- C.85%
- D.100%

6A144

C

The approximate efficiency of a Class C vacuum tube amplifier:

- A.20%-30%
- B.60%
- C.85%
- D.100%

6A145

B

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

- A.Getter
- B.Space charge
- C.Plate saturation
- D.None of the above

6A146

B

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

- A.Space charge
- B.Getter
- C.Collector
- D.Emitter

6A147

B

What types of vacuum tube filaments are reactivated:

- A.Barium beryllate
- B.Thoriated tungsten
- C.Nickel
- D.Thorium oxide

6A148

A

A tungsten filament is operated at \_\_\_\_ temperature than a thoriated tungsten filament:

- A.A higher
- B.A lower
- C.The same
- D.Unknown

6A149

A

The presence of gas within a tube is indicated:

- A.By a blue glow
- B.By a red glow

- C.By a yellow glow
- D.None of the above

6A150

C

The cathode of an indirectly heated type of vacuum tube should be maintained at nearly the same potential as the heater circuit:

- A.To reduce hum pickup into the cathode
- B.To prevent breakdown of the insulation between the heater and cathode
- C.A & B
- D.None of the above

6A151

D

Transmitting tube filaments should be maintained at recommended voltages:

- A.To realize the greatest life-expectancy
- B.If the filament voltage is too low, the emission will be reduced and operation of the circuit may be adversely affected
- C.If the voltage is too high, the filament may burn out
- D.All of the above

6A152

A

Use of an AC filament supply is desirable:

- A.Mostly for practical reasons. It is easily obtainable
- B.Hum may be introduced into the amplifier
- C.A & B
- D.None of the above

6A153

A

If a DC filament supply is used, it is advisable to periodically reverse the polarity of the filament potential:

- A.To lengthen the life of the filament
- B.To lengthen the life of the power source
- C.Both A & B
- D.None of the above

6A154

D

Bias voltage on the grid of an AF amplifier tube:

- A.Determines the operating conditions of the tube
- B.The correct value is essential for undistorted Class A output
- C.In power amplifiers the plate current must be limited to safe value not to exceed the rated plate dissipation of the tube
- D.All of the above

6A155

C

The screen grid in a vacuum tube:

- A.Makes it unnecessary to neutralize RF amplifiers except at very high frequencies,

- B.Makes it possible to obtain much higher values of amplification than with triodes
- C.A & B
- D.None of the above

6A156

D

The suppressor grid in a multielement vacuum tube:

- A.Is highly negative with respect to the plate
- B.Returns secondary electrons to the plate
- C.Increases the permissible gain and the efficiency of the tube
- D.All of the above

6A157

D

The gain of a triode audio amplifier is a function of:

- A.Tube transconduction
- B.Plate load impedance
- C.Transformer step-up (if used)
- D.All of the above

6A158

C

"Load" on a vacuum tube commonly refers to:

- A.The impedance through which plate current flows to produce a useful output
- B.Increases as the load impedance approaches the internal plate impedance in value
- C.A & B
- D.None of the above

6A159

A

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

- A.Blocked grid
- B.Blocked plate
- C.Motorboating
- D.Tuned grid

6A160

A

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

- A.Maximum plate dissipation
- B.Maximum power dissipation
- C.Continuous plate dissipation
- D.Plate heat dissipation

6A161

A

Occurs when plate current equals electron emission for any given filament or cathode temperature:

- A.Plate saturation
- B.Electron saturation

- C.Filament saturation
- D.None of the above

6A162

B

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

- A.A low value of transconductance
- B.A high value of transconductance
- C.High output tube capacitance
- D.None of the above

6A163

A

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

- A.A Triode
- B.A Pentode
- C.A & B
- D.None of the above

6A164

C

Characteristics of a vacuum tube operating as a Class C amplifier:

- A.Low plate circuit efficiency, about 25%; practically no grid driving power; plate current flowing for 360 degrees of each cycle; practically no distortion of the output waveshape
- B.Plate circuit efficiency, about 50-60%; plate current flows slightly more than 180 degrees of each cycle; medium power output
- C.High plate circuit efficiency, up to 80%; plate current drawn in bursts; great distortion of output waveshape
- D.None of the above

6A165

C

Plate current flows for less than 180 degrees (about 120 degrees when the grid bias is about twice cutoff value) in what class amplifier?

- A.A
- B.B
- C.C
- D.AB

6A166

A

Tubes operated as Class C amplifiers are not suited for audio-frequency amplifiers:

- A.Because of excessive distortion
- B.Because of current requirement
- C.Because of reduced life expectancy of the filament
- D.None of the above

6A167

D

Low plate current may be caused by:

- A.Low filament emission and voltage
- B.Excessive bias value, shorted screen by-pass capacitor
- C.Open grid circuit, low screen grid supply voltage
- D.All of the above

6A168

A

A tuned circuit made up of inductance and capacitance is:

- A.An oscillator
- B.A neutralizer
- C.Voltage divider
- D.None of the above

6A169

B

Some radio-frequency amplifiers must be neutralized:

- A.To maintain linear operation
- B.To prevent sustained oscillations from occurring in the amplifier
- C.Sustain feedback
- D.None of the above

6A170

D

Cavity resonators are:

- A.A form of resonant tank circuit
- B.Consist of a hollow metal cylinder bead on all sides
- C.Have a very high Q and selectivity
- D.All of the above

6A171

D

The diode detector:

- A.Is square law on weak signals
- B.Is practically linear on strong signals
- C.Is square law on strong signals
- D.A & B

6A172

D

The functioning of a grid-leak detector:

- A. Depends on the ability of the grid leak and capacitor to follow the average grid current variations which are directly proportioned to the modulation envelope
- B. Depends on second harmonic distortion
- C. Very sensitive to weak signals
- D. A & C

6A173

D

Characteristic of a square law type of vacuum tube detector:

- A. High sensitivity is provided due to the audio output signal amplitude being proportioned to the square of the radio frequency voltage
- B. High percentage of second harmonic distortion
- C. Works on weak signals only
- D. All of the above

6A174

A

A diode detector ordinarily produces \_\_\_\_ overall distortion of the audio output wave than does a triode detector:

- A. Lower
- B. Higher
- C. Practically the same
- D. Either A or B

6A175

D

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

- A. Bias at about cutoff
- B. High input grid resistance
- C. Plate circuit rectification
- D. All of the above

6A176

A

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

- A. To prevent hum voltage from modulating the normal signals
- B. To allow more filament current
- C. A & B
- D. None of the above

6A177

D

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

- A. Bias equals the IR drop across the cathode
- B. Bias is found by dividing the desired DC bias voltage by the total no-signal cathode current
- C. For a tetrode or pentode, the screen current must be added to the plate current
- D. All of the above

6A178

A

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?

- A. 50 V
- B. 100 V
- C. 25 V
- D. None of the above

6A179

C

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

- A. Plate current
- B. Screen grid current
- C. Combined plate and screen grid currents
- D. None of the above

6A180

A

A dynatron oscillator is a \_\_\_\_\_ which depends upon the negative resistance characteristic of a tetrode tube for its operation:

- A. Tuned circuit operation
- B. Diode detector
- C. Magnetron oscillator
- D. Meystron oscillator

6A181

D

Materials which can be used as crystal detectors:

- A. Silicon, galena
- B. Carborundum, iron pyrites
- C. Silicon, iron pyrites
- D. All of the above



6A182

C

A power detector may be operated:

- A.As a square law detector
- B.As a linear detector
- C.As either a square law detector or a linear detector
- D.None of the above

6A183

A

Used to multiply the fundamental frequency by two:

- A.Frequency doubler
- B.Harmonic generator with a suitable resonant circuit
- C.A & B
- D.None of the above

6A184

D

When used as an RF amplifier, a pentode vacuum tube:

- A.Usually does not require neutralization
- B.Usually requires neutralization
- C.May require neutralization at ultra-high frequencies
- D.A & C

6A185

C

A quartz crystal in a radio transmitter:

- A.Is used to provide a high degree of master-oscillator frequency stability
- B.May be the sole tuned circuit in the oscillator
- C.A & B
- D.None of the above

6A186

D

Advantage of crystal control over tuned circuit oscillators:

- A.Very high Q
- B.Compact size
- C.Excellent frequency stability
- D.All of the above

6A187

B

If the crystal will undergo very small changes in its operating frequency with relatively large temperature variations:

- A.A high-temperature coefficient crystal
- B.A low-temperature coefficient crystal
- C.A constant-temperature coefficient crystal
- D.None of the above

6A188

A

A separate source of power is sometimes desirable for crystal-oscillator units in a transmitter:

- A.To prevent dynamic instability of the crystal oscillator
- B.To prevent thermocoupling of the crystal oscillator
- C.To prevent overtuning of the crystal oscillator
- D.To cause dynamic instability of the crystal oscillator

6A189

D

"The temperature coefficient of an x-cut crystal is negative":

- A.The operating frequency of the crystal will decrease as the temperature decreases
- B.The operating frequency of the crystal will decrease as the temperature increases
- C.The operating frequency of the crystal will increase as the temperature decreases
- D.B & C

6A190

C

If you apply DC voltage to the opposite plane surfaces of a quartz crystal:

- A.The crystal plate will always undergo a physical distortion
- B.The crystal might crack under the strain of displacement caused by too much voltage
- C.A & B
- D.None of the above

6A191

D

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

- A.The operating frequency of the crystal will decrease as the temperature decreases
- B.The operating frequency of the crystal will increase as the temperature increases
- C.The operating frequency of the crystal will decrease as the temperature increases
- D.A & B

6A192

B

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

- A.A point contact type transistor
- B.A thermocouple
- C.A junction contact type transistor
- D.A solenoid

6A193

D

Waveguides:

- A.A type of transmission line
- B.Hollow rectangular or circular pipe
- C.Fine application as transmission lines
- D.All of the above

6A194

D

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

- A. Emitter corresponds to the cathode
- B. Collector corresponds to the plate
- C. Base corresponds to the grid
- D. All of the above

6A195

C

Types of transistors:

- A. Point-contact
- B. Junction
- C. Both A & B
- D. NPP

6A196

D

When using and storing crystal microphones:

- A. They should be protected from shock and vibration
- B. They should be protected from humidity
- C. They should be protected from high temperatures
- D. All of the above

6A197

A

What effect does a change in the dielectric constant of a capacitor dielectric material have upon the capacitance of a capacitor:

- A. Capacity varies directly with the dielectric constant
- B. Capacity may fluctuate wildly
- C. There is no effect upon the capacitance
- D. None of the above

6A198

A

Increasing the number of plates of a capacitor:

- A. Will increase the capacitance
- B. Will decrease the capacitance
- C. Will have no effect on the capacitance
- D. Will make the capacitance fluctuate

6A199

A

If the dielectric constants of a capacitor dielectric material between the capacitor plates were changed from 1 to 1:

- A. The capacitance would be twice its original value
- B. The capacitance would be half its original value
- C. The capacitance would decay rapidly
- D. None of the above

6A200

D

Contacts which slide together on opening and closing:

- A. Are butt joined
- B. Are known as self-wiping
- C. Keep the contacts clean by their action
- D. B & C

6A201

D

Permanent magnets used in head telephones:

- A. Place the diaphragms under tension so that the sensitivity of the telephones will be increased
- B. Improve the frequency response
- C. Prevents production of second harmonics in the telephones
- D. All of the above

6A202

A

Emergency repairs to an inductance coil having burned or charred insulation:

- A. Are generally impractical, short of rewinding the coil with good wire
- B. Are always practical if repaired by coating the bad turns with insulating varnish
- C. A & B
- D. None of the above

6A203

D

Indications of a defective vacuum tube in a transmitter:

- A. Gas blow within the tube, excessive plate color due to overheating
- B. No light from the filament, insufficient plate current, reduced output
- C. Excessive plate current, possible internal arcing, fluctuating plate or grid current
- D. All of the above

6A204

C

The breakdown voltage rating of a capacitor are determined by:

- A. The type of dielectric material used
- B. The thickness of the dielectric material
- C. A & B
- D. None of the above

6A205

D

Crystal surfaces should be free of dirt or grease to operate properly:

- A. Do not touch the faces of the crystal with the fingers
- B. Clean the faces with soap and water

- C.Clean the faces with carbon tetrachloride
- D.All of the above

6A206

D

A purplish glow from within a tube indicates:

- A.A soft tube
- B.A hard tube
- C.Air or undesired gases within the tube
- D.A & C

6A207

A

Given a solenoid with a resistance of 5 ohms and 0.34 through the winding when 110V at 60 Hz is applied. What is the impedance?

- A.367 ohms
- B.350 ohms
- C.360 ohms
- D.None of the above

6A208

D

Use of a low pass filter network:

- A.Ripple filter in power supplies, harmonic suppression filters in antenna systems
- B.Line noise filters, tone control systems
- C.Crossover networks, output filters of detector circuits
- D.All of the above

6A209

B

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

- A.Smoothing choke
- B.Swinging choke
- C.Radio frequency choke
- D.Audio frequency choke

6A210

A

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

- A.Glazed porcelain
- B.Glass
- C.Graphite composite
- D.Rubber

6A211

D

Materials frequently used for relay contacts:

- A.Tungsten
- B.Silver

- C.Gold
- D.All of the above

6A212

D

Why is rosin used as a soldering flux?

- A.It is noncorrosive
- B.It allows a perfect soldering bond to be made
- C.It possesses good insulation qualities
- D.All of the above

6A213

A

What substance is the most widely used in crystal oscillators?

- A.Quartz
- B.Galena
- C.Silicon
- D.Tourmaline

6A214

B

Why is an oscillator crystal operated at a constant temperature?

- A.Just because, stupid!
- B.To maintain a constant frequency output from the oscillator
- C.Constant temperature allows easier frequency change
- D.None of the above

6A215

D

The advantage of a single-button carbon microphone:

- A.High output voltage
- B.Sensitivity
- C.Low cost
- D.All of the above

6A216

D

A carbon microphone should not be:

- A.Jarred while in operation
- B.Tapped while in operation
- C.Subjected to violent sound intensities
- D.All of the above

6A217

A

In connecting head telephones directly in the plate circuit of a vacuum tube one should observe the proper polarity:

- A.To maintain maximum sensitivity in the headphones
- B.So its current flows opposed to the field strength of the permanent magnet
- C.A & B

D.None of the above

6A218

A

What should the plate current do in the operation of a Class B audio amplifier?

- A.Fluctuate
- B.Remain Steady
- C.Increase
- D.None of the above

6A219

A

What turns ratio does a transformer need to match a source impedance of 500 ohms to a load of 10 ohms?

- A.7.1 to 1
- B.7 to 1
- C.14 to 1
- D.None of the above

6A220

C

What microphones have a high impedance output?

- A.Crystal
- B.Dynamic
- C.Any
- D.None of the above

6A221

C

How may low impedance (75 ohm) head telephones be connected to the output of a vacuum tube?

- A.By using an impedance matching transformer in the output stage
- B.Connect them as a cathode bias resistor in the output stage
- C.Either A or B
- D.None of the above

6A222

C

Why do headphones usually have high-impedance windings?

- A.They can usually be operated without an impedance matching transformer
- B.They represent a closer match to the plate load impedance for the tube delivering necessary driving power than low impedance planes
- C.A & B
- D.None of the above

6A223

D

A "choke" coil:

- A.Offers a relatively high impedance to AC currents
- B.Has a high "Q" (low RF losses)
- C.Offers a low resistance to DC currents
- D.All of the above

6A224

D

Why is correct grid bias necessary for audio frequency amplifier?

- A.To minimize distortion
- B.To set the operating conditions for determining the class of amplifications
- C.So as not to exceed the rated plate dissipation of the tube
- D.All of the above

6A225

A

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

- A.Slightly more than 180 degrees
- B.Slightly less than 180 degrees
- C.360 degrees
- D.None of the above

6A226

A

A properly operated Class A audio amplifier:

- A.Produces no serious modification of the input waveform
- B.Serious distortion is present
- C.A & B
- D.All of the above

6A227

D

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

- A.Increased power output
- B.Cancellation of even harmonic distortion in the output
- C.Elimination of DC saturation, elimination of cathode by-pass capacitor
- D.All of the above

6A228

A

What is the maximum permissible RMS value of audio voltage which can be applied to the grid of a Class A audio amplifier which has a grid bias of 10 V?

- A.7.07 V
- B.8 V
- C.10 V
- D.14.14 V

6A229

D

Distortion in a Class A amplifier can be caused by:

- A.Insufficient plate and screen potentials, incorrect grid bias defective tube



- B. Leaky or shorted input coupling capacitor
- C. Excessive anode current if grid signal, incorrect value of load impedance
- D. All of the above

6A230

D

Vacuum tubes operating as Class A amplifiers may be used as:

- A. Audio power amplifiers, audio voltage amplifiers, microphones amplifiers, line amplifiers
- B. Oscilloscope amplifiers, modulators
- C. Phonograph amplifiers
- D. All of the above

A6231

A

Why is a push-pull audio frequency amplifier preferable to a single-tube stage?

- A. When compared with a single-tube stage, power output is doubled
- B. When compared with a single-tube stage, power output is the same
- C. When compared with a single-tube stage, power output is cut in half
- D. None of the above

6A232

A

What is the DC plate voltage of a resistance-coupled amplifier stage with a plate-supply voltage of 260 V, a plate current of 1 mA, and a plate load resistance of 100,000 ohms?

- A. 160 V
- B. 100 V
- C. 200 V
- D. 60 V

6A233

A

Why is it necessary to use two tubes in a Class B audio amplifier?

- A. To prevent the excessive distortion which would result from the use of only one tube in Class B
- B. To eliminate hum
- C. A & B
- D. None of the above

6A234

D

If the coupling capacitor leaked in a resistance-coupled audio frequency amplifier:

- A. Excessive plate current would result
- B. A large value of grid current would result
- C. There would be extreme distortion, and very low gain
- D. All of the above

6A235

C

A vacuum tube operated Class C audio amplifier is not feasible, either in single or push-pull:

A. Since the plate current only flows 120 degrees, even in push-pull, only 2/3 of the cycle is reproduced and the resultant distortion would be unacceptable for audio

B. Tank circuits, which replace the missing portions of the cycle, can't be used in an audio amplifier because they only operate on one frequency

C. A & B

D. None of the above

6A236

C

Even harmonics may be reduced in the output of an audio frequency amplifier:

A. By operating the stage push-pull

B. In a single tube amplifier, by operating the stage only on the linear part of the tube's characteristic curve

C. A & B

D. None of the above

6A237

A

The main advantage of a tuned audio frequency amplifier in a receiver used for the reception of CW:

A. A reduction in interference from unwanted signals

B. The desired audio beat frequency is attenuated

C. A & B

D. None of the above

6A238

A

Decoupling networks in the plate circuit of a multistage audio amplifier:

A. Prevents oscillations from occurring in the amplifier

B. Result in oscillations in the amplifier

C. Allow variable oscillations in the amplifier

D. None of the above

6A239

A

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

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

B. Because an ordinary transformer supplies too much impedance to the plate circuit

C. Because an ordinary transformer would be too costly

D. None of the above

6A240

B

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

- A. Hum currents are in phase
- B. Low distortion of the output signal
- C. Tendency for regeneration is increased
- D. Elimination of cathode bypass capacitors

6A241

D

Which is not the principle advantage of transformer coupling compared to resistance coupling in audio-frequency amplifiers? A. Greater gain per stage

- B. Can provide necessary impedance matching
- C. A & B
- D. A transformer is expensive, heavy, and bulky

6A242

D

Efficiency of a power transformer is determined by:

- A. Eddy current losses
- B. Hysteresis losses
- C. Copper losses
- D. All of the above

6A243

D

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

- A. Are approximately in inverse ratio to the turns ratio
- B. Is to some extent affected by the diameter of the primary and secondary wire
- C. The current ratio is in inverse proportion to the voltage ratio
- D. All of the above

6A244

A

A transformer has a primary voltage of 100, primary turns = 200, and secondary turns = 40. What is the secondary voltage?

- A. 20 V
- B. 240 V
- C. 140 V
- D. 340 V

6A245

B

What factors determine the no-load voltage ratio of a power transformer?

- A.Power ratio
- B.Turns ratio
- C.Voltage ratio
- D.Power factor

6A246

A

The turns ratio of a transformer varies:

- A.As the square root of the impedance ratio
- B.As the square of the impedance ratio
- C.As one-half the impedance ratio
- D.As twice the impedance ratio

6A247

D

Primary cells:

- A.Can be recharged
- B.Cannot be recharged
- C.An attempt to recharge it would not restore the eroded electrode
- D.B & D

6A248

D

Secondary cells:

- A.Can be recharged
- B.Cannot be recharged
- C.The products of the chemical change are not soluble in the electrolyte
- D.A & C

6A249

B

The formation of hydrogen gas around the positive electrode of a primary cell is:

- A.Depolarization
- B.Polarization
- C.Manganese dioxide
- D.None of the above

6A250

D

A dry cell may be tested:

- A.Must be tested under normal load condition
- B.May be tested under no load condition
- C.May be taken by any conventional voltmeter
- D.A & C

6A251

D

In the usual type dry cell:

- A.The negative electrode is made of zinc

- B.The positive electrode is made of carbon
- C.The negative electrode is made of zinc
- D.A & B

6A252

D

"A", "B", and "C" batteries are alike, but specifically constructed for a particular function. Explain:

- A."B" battery is for plate and screen power
- B."C" battery for grid bias voltage
- C."A" battery for filament power
- D.All of the above

6A253

D

The condition of a dry "B" battery may be determined:

- A.By measuring the voltage under normal load
- B.By measuring the voltage under no load
- C.A loss of 20 % of the voltage under normal load indicates that the battery should be replaced
- D.A & C

6A254

A

Spare "B" batteries should be stored:

- A.In a dry place
- B.In a hot place
- C.Anywhere
- D.A & C

6A255

A

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

- A.Specific gravity
- B.Specific mass
- C.Specific volume
- D.None of the above

6A256

D

Edison type batteries:

- A.Have plates up nickel
- B.Have plates of iron
- C.Have plates of compounds of nickel and iron
- D.All of the above

6A257

D

The electrolyte of a lead-acid storage cell:

- A.Concentrated sulfuric acid
- B.Dilute sulfuric acid

- C.Has a specific gravity about 1.3 fully charged
- D.B & C

6A258

A

The negative plate of a lead-acid storage cell:

- A.Is composed of pure spongy lead
- B.Is composed of lead peroxide
- C.Is composed of a compound of pure spongy lead and lead peroxide
- D.None of the above

6A259

B

The positive plate of a lead-acid storage cell:

- A.Is composed of pure spongy lead
- B.Is composed of lead peroxide
- C.Is composed of a compound of pure spongy lead and lead peroxide
- D.None of the above

6A260

D

The chemical composition of the electrolyte in an Edison-type storage cell:

- A.Is contained in a nickel-plated sheet steel tank
- B.Has a specific gravity of about 1.200
- C.Is a 21% solution of potassium and lithium hydroxides in distilled water
- D.All of the above

6A261

A

The negative plate of an Edison-type storage cell is:

- A.Finely powdered pure iron
- B.Green oxide of nickel
- C.Potassium oxide
- D.None of the above

6A262

B

The positive plate of an Edison-type storage cell is:

- A.Finely powdered pure iron
- B.Green oxide of nickel
- C.Lithium oxide
- D.None of the above

6A263

A

The average fully-charged voltage of an Edison storage cell is:

- A.1.2 V
- B.1.5 V
- C.2 V

D.1 V

6A264

D

Decrease in capacity of an Edison-type storage cell can be caused by:

- A.Frequent overheating, and operating conditions over 115 degrees fahrenheit
- B.Charging at less than the normal rate
- C.Adding impure water to the electrolyte, or a weak or aged electrolyte
- D.All of the above

6A265

C

The average fully charged voltage of a lead-acid cell is:

- A.1.0 V
- B.1.56 V
- C.2.06 V
- D.2.5 V

6A266

A

To increase the power output of a storage cell:

- A.Low internal resistance is desirable
- B.High internal resistance is desirable
- C.Low terminal voltage under load is desirable
- D.None of the above

6A267

C

The condition of charge of an Edison cell can be determined:

- A.By reading the terminal voltage under load
- B.By checking the voltage against a standard discharge curve
- C.Both A & B
- D.Checking the specific gravity

6A268

C

The charge of a lead-acid storage cell:

- A.May be determined by hydrometer readings
- B.By measuring voltage under a heavy load
- C.A or B
- D.None of the above

6A269

D

Sulfation:

- A.Reduces terminal voltage
- B.Increases internal resistance
- C.Reduces power output
- D.All of the above

6A270

D

If the polarity is reversed when charging a storage cell:

- A.No damage in a lead-acid cell unless excessive
- B.Damage in an Edison-cell
- C.No damage in an Edison-cell if temperatures below 115 degrees Fahrenheit
- D.A & C

6A271

A

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

- A.To determine its condition of charge
- B.To determine its polarity
- C.To determine its age
- D.None of the above

6A272

A

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

- A.Polarity was reversed while charging
- B.Polarity was doubled while charging
- C.Polarity has no influence of charging
- D.Polarity was correct while charging

6A273

D

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

- A.To keep the electrolyte 1/4 inch above the top of the plates
- B.To keep the useful plate area sufficient to maintain the full capacity of the cell
- C.None of the above
- D.A & B

6A274

D

Local action in a lead-acid storage cell:

- A.Causes a slow discharge in the cell
- B.Forms a very hard sulfate on the plates
- C.May be reduced by trickle charging when the battery is not in actual use



D.All of the above

6A275

D

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

- A.Observe correct charge and discharge rates
- B.Overcharge about once a month to remove sulfation
- C.Keep all terminal connections clean and tight
- D.All of the above

6A276

D

What may cause the plates of a lead-acid cell to buckle?

- A.Excessive sulfation
- B.Overheating
- C.Overdischarging of the battery
- D.All of the above

6A277

D

What may cause sulfation of a lead-acid cell?

- A.It is a normal process
- B.Overdischarging
- C.Local action with improper charging
- D.All of the above

6A278

D

What may be used to neutralize an acid electrolyte?

- A.Ammonium hydroxide
- B.Baking soda
- C.Washing soda
- D.All of the above

6A279

A

To prevent corrosion of battery terminals:

- A.Occasionally clean and coat them with Vaseline or other suitable lubricants
- B.Use only brass terminals
- C.Use only stainless steel terminals
- D.Keep battery on trickles charge

6A280

D

Why should there be ventilation to the room housing a large group of storage cells?

- A.To prevent gas accumulation
- B.To prevent overheating
- C.To prevent the terminals from shorting
- D.A & B

6A281

D

Radio equipment on which electrolyte may be used:

- A. Electrolyte capacitor
- B. Electrolyte rectifier
- C. Electrolyte detector
- D. All of the above

6A282

C

What is the effect of low temperature on the operation of a lead-acid storage battery?

- A. Electrolyte may freeze and split the battery if sg too low
- B. The capacity is decreased
- C. A & B
- D. None of the above

6A283

A

What form of energy is stored in a lead-acid storage battery?

- A. Chemical
- B. Mechanical
- C. Heat
- D. Light

6A284

C

How may polarity of a storage battery be determined?

- A. Voltmeter
- B. Salt water method
- C. A & B
- D. None of the above

6A285

A

A battery with a terminal voltage of 12.5 V is to be trickle-charged at a 0.5 A rate. What resistance should be connected in series with the battery to charge from a 110 V line?

- A. 195 ohms
- B. 300 ohms
- C. 95 ohms
- D. None of the above

6A286

A

A discharged storage battery of 3 cells has an open circuit voltage of 1.8 V per cell and an internal resistance of 0.1 ohm per cell. What voltage is needed to give an initial charging rate of 10 A?

- A. 8.4 V
- B. 10 V
- C. 15 V
- D. 12.5 V

6A287

C

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.A battery rated greater than 177 amperhours
- B.A battery rated at least 177 amperhours
- C.A & B
- D.None of the above

6A288

A

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

- A.Increase the charging rate
- B.Get a new battery
- C.Discontinue the required watch period
- D.B & C

6A289

D

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

- A.Reversed polarity
- B.Excessive overload
- C.A partially discharged battery
- D.B & C

6A290

A

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

- A.Could have polarity reversed
- B.Could be overloaded
- C.A & B
- D.None of the above

6A291

D

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

- A.To prevent slow discharge of the battery
- B.To prevent terminal overload
- C.To reduce the formation of terminal corrosion
- D.A & C

6A292

C

When lead-acid cells are subject to low temperatures they should:

- A.To prevent freezing
- B.To provide the maximum capacity
- C.A & B
- D.None of the above

6A293

A

If an electrolyte in a lead-acid storage cell becomes low due to evaporation:

- A.The level should be brought to about 1/4 inch above the tops of the plates with pure water
- B.The level should be brought to about 1/4 inch above the tops of the plates with tap water
- C.The level should be brought to about 1/4 inch above the tops of the plates with salt water
- D.None of the above

6A294

C

An Edison storage battery should not be charged at less than the manufacturer's specified rate:

- A.In order that the capacity of the battery shall be maximum after charge
- B.The chemical reactions of the Edison-type cell
- C.A & B
- D.None of the above

6A295

D

Your emergency battery has a specific gravity reading of 1.120. What should be done?

- A.Place the battery on charge at once
- B.Bring the electrolyte level to about 1/4 inch above the top of the plates
- C.The battery will be fully charged when the specific gravity reads 1.280 to 1.300
- D.All of the above

6A296

A

What care should be taken with selecting water to add to a storage cell?

- A.It should be chemically pure or distilled
- B.It should be only sea water
- C.Tap water is as good as any
- D.None of the above

6A297

D

If the circuit breakers refuse to stay closed when you place the emergency batteries on charge, what is the trouble?

- A. Internally shorted cells
- B. Reversed charging polarity
- C. Grounded circuit connections
- D. Any of the above

6A298

C

Heat developed within a storage cell under charge or discharge conditions is caused by:

- A.  $I^2R$  losses
- B. Energy transfer due to chemical reactions
- C. A & B
- D. None of the above

6A299

A

How would you connect a group of similar cells in a storage battery to obtain the maximum zero resistance current?

- A. In parallel
- B. In series
- C. In series/parallel
- D. None of the above

6A300

B

How would you connect a group of similar cells in a storage battery to obtain the maximum no-load output voltage?

- A. In parallel
- B. In series
- C. In series/parallel
- D. None of the above

6A301

A

What current will flow in a 6 V storage battery with an internal resistance of 0.01 ohms, when a 3 W, 6 V lamp is connected?

- A. 0.4995 A
- B. 0.4885 A
- C. 0.5566 A

D.0.5795 A

6A302

C

The charging rate of a storage cell charged from a fixed voltage source decreases as the charging progresses opposition to the charging voltage?

- A.Because as cell voltages increase, offering more opposition to the charging voltage
- B.When the effective charging potential is reduced, the charging current is decreased
- C.Both A & B
- D.None of the above

6A303

C

The principal function of the filter in a power supply:

- A.To remove the variations in amplitude of the rectifier output
- B.To provide a relatively unvarying DC voltage for use in the various circuits
- C.Either A or B
- D.None of the above

6A304

C

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

- A.Capacitor-input filter provides higher output voltage under reasonably light load conditions
- B.Choke-input filter offers better voltage regulations
- C.A & B
- D.None of the above

6A305

A

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

- A.Insure that the correct voltage appears across each unit
- B.Discharge the capacitors
- C.Does not insure the correct voltage across each unit
- D.None of the above

6A306

A

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

- A.The current would rise to an excessive value and trip the circuit breaker
- B.The short would burn the transformer
- C.The current in the secondary winding would decrease
- D.None of the above

6A307

C

Bleeder resistors are used in power supplies:

- A.To improve the output voltage regulation
- B.They also discharge the filter capacitor when the power is turned off
- C.Either A or B
- D.None of the above

6A308

B

The ratio of the frequencies of the output and input circuits of a single-phase full-wave rectifier:

- A.1 to 1
- B.2 to 1
- C.1 to 2
- D.None of the above

6A309

A

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

- A.To improve the power factor
- B.To improve output voltage regulation
- C.To rectify the primary windings
- D.None of the above

6A310

A

What is the maximum allowable secondary voltage of a transformer used as a center-tapped full-wave rectifier with tubes having a peak inverse voltage rating of 10,000 V?

- A.7070 V
- B.14140 V
- C.10000 V
- D.5000 V

6A311

D

If a 60 Hz transformer is connected to a 120 Hz source of the same voltage:

- A.The impedance of the transformers would be greater
- B.The current would be reduced
- C.There would be a decrease in power delivered to the load
- D.All the above

6A312

D

If a 500 Hz transformer is connected to a 60 Hz source of the same voltage:

- A.The primary would draw excessive current
- B.The transformer would overheat
- C.The primary might burn out
- D.All of the above

6A313

D

A 500 Hz AC plate supply, rectified by a full-wave, unfiltered rectifier circuit. What would the emission be?

- A.A modulated continuous wave of 500 Hz
- B.A modulated continuous wave of 1000 Hz
- C.A-2
- D.All of the above

6A314

A

The purpose of an air gap in a filter choke coil core. Which is the incorrect answer?

- A.To decrease the effective inductance for the AC component of current by increasing the DC saturation
- B.To increase the effective inductance for the AC component of current by decreasing the DC saturation
- C.The inductance of the coil in general's decreased
- D.All of the above

6A315

C

Loose laminations in a filter choke:

- A.Make it impossible to firmly connect the choke in a circuit
- B.A & C
- C.Cause a buzzing or chattering sound
- D.None of the above

6A316

D

Poor regulation in a power supply may be caused by:

- A.No bleeder resistance
- B.High resistance filter chokes
- C.Insufficient filter capacity
- D.All of the above

6A317

C



Why should the case of a high-voltage transformer be grounded?

- A.To protect personnel handling the equipment from shock
- B.To prevent high static voltages building up between the case and grounds
- C.A & B
- D.None of the above

6A318

A

When connecting electrolytic capacitors in series:

- A.Observe the polarity marked on the component
- B.There is no polarity to observe
- C.Connect anode to anode
- D.Connect cathode to cathode

6A319

C

Full wave rectification has \_\_\_\_\_ than half-wave:

- A.Better output voltage regulation
- B.Smaller filter components for a given ripple percentage
- C.A and B
- D.None of the above

6A320

A

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

- A.Made worse
- B.Made better
- C.The same
- D.None of the above

6A321

D

Electrolyte capacitors are desirable over other types because:

- A.A large capacitance may be obtained with small physical dimensions
- B.They have a cathode
- C.The wet-type electrolytic capacitor is "self-healing"
- D.A & C

6A322

A

The most common values of chokes range from:

- A.5 H to 30 H
- B.30 H-100 H
- C.1 H to 100 H
- D.100 H to 1000 H

6A323

D

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?

- A.The secondary would burn out
- B.The primary would overheat and burn out
- C.The circuit breaker would open to protect the circuit
- D.Either A or B

6A324

A

A shunt-wound DC motor:

- A.Has a practically constant speed under widely varying load conditions
- B.Has poor speed regulation under varying load conditions
- C.High starting torque
- D.None of the above

6A325

D

A series DC motor has:

- A.Maximum torque at low speed
- B.Quick starting
- C.Poor speed regulation under varying loads
- D.All of the above

6A326

B

This partially counteracts the line voltage and so limits the armature current in a DC motor:

- A.EMF
- B.Counter EMF
- C.Opposition EMF
- D.None of the above

6A327

D

A compound-wound DC motor:

- A.Has constant speed under changing load conditions
- B.Low starting torque

- C.High starting torque
- D.A & B

6A328

C

Laminated iron is used in armature and field construction to:

- A.Reduce eddy current losses
- B.Offer a number of high-resistance paths to Eddy currents
- C.A or B
- D.None of the above

6A329

B

The \_\_\_\_ of a DC motor periodically change the armature coils to maintain one direction of rotation:

- A.Field coils
- B.Connector
- C.Brushes
- D.Auxiliary speed control

6A330

A

The speed of a series DC motor may increase and destroy the motor by centrifugal action:

- A.When operated without a load
- B.When operated on AC
- C.When operated under varying load
- D.None of the above

6A331

A

When the field of a shunt-wound DC motor opens while the machine is operating under no load:

- A.The motor would race, and if unchoked, might destroy itself
- B.The motor would quit running without damage
- C.The motor would burn out the field coils
- D.None of the above

6A332

C

\_\_\_\_ are used in a DC motor to reduce brush sparking without moving the brushes:

- A.Interpoles
- B.Commutating poles
- C.Either A or B
- D.None of the above

6A333

C

A short in the armature coils of a DC motor causes:

- A.No excessive sparking at the commutator brushes
- B.No overheating of the motor
- C.Reduction of speed under load, and excessive armature current
- D.All of the above

6A334

B

The motor-field rheostat should be \_\_\_\_ when starting a DC motor generator set:

- A.Minimum resistance in the armature circuit
- B.Minimum resistance in the field circuit
- C.Maximum resistance in the field circuit
- D.None of the above

6A335

D

If a motor generator fails to start when the start button is depressed, the trouble may be:

- A.Blown fuse or tripped circuit breaker
- B.Open armature or motor-field rheostat
- C.Broken connections, defective brushes
- D.All of the above

6A336

A

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

- A.Decrease the resistance after rheostat in series with the generator field
- B.Increase the resistance of the rheostat in series with the generator field
- C.Output cannot be easily increased
- D.Shut down the motor-generator and restart under full load

6A337

D

A dynamotor is:

- A.A combination motor-generator which utilizes a common field winding
- B.Usually run by battery power
- C.A higher efficiency than a motor-generator
- D.All of the above

6A338

C

Output voltage of a dynamotor may be regulated:

- A. Only by changing the speed of the motor
- B. A series resistance in the output line could be used to reduce the available output voltage
- C. Either A or B
- D. None of the above

6A339

D

What disadvantage is there to a dynamotor?

- A. Compactness
- B. Operating efficiency
- C. It can be operated from batteries
- D. Its output voltage is dependent on the source voltage stability

6A340

D

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

- A. Brushes not properly set at neutral point, dirt on commutator, motor overloaded
- B. Weak spring tension on brushes, brushes worn, commutator worn eccentric
- C. High mica-insulation between bars, commutator bars of uneven height
- D. All of the above

6A341

D

By-pass capacitors are often connected across the brushes of a high-voltage DC generator:

- A. To regulate the voltage
- B. To protect the generator winding from high voltage surges
- C. To reduce RF interference
- D. B & C

6A342

D

Causes of motor-generator bearing overheating include:

- A. Incorrect kind of lubrication, lack of ventilation
- B. Constant overload, dirt in bearings
- C. Misalignment
- D. All of the above

6A343

D

RF interference may be minimized:

- A.By the use of brush by-pass capacitors
- B.Low frequency filters
- C.Shielding of long connecting leads
- D.All of the above

6A344

A

Emery cloth should never be used to clean the commutator of a motor or generator:

- A.Because it contains particles which may lodge between commutator segments and cause short circuits
- B.Because it may polish the commutator too smooth for good brush contact
- C.Because it may decrease the insulating quality of its mica between the interpoles
- D.None of the above

6A345

A

A 3 HP 100 V DC motor is 85% efficient when developing its rated output. What is the current?

- A.23.93 A
- B.25 A
- C.20 A
- D.8.5 A

6A346

D

The speed of a synchronous motor is determined:

- A.By the number of pairs of poles
- B.By the line frequency
- C.By the load
- D.A & B

6A347

D

The speed of an induction motor is determined:

- A.By the number of pairs of poles
- B.By the line frequency
- C.By the load
- D.All of the above

6A348

A

The speed of a DC series motor is determined:

- A.By the load
- B.By the number of pairs of poles
- C.By the commutator
- D.None of the above

6A349

B

What is the line current of a 7 HP motor operating on 120 V at full load, a power factor of 0.8, and 95% efficiency?

- A.56 A
- B.57.2 A
- C.58 A
- D.None of the above

6A350

A

Alternators are usually rated in:

- A.Volt-amperes output
- B.Watts
- C.Amperes
- D.\*\*\*<This answer left blank by the FCC>

6A351

C

What conditions must be met before two AC generators can be operated in parallel?

- A.Output voltages must be equal, frequencies must match
- B.Phase rotation, and relative phase positions must match
- C.A & B
- D.None of the above

6A352

A

The voltage of an alternator will:

- A.Decrease under load
- B.Increase under load
- C.Load has no effect on voltage
- D.None of the above

6A353

C

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

- A.The grid to plate capacitance will be destroyed
- B.The oscillation will be higher because of higher Q
- C.Overheating of the crystal and possible breakage
- D.Overmodulation

6A354

B

The operation of a dynatron oscillator depends on what?

- A.The positive emission from the anode
- B.The secondary emission from the anode
- C.Cathode being in saturation
- D.Positive resistance characteristic of the tetrode tube

6A355

A

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

- A.An additional plate grid feedback capacitor
- B.Adding a coupling circuit in series with the plate resistors
- C.An astable multivibrator
- D.A monostable multivibrator

6A356

C

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

- A.No cross-modulation
- B.Increase in gain
- C.Frequency stability
- D.Impedance gain and wider bandpass

6A357

B

What are the advantages of self excited oscillator and master-oscillator power-amplifier transmitters?

- A.The master-oscillator has fewer parts than the self-excited and is simpler to construct
- B.The self-excited oscillator transmitter is simpler to construct and has fewer parts than the master-oscillator
- C.Either A or B
- D.Neither



6A358

D

The primary function of the power-amplifier stage of a marine radiotelegraph transmitter is:

- A.To transmit messages concerning the safety and health of the ship personnel
- B.To transmit messages concerning the weather and safety of upcoming storms
- C.Both A and B
- D.To improve the frequency stability of the oscillator

6A359

C

The buffer amplifier stage of a transmitter:

- A.To hold any discriminator signals until verified by the varactor diode circuits
- B Buffers any signals that may have been imposed upon the carrier signal
- C.To improve the frequency stability of the oscillator
- D.Both A and C

6A360

C

Which class of amplifier is used in the final amplifier stage for maximum plate efficiency?

- A.Class A
- B.Class B
- C.Class C
- D.Filtered Class D

6A361

B

What class of amplifier is used as linear in order not to distort the modulation components?

- A.Class A
- B.Class B
- C.Class C
- D.None of the above

6A362

C

If a class B linear final R-F amplifier were in saturation and no modulation what would happen when modulated?

- A.The carrier frequency would override the grid-plate current and the result would be positive shift resulting in amplification
- B.The Class B linear amplifier only modulates below cut-off
- C.A condition of negative carrier shift would be the result
- D.Both A and B

6A363

D

A class C amplifier:

- A.Has an output for the entire input signal cycle
- B.Output is present for less than 180 degrees of the input cycle
- C.Bias is set well beyond cutoff
- D.Both B and C

6A364

A

What effect would insufficient radio-frequency excitation have on Class C modulated amplifier output?

- A.A negative carrier shift
- B.A positive carrier shift
- C.Both A and B
- D.None of the above

6A365

B

The second harmonic of a 380 kHz frequency is:

- A.1520 kHz
- B.760 kHz
- C.190 kHz
- D.2

6A366

D

Two effects of over-excitation of a Class B amplifier grid circuit are:

- A.Increased plate efficiency, decreased power output
- B.Decreased plate efficiency, excessive grid current
- C.Excessive plate current, excessive distortion
- D.Both B and C

6A367

D

Three main factors to consider about grid-leak in a vacuum tube transmitter:

- A.The value of grid leak current and grid leak anode to grid
- B.The value of grid leak resistance and duration of time the grid current is flowing
- C.Internal resistance of the tube between the grid and cathode
- D.Both B and C

6A368

A

How can an R-F amplifier stage be neutralized?

- A. Vary the tuning of the plate tank circuit while observing the amp. meter
- B. Vary the tuning of the plate tank circuit while observing the SWR meter
- C. Neutralization is done by circuit design either by increasing the input impedance or lowering the inductance value
- D. Both A and C are correct

6A369

B

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

- A. Used to raise the gain of signal after filtering
- B. To raise the signal-to-noise ratio and the output voltage of microphones
- C. To feed the mixer where signal-to-noise ratio is raised
- D. To pre-amp the weaker of the two signals received

6A370

C

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?

- A. The waveform would be sawtooth causing undermodulation
- B. The waveform would be square wave creating cross-modulation
- C. The output would be distorted
- D. Both A and C

6A371

D

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

- A. Below cut-off frequency
- B. At grid saturation
- C. At bias
- D. 1 and half to 3 times plate current cutoff value

6A372

B

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?

- A. Grid
- B. Plate
- C. Cathode
- D. Anode

6A373

B

Modulation occurring in an RF stage other than the final power amplifier:

- A.High level
- B.Low level
- C.Pre-emphasis
- D.Plate

6A374

C

The efficiency of a grid-bias modulated stage should be:

- A.Maximum at complete modulation
- B.Minimum at zero modulation
- C.Either A or B
- D.None of the above

6A375

C

Does grid current flow in a grid-bias modulated stage under modulated conditions?

- A.Grid current may exist during the positive portions of the AF cycle
- B.Grid current may cause distortion
- C.A and B
- D.None of the above

6A376

D

What might be the cause of a positive shift in carrier amplitude during modulation?

- A.Parasitic oscillations, excessive audio drive
- B.Incorrect tuning of final amplifier
- C.Insufficient RF excitation, incorrect neutralization
- D.All of the above

6A377

B

For 100% modulation, DC power input to the modulated RF amplifier should:

- A.Be the same as the AC power from the modulation
- B.Be 1/2 the AC power from the modulation
- C.Be 1/4 the AC power from the modulation
- D.None of the above

6A378

A

When a radiotelephone transmitter is 100% modulated by sinusoidal waveform , how much antenna current will be observed?

- A.22.5 % increase
- B.22.5 % decrease
- C.12.25% increase
- D.No change in antenna current

6A379

A

What can be done in a Heising modulation system to obtain 100% modulation?

- A.Use a series resistor between the amplifier and modulator in the DC plate supply
- B.Nothing needs to be done
- C.Use a series capacitor between amplifier and modulator in the DC grid supply
- D.Both A and C

6A380

C

A plate choke in a Heising modulator:

- A.Builds up audio modulating voltages
- B.Feeds audio modulating voltages to the plate of the RF modulated amplifier to produce plate modulation
- C.A and B
- D.None of the above

6A381

A

What value of sinusoidal audio power is required to insure 100% modulation when the DC plate input to a modulated Class C amplifier has an efficiency of 60 % , and is 200 W?

- A.100 W
- B.50 W
- C.25 W
- D.12 W

6A382

C

What would be the antenna current when a transmitter has an antenna current of 8 amp, under A -1, even if it is 100% modulated by sinusoidal modulation?

- A.9.8 amp
- B.The antenna current will increase by 22.5%
- C.Either A or B
- D.None of the above

6A383

D

If a transmitter is adjusted for maximum power for telegraph, what must be done to be amplitude modulated?

- A.The plate voltage must be reduced
- B.The plate voltage must be increased
- C.Tubes would have to dissipate 1.5 times as much power if the plate voltage were not reduced
- D.Both A and C

6A384

D

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

- A.It would short out the power supply
- B.It would remove the plate voltage
- C.It would possibly damage the power supply
- D.All of the above

6A385

D

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

- A.The plate tank circuit would be effectively shorted
- B.The DC plate current would increase, possibly to excess
- C.No RF output could be expected
- D.All of the above

6A386

A

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:

- A.1600 Hz
- B.1.6 kHz
- C.800 kHz
- D.1000 kHz

6A387

A

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?

- A.40 V
- B.50 V
- C.30 V

D.60 V

6A388

A

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

- A.Carrier shift
- B.Frequency shift
- C.Amplifier shift
- D.None of the above

6A389

D

What may be used as indicating devices in neutralizing an RF amplifier stage?

- A.Neon bulb, sensitive wavemeter
- B.A flashlight bulb connected to a small loop of wire, a sensitive thermocoupler either attached to a small loop of wire
- C.Amplifier grid current meter, a thermocouple meter connected in series with the plate tank
- D.All of the above

6A390

D

Important factors in the operation of the vacuum tube as a frequency doubler are:

- A.Plate tank should be tuned to twice the grid circuit frequency
- B.The grid bias should be very large, the grid driving voltage must be very large, the plate voltage should be comparatively high
- C.The plate tank circuit should have a low C to L ratio
- D.All of the above

6A391

A

If a 1500 kHz radio wave is modulated by a 2000 Hz sine wave tone, what frequencies does the modulated wave contain?

- A.1500 kHz , 1502 kHz , 1498 kHz
- B.1500 MHz , 1502 MHz , 1498 MHz
- C.1500 Hz , 1502 Hz , 1498 Hz
- D.None of the above

6A392

A

To avoid damage to components what precautions should be observed in tuning a transmitter?

- A.It should be adjusted at reduced power
- B.It should be adjusted under normal power
- C.Plate tank circuits are tuned for maximum DC current
- D.None of the above

6A393

A

A transmitter has a master-oscillator, intermediate amplifier, and final amplifier. In what order should the circuit be adjusted in putting the transmitter in operation?

- A.Master-oscillator, intermediate amplifier, final amplifier, antenna circuit
- B.Antenna circuit, master-oscillator, intermediate amplifier, final amplifier
- C.Final amplifier, antenna circuit, master-oscillator, intermediate amplifier
- D.Master-oscillator, intermediate amplifier, antenna circuit, final amplifier

6A394

D

Excessive plate current of an RF amplifier may be caused by:

- A.Plate-tank circuit off resonance, defective tube
- B.Excessive loading of plate tank, insufficient bias, parasitic oscillations
- C.Excessive plate and screen voltage, excessive excitation voltage, improper neutralization
- D.All of the above

6A395

A

The disadvantage of using a self-excited oscillator type of transmitter for shipboard service:

- A.Frequency instability
- B.Parasitic oscillations
- C.Violent sound intensities
- D.Large capacity

6A396

A

The degree of coupling is varied in a pi-network used to transfer energy from a vacuum tube plate circuit to an antenna:

- A.By adjusting the series capacitors
- B.By adjusting the tank capacitors
- C.By changing the plate voltage
- D.None of the above

6A397

A

In order of selectivity, the best receivers are:

- A.Superheterodyne, tuned radio frequency, superregenerative
- B.Tuned radio-frequency, superheterodyne, superregenerative
- C.Superregenerative, tuned radio-frequency, superheterodyne
- D.Tuned radio frequency, superregenerative, superheterodyne

6A398

A

An RF filter in the plate circuit of a tube detector is sometimes necessary to:



- A.Prevent RF variations from affecting the following audio stages
- B.Alter the impedance of the detector load circuit
- C.Insert RF variations from affecting the audio stages
- D.To prevent RF variations from affecting the following RF stages

6A399

A

In an RF amplifier with fixed bias, as the plate circuit is varied from below resonance to above resonance, what will the grid current do?

- A.The grid current will rise slightly at resonance
- B.The grid current will dip slightly at resonance
- C.The grid current will not vary
- D.None of the above

6A400

A

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?

- A.60 V
- B.30 V
- C.90 V
- D.50 V

6A401

A

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

- A.Bias is equal to IR drop across the cathode resistance
- B.Measure with a regular multimeter
- C.Both A & B
- D.None of the above

6A402

A

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

- A.The coupling together of two circuits which may be separated by a relatively large distance with low-impedance
- B.The coupling together of two circuits which may be separated by a relatively short distance
- C.Isolating one R-F amplifier stage by using a closed loop coupler
- D.Either B or C

6A403

B

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

- A.Push-push

- B.Push-pull
- C.Phase splitter
- D.FM discriminator

6A404

C

An advantage of link coupling between RF amplifier stages is:

- A.The flexibility of mechanical construction possible
- B.Reduction of tube capacitance effects on the L/C ratio of the tank circuits
- C.Both A and B
- D.Neither A or B

6A405

C

What effect does excessive coupling between the output circuit of an oscillator and an antenna have?

- A.The effect of cross-modulation of nearby frequencies
- B.Instability of the oscillator and feedback op-amp
- C.The oscillator will be very unstable
- D.Frequency discrimination will be unstable

6A406

C

How is power output of a transmitter adjusted?

- A.It should radiate the minimum power necessary to insure reliable communications
- B.It may be controlled by varying the plate supply
- C.Both A and B
- D.None of the above

6A407

A

When is a transmitter tuned to reduced power?

- A.The receiver is initially reduced because the receiver is very sensitive
- B.The receiver is non adjustable in almost all applications
- C.The receiver has a pre-stage amplifier that self-adjusts
- D.In the doubler stages

6A408

D

What is meant by split tuning?

- A.An effect resulting from excessive coupling between two tuned circuits which are at the same frequency
- B.Also known as double hump
- C.Also known as critical coupling
- D.Both A and B

6A409

C

What is a self rectified circuit?

- A.Provides a tone frequency for F3F emissions
- B.An op-amp circuit that provides a feed-back to the input
- C.Provides a tone frequency for A-2 emissions
- D.A self oscillating frequency discriminator circuit

6A410

A

What would be the dB change in field intensity at a given distance if the power is doubled?

- A.3 dB
- B.6 dB
- C.2 dB
- D.10 dB

6A411

C

Keying can be accomplished at various points in a radiotelegraph transmitter. Some are:

- A.At the primary of power transformer, at filament centertap, at screen grid circuit
- B.At the control grid circuit, at the DC supply
- C.A or B
- D.None of the above

6A412

C

What is the term used when the receiving operator may interrupt the transmitting operator at any point during transmission?

- A.Modulation compandering
- B.Interruption shift keying
- C.Break-in operation
- D.Transmission shift keying

6A413

C

Which of the following best explains frequency-shift keying?

- A.The shifting of frequencies by modulating the carrier antenna
- B.Changing the frequency of the input when the key is depressed
- C.Changing the frequency of the output when the key is depressed
- D.None of the above

6A414

C

What is one of the advantages frequency-shift keying has over "on-off" keying?

- A.Increase of transmitter bandwidth
- B.Decrease of signal-to-noise ratio
- C.Increase of signal-to-noise ratio
- D.Both A and C

6A415

A

Code speed or number of words per minute transmitted have what effect if any on the bandwidth of emission of a radiotelegraph transmitter?

- A.It does have an effect. Bandwidth increases as the code speed is increased
- B.No effect. Bandwidth decreases as the code speed is increased
- C.Signal strength increases as the speed increases
- D.Both A & C

6A416

A

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

- A.Inserting the key in series with the primary of the high voltage plate transformer
- B.Inserting the key in parallel with the primary of the high voltage plate transformer
- C.Inserting the key in series with the final output to the antenna
- D.None of the above

6A417

D

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?

- A.Neutralization may have been upset
- B.The plate circuit may have been detuned, bias may have been lost
- C.Grid excitation may have decreased, there may be a faulty tube, or there may be parasitic oscillations
- D.All of the above

6A418

C

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

- A.Avoid bending the wire
- B.Avoid smashing the insulators against metal objects
- C.A and B
- D.None of the above

6A419

A

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

- A. 50 microvolts
- B. 10 microvolts
- C. 200 microvolts
- D. 150 microvolts

6A420

A

Field intensity is:

- A. Directly proportional to the antenna current
- B. Inversely proportional to the antenna current
- C. Directly proportional to the square of the antenna current
- D. Directly proportional to the square root of the antenna current

6A421

A

What point on a shipboard antenna system displays the maximum potential?

- A. The end of the antenna furthest from the transmission line connections
- B. The end of the antenna closest to the transmission line connections
- C. Near the center of the antenna
- D. None of the above

6A422

D

A defective vacuum tube in a transmitter may be indicated by:

- A. Gas glow within the tube
- B. No light from the filament
- C. Reduced output
- D. All of the above

6A423

C

A master-oscillator power-amplifier transmitter has been operating normally. The antenna ammeter suddenly reads zero. All filaments are burning and plate and grid meters read normal currents and voltages. What happened?

- A. A shorted antenna ammeter
- B. An open connection in the remote reading meter
- C. Both a and b
- D. None of the above

6A424

D

Effects of dirty or salt-encrusted insulation are:

- A. Erratic readings of antenna current
- B. Increased corona discharge
- C. Decreased radiation power
- D. All of the above

6A425

A

To reduce the sparking at the contacts of a key used in a radiotelegraph transmitter:

- A. Connect a suitable key-click filter across the key
- B. Connect a suitable key-click filter in series with the key
- C. Connect a suitable high-pass filter across the key
- D. Increase the contact space of the key

6A426

A

In a self excited oscillator, a swinging antenna:

- A. Will cause serious frequency instability
- B. Will cause no noticeable frequency instability
- C. May cause minor frequency instability
- D. None of the above

6A427

A

What may be observed as the antenna circuit is brought into resonance about the plate current of the final amplifier?

- A. It will increase
- B. It will decrease
- C. It will remain constant
- D. None of the above

6A428

D

Instruments used to indicate various DC currents and voltages in a transmitter may be protected against damage to stray RF by:

- A. Insufficient grid blocking bias is applied to the grid when the key is open
- B. Shorted bias resistor
- C. Shorted key-click filter
- D. All of the above

6A429

D

In a radiotelegraph transmitter with a DC generator plate voltage source, an AC generator filament supply, and grid-bias keying, what could be wrong when the emission continues with the key contacts open?

- A. Insufficient grid blocking bias is applied to the grid when the key is open
- B. Shorted bias resistor
- C. Shorted key-click filter
- D. All of the above

6A430

A

A station has an assigned frequency of 8000 kHz and a frequency tolerance of plus or minus 0.04%. The oscillator operates at 1/8th of the input. What is the maximum permitted deviation of the oscillation frequency in Hz, which will not exceed the tolerance?

- A. Plus or minus 400 Hz
- B. Plus or minus 320 Hz
- C. Plus or minus 800 Hz
- D. Plus or minus 640 Hz

6A431

A

A transmitter operating on 5000 kHz uses a 1000 kHz crystal with a temperature coefficient of - 4 Hz/MHz/0 degrees centigrade. What is the change in the output frequency of the transmitter if the temperature increases 6 degrees centigrade?

- A. 499.88 kHz
- B. 5000.12 kHz
- C. 4120.0 kHz
- D. 5120.0 kHz

6A432

C

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

- A. Impedance total equal  $0.25 \text{ over } 1 \text{ squared}$
- B. Impedance total equal impedance of the antenna times impedance of the line squared over 1 times
- C. 14
- C. Impedance zero equal impedance of antenna times impedance of the line squared
- D. None of the above

6A433

A

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

- A. Diameter of the conductor, space between conductors, dielectric constant of insulating material
- B. Voltage on RF line, diameter of conductors, space between dielectric

- C. Diameter of shielding, space between dielectric constant, insulating shield around the conductor
- D. None of the above

6A434

C

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

- A. 2160 kHz
- B. 2 GHz
- C. 2110 kHz
- D. 2 kHz

6A435

A

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

- A. Decrease
- B. Increase
- C. Neutralization
- D. Equalization

6A436

B

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

- A. Decrease
- B. Increase
- C. Neutralization
- D. Equalization

6A437

D

The radiated wavelength of a Hertzian antenna is:

- A.  $1/2$  the physical length of the modulated coaxial
- B.  $1/4$  the physical length of the modulated RF line
- C.  $1/2$  the physical length of the antenna
- D. Approximately twice the physical length of the antenna

6A438

B

To operate on a lower resonant frequency on an available Marconi antenna which would be the correct procedure?

- A. Add a capacitor in series with the antenna
- B. Add an inductor in series with the antenna
- C. Add a screen grid bypass capacitor parallel to the antenna trap
- D. Add an RF choke across the feed line to ground



6A439

D

By reducing the physical length of a Hertzian antenna what are the results?

- A.The resonant frequency will be reduced
- B.The signal on a nearby frequency will be saturated upon modulation
- C.The antenna trap is reduced causing cross modulation
- D.The resonant frequency will increase

6A440

D

Which antenna system has the ability to discriminate between various directions of receiving or transmitting?

- A.1/4 stub bi-directional
- B.Multi-band Marconi 1/2 wave
- C.1/2 wavelength Yagi perpendicular polarized antenna
- D.Single element vertical antenna

6A441

B

Given the current and resistance of the base of a Marconi antenna, what would be the formula for determining the power?

- A. $P = \text{watts} \times \text{amps}$
- B. $P = \text{amps. squared} \times \text{resistance}$
- C. $P = \text{current} \times \text{resistance}$
- D.None of the above

6A442

D

A vertical loop antenna has a:

- A.Omni-directional pattern which is maximum in the directions of the plane of the loop, and minimum in the directions broadside to the loop
- B.Non-directional with regard to compass points
- C.Has minimum radiation or reception in the direction of the ends of the antenna
- D.Has a bi-directional pattern which is maximum in the direction of the plane of the loop, and minimum in the directions broadside to the loop

6A443

C

What modulation is contained in static and lightning radio waves?

- A.All odd harmonic frequencies
- B.All even harmonic frequencies
- C.Amplitude modulation
- D.Frequency modulation

6A444

A

The difference between a Hertz and Marconi antenna is:

- A.The physical length
- B.The positioning of the capacitor feed traps
- C.The grounding of RF shielding
- D.None of the above

6A445

C

What is meant by the term polarization of a radio wave?

- A.Electromagnetic waves penetrate conductors because of eddy currents
- B.Electromagnetically charged waves cross the zero axis in perpendicular patterns causing polarization to appear
- C.The polarization of a radio wave is determined by the direction of the electromagnetic wave plane
- D.The polarization of a radio wave is determined by the direction of the magnetic wave plane

6A446

C

What are the lowest frequencies used in radio communication today?

- A.SSB voice
- B.Double-sideband FM voice
- C.15 kHz
- D.1 kHz to 5 kHz

6A447

A

Radio frequencies that are useful for long distance communications requiring continuous operation:

- A.Low frequency
- B.High frequency
- C.Very high frequency
- D.Ultra high frequency

6A448

C

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:

- A.High power
- B.Low power
- C.Extremely high power
- D.Extremely low power

6A449

C

Frequencies with substantially line propagations:

- A.VHF, UHF, microwave
- B.About 50-30,000 MHz
- C.A & B
- D.None of the above

6A450

A

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:

- A.Sun spot activity
- B.Aurora borealis
- C.Extratropical Advection
- D.Perigean tide

6A451

D

Harmonic radiation is:

- A.Radiation occurring on frequencies that are whole multiples of the original frequency
- B.Is always higher than the fundamental frequency
- C.Reduced by proper tuning of the transmitter
- D.All of the above

6A452

C

Harmonic radiation from a transmitter may cause interference:

- A.Where the fundamental signal cannot be heard because of "skip"
- B.In other shipboard equipment
- C.A & B
- D.None of the above

6A453

C

Why suppress RF harmonics in the output of a transmitter?

- A.To prevent interference from occurring with other radio services
- B.To restrict the bandwidth of the particular station to the legal limits
- C.Both A & B
- D.None of the above

6A454

A

A wavetrap in a receiver:

- A.Prevents the effects of any undesired output of the receiver
- B.Generates desired frequencies in the output of the receiver

- C.A & B
- D.None of the above

6A455

D

The follow devices that could be used to indicate oscillation in a crystal oscillator are:

- A.Plate DC milliammeter, grid DC ammeter, neon bulb
- B.Thermogalvanometer, wavemeter
- C.Flashlight bulb on a loop of wire, heterodyne type frequency meter
- D.All of the above

6A456

D

An artificial antenna sometimes used in testing a transmitter:

- A.Dummy antenna
- B.Dummy load
- C.Prevents undesired radiation
- D.All of the above

6A457

D

The system producing A-2 emission by a "chopper" may be thought of:

- A.As a double-keying system
- B.The automatic "chopper" turns the transmitter on and off at a rapid rate
- C.The other key is a normal hand operated key
- D.All of the above

6A458

A

Advantages of high-frequency radio communication:

- A.The upper frequencies are substantially free of atmospheric interference, small antennas permit efficient mobile operation
- B.Man-made noises are no problem, reflections may easily occur from buildings and other objects
- C.A & B
- D.None of the above

6A459

D

Transmitters that employ variometers rather than variable capacitors as tuning elements do so because of:

- A.The size of required variable capacitors in the medium frequency band
- B.There is no such thing as a variometer!
- C.Variometers can be relatively compact
- D.A & C

6A460

B

The relationship between the antenna current and radiated power of an antenna:

- A.  $P = I^2 \times R$
- B.  $P = I^2 \times \text{radiated resistance}$
- C. No relationship exists
- D.  $P = E \times I$

6A461

D

Iron compound cylinders found in inductances:

- A. Increase Q
- B. Increase selectivity
- C. Increase gain
- D. All of the above

6A462

A

Modulation of an RF carrier produces in the plate circuit of the last radio stage of the system:

- A. High-level modulation
- B. Low-level modulation
- C. Medium-level modulation
- D. None of the above

6A463

D

Basically, an FM receiver is a conventional superheterodyne but differs in:

- A. The method of detection
- B. The reduction of sensitivity to amplitude modulation
- C. De-emphasis
- D. All of the above

6A464

A

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

- A. Superregenerative receiver
- B. Superheterodyne receiver
- C. Discriminator receiver
- D. Detuned radio frequency receiver

6A465

D

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

- A.Improves receiver sensitivity, improves image rejection
- B.Improves selectivity, improves stability
- C.Improves signal-to-noise ratio, reduced interference
- D.All of the above

6A466

A

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

- A.The first detector
- B.The second detector
- C.The beat frequency oscillator
- D.None of the above

6A467

A

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

- A.Twice
- B.Three times
- C.Half of
- D.Three quarters of

6A468

A

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

- A.475 kHz
- B.950 kHz
- C.2263 kHz
- D.3213 kHz

6A469

A

A superheterodyne receiver may not successfully be used for reception of frequencies very near the IF frequency:

- A.Because those near frequencies would pass directly through the IF amplifier and not be greatly affected by the tuning of the RF or oscillator stages
- B.Because those near frequencies would not pass directly through the IF amplifier
- C.Because those near frequencies would be greatly affected by the tuning of the RF or oscillator stages
- D.None of the above

6A470

A

Some superheterodyne receivers employ a crystal-controlled oscillator:

- A.To insure maximum stability of operation
- B.To reduce noise generated by a conventional oscillator
- C.Because it requires no shielding
- D.To control feedback

6A471

D

To obtain maximum response to weak CW signals with a superheterodyne receiver:

- A.RF gain control should be fully advanced
- B.BFO control varied to obtain the clearest tone
- C.AVC advanced to the best volume
- D.All of the above

6A472

A

Most receiver hiss is due to:

- A.Noise generated in the first detector
- B.Noise generated in the first AF amplifier
- C.Faulty regeneration control
- D.None of the above

6A473

A

High IF frequencies in a superheterodyne receiver:

- A.Reduce image frequency response
- B.Increases image frequency response
- C.Places the image frequency as close as possible to the normal received frequency
- D.None of the above

6A474

A

What is the IF of a superheterodyne receiver receiving on 1000 kHz and the mixing oscillator is tuned to 1500 kHz?

- A.500 kHz
- B.2500 kHz
- C.2000 kHz
- D.None of the above

6A475

D

Image response may be minimized in a superheterodyne receiver:

- A.By using one or more tuned RF stages ahead of the mixer
- B.By choosing a suitable IF (such that the image frequency will fall within the receiver's operating range)
- C.By choosing a suitable IF (such that the image frequency will fall outside of the receiver's operating range)
- D.A & C

6A476

D

In a tuned RF receiver the heterodyne method, over the autodyne reception, has:

- A.Great sensitivity
- B.More stable operation of the circuit
- C.Wider control of the beat-frequency
- D.All of the above

6A477

D

A regenerative receiver's operation is:

- A.An incoming RF carrier is coupled into the tuned-grid circuit and applied to the grid
- B.It is then amplified in the usual manner. A controllable portion of the plate signal is coupled back into the grid circuit
- C.The coupled back signal is in phase with the original signal thus amplifying it and providing a greater output signal in the plate circuit
- D.All of the above

6A478

D

Advantages of a stage of RF amplification are:

- A.Improved sensitivity, improved signal-to-noise ratio
- B.Improved selectivity, improved signal-to-noise ratio
- C.Improved signal-to-noise ratio, more efficient and more stable operation of the detector
- D.All of the above

6A479

D

Disadvantages of a stage of RF amplification are:

- A.A power audio amplifier would be needed to operate a loudspeaker
- B.An RF amplifier requires additional tuned circuits and tuning elements
- C.Shielding will probably be necessary
- D.All of the above

6A480

A

The sensitivity of a 3 circuit receiver is controlled by:



- A.The setting of the regeneration control
- B.The setting of the audio frequency control
- C.The setting of the radio frequency control
- D.The setting of the beat frequency oscillator

6A481

A

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

- A.May radiate energy that can beat with other carrier frequencies and cause heterodyning interference in a number of receivers
- B.Cannot radiate energy
- C.Radiates extremely high energy
- D.None of the above

6A482

D

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

- A.Faulty tube
- B.Out of phase feedback
- C.Insufficient feedback
- D.All of the above

6A483

D

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

- A.All tubes, power supply voltage, continuity of coils
- B.Proper contacting of each position of tapped switches, pigtail connections, shorted variable capacitor
- C.Grid leak for open circuit, grid capacitor for short, audio transformer for continuity, jacks & cords, antenna and ground connections
- D.All of the above

6A484

D

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

- A.Defective tubes, poor connections
- B.Defective audio transformers
- C.Defective grid resistance of grid-capacitor, or defective elements in the power supply
- D.All of the above

6A485

C

How could you test a regenerative receiver to determine if the detector is oscillating?

- A.Touch a finger on grounded wire to the grid circuit. You will hear a "plop" if the circuit was oscillating

- B.Vary the regeneration control to its maximum limits. You will hear a "plop" as the circuit goes in and out of oscillation
- C.Either A or B
- D.None of the above

6A486

A

How would you adjust a regenerative receiver without RF amplifier stages to receive radiotelegraph signals through interference?

- A.Provide the maximum selectivity and gain at the incoming signal frequency
- B.Increase the degree of coupling between the antenna and grid coils
- C.Provide the minimum possible regeneration
- D.None of the above

6A487

B

How would you reduce or eliminate broadcast signal interference of reception on 500 kHz?

- A.Use a regenerative receiver without RF amplifier stages
- B.Use a suitable wavetrap resonated to reject the undesired signals
- C.Use a crystal detector receiver tuned to the exact frequency
- D.None of the above

6A488

C

To adjust a regenerative receiver for maximum sensitivity:

- A.The station is tuned in with the receiver in the oscillating condition
- B.Slowly back the regeneration control off until the receiver just breaks out of oscillation and is also below the fringe howl point
- C.First A then B
- D.First B then A

6A489

D

What type of radio receiver do not respond to static interference?

- A.AM receivers are less responsive
- B.FM receivers have better sensitivity to such interference
- C.Both AM & FM
- D.B & C

6A490

D

Audio howl may be caused by:

- A.A "fringe" setting of the regeneration control
- B.A defective tube
- C.An open grid resistor

D.All of the above

6A491

D

If signals are heard with headphones in the detector plate circuit of a receiver, but none are heard with headphones in the first AF stage plate circuit, what might be the cause?

- A.Open winding of the coupling transformer
- B.Defective coupling capacitor, improper operating potentials
- C.Defective tube
- D.All of the above

6A492

C

In the case of an open secondary winding in a coupling transformer causing no signal in the first AF stage, satisfactory repair could be made by:

- A.Replacing the transformer
- B.Disconnecting the secondary winding and changing the coupling system to impedance coupling with a grid resistor and coupling capacitor
- C.A & B
- D.None of the above

6A493

A

An oscillator in a receiver operating on a frequency near the IF of the receiver:

- A.Beats with the IF in the second detector to produce an audible note
- B.May cause audio howl in the receiver
- C.Increases sensitivity
- D.May cause noisy operation of the receiver

6A494

A

Generally used to prevent any undesired frequencies from appearing in the output of a receiver:

- A.Wave trap
- B.Wave guide
- C.Ripple filter
- D.Tarody screen

6A495

C

By-pass capacitors across the cathode-bias resistors of an RF amplifier:

- A.Prevent variations of bias during excitation of the amplifier
- B.Results in better gain of the amplifier stage
- C.A & B
- D.None of the above

6A496

D

In general, shielding between RF amplifier stages:

- A.Prevents electromagnetic coupling
- B.Prevents electrostatic coupling
- C.Improves the overall stability of a receiver
- D.All of the above

6A497

D

Minimizes transfer of harmonic frequencies between two inductively coupled circuits:

- A.\*\*\*<This answer left blank by the FCC>
- B.Induces magnetic shielding between two coils
- C.Transfers energy between two coils
- D.None of the above

6A498

B

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

- A.Is mainly a spare antenna
- B.Enables the radio operator to maintain watch on 500 kHz whether or not the direction finder is in use
- C.Enables the radio operator to use the direction finder whether or not the communications receiver is in use
- D.None of the above

6A499

B

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:

- A.Rhymed effect
- BAutomatic volume control
- C.Neutralization
- D.Refraction

6A500

C

The center-tap connection in a filament supply transformer:

- A.Prevents hum voltages from modulating the normal signal
- B.The voltage change on one side of the filament will be effectively cancelled out by an equal and opposite voltage change at the other side of the filament, yielding no hum
- C.A & B
- D.None of the above

6A501

D

A shorted grid capacitor in a three-circuit regenerative receiver would:

- A. Render the receiver mostly or completely inoperative
- B. Have no noticeable effect
- C. Some forms of plate detection might occur but with considerably reduced sensitivity and volume
- D. A & C

6A502

C

The first detector in a superheterodyne receiver:

- A. Acts as a mixer, providing the action which produces the desired intermediate frequency
- B. The first detector must be operated on the non linear portion of its characteristic to provide the proper action
- C. A & B
- D. None of the above

6A503

D

The advantage of using iron cores of special construction in RF transformers and inductance?

- A. Increase of Q and gain of circuits using such cores
- B. Increase of selectivity and gain of circuits using such cores
- C. Increase of Q and selectivity
- D. All of the above

6A504

A

The auto alarm receiver is tuned to \_\_\_\_ but is able to respond to signals from \_\_\_\_ to \_\_\_\_ (+/- 12.5 kHz)

- A. 500 kHz, 487.5 kHz, 512.5 kHz
- B. 500 kHz, 485.0 kHz, 515 kHz
- C. 500 kHz, 490.00 kHz, 510 kHz
- D. 500 kHz, 470.00 kHz, 530 kHz

6A505

A

The auto-alarm signal is:

- A. Four consecutive dashes from C.5 to D.5 seconds, separated by spaces ranging from 0.1 to 0.5 seconds. The combination may not exceed 5 seconds
- B. Three consecutive dashes from D.5 to 5.5 seconds, separated by spaces ranging from 0.5 to A.0 seconds
- C. Five consecutive dashes from B.5-3.5 seconds, separated by spaces ranging from 0.01 to 0.25 seconds. The combination may not exceed 5 seconds
- D. None of the above

6A506

D

The determining factor of the setting of the sensitivity control of an auto-alarm receiver:

- A. Prevailing static at a given time
- B. Radio interference at a given time
- C. Signal strength
- D. A & B

6A507

D

With an auto alarm that uses a square-law detector and a mechanical selector what causes the bell to ring?

- A. Receipt of the true auto-alarm signal, low battery voltage
- B. Filament circuit open, the 24 V circuit to receiver open
- C. Battery charger fuse blown, motor stopped or running
- D. All of the above

6A508

D

Intermittent ringing of the bells of an auto alarm with a linear detector and an electronic selector could be caused by:

- A. An intermittent vacuum tube filament
- B. Fluctuating line voltage
- C. Faulty contacts or relay adjustment of warning relay receiver
- D. All of the above

6A509

D

An open filament on an auto-alarm with a linear detector and an electronic selector will:

- A. De-energize the restore relay K-105
- B. K105 applies voltage to K-100, time delay relay
- C. K106 causes the bell to ring after about 2 minutes
- D. All of the above

6A510

C

The auto-alarm bell rings and the release button stops it:

- A. There could be reception of a true alarm signal
- B. There could be reception of a false alarm signal
- C. A or B
- D. Neither A or B

6A511

D

If the auto-alarm bell rings and the release button doesn't stop it:

- A. Bell relay K-107 could be stuck, or there could be an open filament
- B. The alarm bell relay circuit ground could be bad
- C. There could be failure or low line voltage
- D. All of the above

6A512

A

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

- A. A pair of contacts close and energize the bell relay
- B. A pair of contacts open and energize the bell relay
- C. A pair of contacts close and de-energize the bell relay
- D. A pair of contacts open and deenergize the bell relay

6A513

A

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

- A. Shorted
- B. Removed from the circuit
- C. Insulated
- D. Straightened out

6A514

D

Harmonic radiation by a transmitter may be prevented:

- A. By using a suitable crystal filter
- B. By using a Faraday shield between the final amplifier and antenna circuit
- C. By using suitable tuned filters in the transmission line system
- D. B & C

6A515

A

The keying circuit of the ship's transmitter is disconnected:

- A. When the auto-alarm antenna switch is placed in the auto-alarm operating position
- B. When the auto-alarm antenna switch is placed in the auto-alarm off position
- C. Manually as desired
- D. None of the above

6A516

A

Normal undistorted modulation is indicated by:

- A. An increase in antenna current without carrier shift

- B.A decrease in antenna current without carrier shift
- C.An increase in antenna current with carrier shift
- D.A decrease in antenna current with carrier shift

6A517

C

If a vacuum tube in the only RF stages of your receiver burned out, make a temporary repair by:

- A.Remove its tube and connect a small (about 0.001 microfarad) capacitor between the control grid and plate connections
- B.Connect the antenna to the control grid of the stage following the one which was burned out
- C.Either A or B
- D.A & B

6A518

A

A \_\_\_\_ provides a very high degree of selectivity in a receiver:

- A.Crystal filter
- B.Low pass filter
- C.Bleeder resistor
- D.By-pass capacitor

6A519

C

The D'Arsonval type meter consists of:

- A.A permanent magnet, a movable coil with pointer attached rotating in jewel bearing
- B.A movable coil with pointer attached rotating in jewel bearings, and two spiral springs (one on each side of the removable coil)
- C.A & B
- D.None of the above

6A520

B

What is the purpose of multiplier resistance used with a voltmeter?

- A.Multiplier resistance is not used with a voltmeter
- B.To increase the voltage indicating range of the voltmeter
- C.To decrease the voltage indicating range of the voltmeter
- D.None of the above

6A521

B

What is the purpose of a shunt as used with an ammeter?

- A.To permit a decrease in the indicating range of the meter



- B.To permit an increase in the indicating range of the meter which is almost inversely proportional to the resistance of the shunt
- C.A shunt should not be used with a ammeter
- D.None of the above

6A522

D

What is indicated if a voltmeter connected between the negative side of a ship's DC line and ground reads the full line voltage?

- A.It indicates that the voltmeter leads are reversed
- B.This indicates that the positive side of the line, rather than the negative side is grounded
- C.The generator terminals should be reversed
- D.Both B & C are correct

6A523

C

Why are copper oxide rectifiers, associated with DC voltmeters to measure AC, unsuitable for the measurement of voltages at radio frequencies?

- A.Because of the relatively low shunt capacitance of the copper oxide rectifier
- B.The AC & DC voltages will read low
- C.Because of the relatively large shunt capacitance of the copper oxide rectifier
- D.All of the above

6A524

C

How may the power in a AC circuit be determined?

- A.The power in an AC circuit may be determined by a wattmeter
- B.By multiplying the product of the circuit voltage and current by the power factor
- C.Both answers A & B
- D.None of the above

6A525

B

The product of the readings of an AC voltmeter and ammeter in an AC circuit is called what?

- A.Reverse power
- B.Apparent power
- C.Current power
- D.None of the above

6A526

B

Does an AC ammeter indicate peak, average, or effective values of current?

- A.The conventional AC ammeter is calibrated to indicate effective (TRM) values of current
- B.The conventional AC ammeter is calibrated to indicate effective (RMS) values of current
- C.An AC ammeter indicates peak values of current

D.An AC ammeter indicates average values of current

6A527

C

What types of meters may be used to measure RF currents?

- A.The hot wire ammeter
- B.The thermocouple ammeter
- C.Both A & B
- D.None of the above

6A528

C

How may the range of a thermocouple ammeter be increased?

- A.By using a current transformer
- B.By using a capacitor shunt
- C.Both A & B
- D.By using a resistor shunt

6A529

A

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?

- A.By the factor of 0.9
- B.By the factor of 9.0
- C.By the factor of A.0
- D.By the factor of B.0

6A530

B

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?

- A.The multiplying factor is .414
- B.The multiplying factor is A.414
- C.The multiplying factor is A.114
- D.The multiplying factor is A.141

6A531

A

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

- A.Zero beat occurs when two frequencies are being mixed together and have no difference frequency between them
- B.To achieve this the frequencies must be suppressed
- C.The transmitter must be nulled
- D.None of the above

6A532

D

What is the directional reception pattern of a loop antenna?

A.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

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

C.A horizontal loop antenna is directional along the plane of the loop antenna

D.Both A & B

6A533

A

What is the reception pattern of a vertical antenna?

A.It has minimum radiation or reception vertically

B.A vertical Jackson antenna has a pattern which is nondirectional with regard to all compass points

C.It has maximum radiation or reception vertically

D.None of the above

6A534

A

What is the principal function of a vertical sense antenna associated with a unilateral radio direction finder?

A.To determine from which direction the signal is coming

B.A vertical sense antenna is not associated with a radio direction finder

C.Unilateral radio direction finders are associated with loop antennas

D.None of the above

6A535

D

What figure represents the reception pattern of a properly adjusted unilateral radio direction finder?

A.A cardioid

B.A figure eight

C.A heart shaped figure

D.Both A & C

6A536

C

From how many simultaneous directions is a direction finder capable of receiving signals if adjusted to take unilateral bearings through 360 degrees?

A.From 360 degrees

B.From 180 degrees

C.From all but one direction

D.None of the above

6A537

D

How is the unilateral effect obtained in a direction finder?

- A. With a balancing capacitor
- B. With a compensator
- C. With insulating material
- D. None of the above

6A538

C

What is the function of the balancing capacitor in a direction finder?

- A. To maximize "antenna effect" and so obtain a sharper null point indication of direction
- B. To reduce the noise factor in the first IF
- C. To minimize "antenna effect" and so obtain a sharper null point indication of direction
- D. None of the above

6A539

B

What is indicated by the bearing obtained from the use of a bilateral radio direction finder?

- A. A line of direction which passes through two stations
- B. A line of direction which passes through the originating station
- C. A line of direction can read in either direction
- D. None of the above

6A540

C

On shipboard what factors may effect the accuracy of a direction finder after it has been properly installed, calibrated?

- A. A received wave which has been bent by night effect
- B. By any changing of the position of nearby metallic objects
- C. Both A & B
- D. None of the above

6A541

B

What is indicated by the bearing obtained from the use of a unilateral radio direction finder?

- A. The direction of another station
- B. The sense of direction of the originating station
- C. All bearings are from
- D. None of the above

6A542

C

Within what frequency band limits do all United States marine radio beacon stations operate?

- A.From 280 to 385 kHz
- B.From 162 to 385 kHz
- C.From 285 to 315 kHz
- D.From 300 to 465 kHz

6A543

C

In what part of the RF spectrum do marine radar systems operate?

- A.In the order of 10,000 MHz or 3000 MHz
- B.Wavelength of 3 cm or 10 cm
- C.Both A & B
- D.None of the above

6A544

B

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

- A.At speeds ranging from about 6 to 19 RPM
- B.At speeds ranging from about 6 to 15 RPM
- C.At speeds ranging from about 15 to 30 RPM
- D.At speeds ranging from about 20 to 40 RPM

6A545

C

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

- A.Rotate the antenna for a deep null
- B.Reduce the gain control
- C.The operator should manually adjust the "suppressor" control or sensitivity time control, STC
- D.None of the above

6A546

D

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

- A.A master & a slave station
- B.1 slave station
- C.2 slave stations & 1 master station
- D.Four, or two pairs of "master and "slave" stations

6A547

A

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

- A.A master station originates the RF pulse which then travels in all directions and is intercepted by the slave station
- B.The slave station originates the RF pulse
- C.There must be at least two slave stations
- D.All of the above

6A548

D

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

- A.By their pulse recurrence rate
- B.By reference to their frequency of transmission
- C.None of the above
- D.Both A & B

6A549

A

During daytime hours, approximately what is the maximum distance in nautical miles from LORAN transmitting stations from which LORAN lines of position can be determined?

- A.About 700 miles
- B.During nighttime hours, the maximum distance is increased to about 1800 miles by the use of sky waves
- C.About 1000 miles
- D.About 1500 miles

6A550

A

What is the purpose of blinking in a loran navigational system?

- A.To warn the receiving operator that difficulty exists at the transmitting stations?
- B.To warn the operator that the system is in use
- C.The loran system needs to be aligned
- D.None of the above

6A551

D

What precautions should an operator or serviceman observe when working with cathode-ray tubes?

- A.The tube must not strike against any hard surface
- B.The tube might implode
- C.Safety goggles and gloves should be worn when handling cathode-ray tubes
- D.All of the above

6A552

A

If the velocity of a radio wave is 186,000 statute miles per second, how many nautical miles does a radar pulse travel in one microsecond?

- A. 0.1614 nautical miles
- B. 11614 nautical miles
- C. 0.2014 nautical miles
- D. 2200 nautical miles

6A553

C

In all cases other than those in which the transmitter output must be maintained at a fixed value, what amount of power should be employed for routine communications?

- A. The maximum amount of power to maintain communications
- B. The transmitter must be maintained at a fixed value
- C. The minimum amount of power necessary to ensure reliable communications
- D. None of the above

6A554

D

What is the definition of a "station open to public service"?

- A. A station which handles public correspondence
- B. Paid or toll messages
- C. Radiotelephone facilities for the general public at prescribed rates
- D. All of the above

6A555

C

In the transmission of the international Morse code, what are the relative time lengths of dashes, dots?

- A. Dashes are about four times as long as dots
- B. Dots are about half the length of dashes
- C. Dashes are about three times as long as dots
- D. None of the above

6A556

C

Why is the clock on a compulsorily equipped ship radiotelegraph station required to have a sweep second hand?

- A. To be able to accurately time the spaces and dashes of the auto-alarm system
- B. To accurately time the silent periods
- C. Both A & B
- D. None of the above

6A557

C

Between what points on a ship, compulsorily equipped with a radiotelegraph installation, is a reliable intercommunication system required?

- A. Between the forward bridge and the radio room
- B. Between the radio room and engineering
- C. Between the radio room and the navigation bridge
- D. None of the above

6A558

B

Are there any age requirements that a person must meet before he can be issued a radiotelegraph operator license?

- A. At least 18 years of age for a second class license
- B. At least 21 years of age for a first class license
- C. Persons under 21 now holding a radiotelegraph first class license may renew same without regard to age requirement
- D. All of the above

6A559

D

Upon compulsorily equipped vessels which are required to have an accurate clock in the radio room, how frequently must this clock be adjusted and be compared with standard time?

- A. Every three hours
- B. Ever four hours
- C. Every six hours
- D. At least once every 24 hours

6A560

D

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

- A. At least every 15 minutes
- B. This is in addition to the entries referring to silent periods
- C. At least every 30 minutes
- D. Both A & B

6A561

C

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

- A. Routine transmissions are forbidden in 480 to 515 kHz
- B. 480 to 515 kHz are out of the marine radio band
- C. Routine transmissions are forbidden during the international silent period
- D. None of the above

6A562

B

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

- A. Zulu time according to the twelve hour system



- B.Greenwich Mean Time according to the 24 hour system
- C.Zulu time according to the 12 hour time
- D.None of the above

6A563

C

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

- A.300 kHz
- B.400 kHz
- C.500 kHz
- D.600 kHz

6A564

C

Describe how a distress call should be made:

- A.The distress call should be made three times
- B.SOS should be called twice
- C.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
- D.None of the above

6A565

A

What transmission should precede the transmission of the distress call?

- A.The distress call, when sent in radiotelegraph on 500 kHz shall as a general rule, be immediately preceded by the auto-alarm signal
- B.SOS should be sent three times
- C.The words "MAY DAY" should be sent three times
- D.None of the above

6A566

D

What stations shall be in control of distress traffic?

- A.Control of the distress traffic shall be with the station first hearing the call
- B.The control of the distress traffic rests with the mobile station in distress
- C.With the mobile station which sends the distress call in the event that the station in distress is not able to transmit it
- D.Both B & C

6A567

A

During what periods must a distress message be repeated following the initial transmission?

- A.Until an answer is received, especially during the silent periods
- B.Must repeated every 15 minutes
- C.Must be repeated every 5 minutes

D.Must be repeated every 3 minutes

6A568

A

For how long must mobile stations listen after hearing an urgency signal?

- A.For at least 5 minutes
- B.For at least 30 minutes
- C.For at least 3 minutes
- D.None of the above

6A569

C

When the auto-alarm bell rings, what should the operator do?

- A.Proceed immediately to the radio room and press the reset button
- B.If the bell stops, the operator should listen for further signals
- C.Both A & B
- D.None of the above

6A570

A

What space of time should elapse between the transmission of the international auto-alarm signal and the distress call?

- A.2 minutes
- B.4 minutes
- C.5 minutes
- D.10 minutes

6A571

C

While a vessel is at sea, how frequently must the auto-alarm be tested?

- A.At least once ever 6 hours
- B.At least once ever 12 hours
- C.At least once ever 24 hours
- D.None of the above

6A572

B

Upon hearing an SOS, what should an operator do?

- A.Should repeat the SOS to all traffic
- B.Immediately cease all transmissions capable of interfering with the distress traffic
- C.Contact the vessel in distress
- D.None of the above

6A573

C

What is the purpose of an auto-alarm signal keying device on a compulsorily equipped ship?

- A.To automatically produce Morse code
- B.To automatically send an SOS signal
- C.To automatically produce the correct auto-alarm signal
- D.None of the above

6A574

C

On a United States vessel equipped with an approved auto-alarm, where is the control button which silences the warning bells located?

- A.On the navigation bridge
- B.In main engineering control
- C.In the main radiotelegraph operating room
- D.None of the above

6A575

C

With what type(s) of emission and upon what frequency should a transmitter be adjusted to transmit a distress call?

- A.The distress wave of 600 kHz and type C emission
- B.The distress wave of 400 kHz and type C emission
- C.The international distress wave of 500 kHz / type A-2 OR B emission
- D.None of the above

6A576

D

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?

- A.Five letter call signals are assigned to aircraft stations
- B.Three letter call signals are assigned to land stations
- C.Four letter call signals are assigned to ship stations
- D.All of the above

6A577

B

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

- A.Every 12 hours
- B.Once daily
- C.Every 48 hours
- D.Once every week

6A578

D

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?

- A.Once a week
- B.Every 12 hours
- C.Every 48 hours
- D.Once daily

6A579

D

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

- A.Once a day
- B.Once a week
- C.Once a month
- D.Only when the vessel is ready to leave port

6A580

D

You intercept "CQ CQ WSV TFC"; what does this mean?

- A.General call to all stations
- B.Call letter of a coastal station
- C.Traffic
- D.All of the above

6A581

C

Explain the use and meaning of the following indicator or prefix "RP" on radiotelegrams:

- A.Please reply
- B.Repeat following parts of message
- C."Reply paid"
- D.None of the above

6A582

C

Upon what band, in addition to the 350 to 515 kHz band must a main receiver on a United States ship be capable of operation?

- A.600 TO 700 kHz
- B.1000 TO 1200 kHz
- C.100 TO 200 kHz
- D.516 TO 615 kHz

6A583

B

After a distress call has been transmitted, every distress-traffic radiotelegram shall contain what symbol in the preamble?

- A.SOS followed by the call signal
- B.The distress signal preceding the call and repeated at the beginning of the preamble
- C.All of the above
- D.None of the above

6A584

A

For how long a period of continuous operation should the emergency power supply of a compulsorily equipped ship station be capable of energizing the emergency radiotelegraph installation?

- A.At least 6 consecutive hours
- B.At least 12 hours
- C.At least 24 consecutive hours
- D.At least 48 consecutive hours

6A585

B

What is the principal port of the United States, on the Pacific coast, at which navigation lines terminate?

- A.Los Angeles
- B.San Francisco
- C.San Diego
- D.None of the above

6A586

B

In what city is the major telecommunication center of the United States located?

- A.Houston
- B.New York City
- C.Washington
- D.Chicago

6A587

C

Under what condition may an eligible person hold a radiotelegraph operator's license and a Marine Radio Operator permit?

- A.When the planned telegraphy operation will occur aboard ship in international waters and another vessel is licensed for operation on the inland waterways
- B.When the commercial radio operator is legally eligible for both foreign and domestic employment
- C.No person may hold any class of radiotelegraph operator's certificate and a Marine Radio Operator Permit

D.Commercial radiotelegraphers are required to also hold a Marine Radio Operator Permit when the operation occurs on vessels of less than 1600 gross tons

6A588

C

How does a First Class Radiotelegraph Operator renew an unexpired license?

A.Renewal document indicating license serial number must be forwarded to the FCC during the last 90 days of the license term

B.Application is made to the nearest Commercial Operator Licensing Examination Manager (COLEM) during the final six months of the license term

C.By submitting Form 756, current license copy, and appropriate fee to the FCC during the last year of the five year license term

D.A current Radio telegraphy Proficiency Testimonial (RPT) obtained from the ship's master must be attached to the renewal application Form 739

6A589

A

How does an eligible Second Class Radiotelegraph Operator upgrade his license to First Class?

A.By submitting the necessary Proof-of-Passing Certificates (PPC) from a COLEM along with the required fee and Form 756 to the FCC

B.By fulfilling the Six Months Service Endorsement requirement

C.By presenting a one year radiotelegraph experience certification to a commercial radio operator examination manager

D.By complying with the ITU Provision "D" concerning telegraphy operation in the Maritime Service

6A590

D

What is the license term of the First Class Radiotelegraph Operator License?

A.The license is valid for the lifetime of the holder

B.A license is valid for a period of ten years form the DOI (date of issuance)

C.The five year term license is renewable by retaking updated exam Elements 1 and 3 during the last 90 days before expiration

D.The license term is five years and may be renewed indefinitely without retesting

6A591

B

What is a requirement of every commercial operator on duty and in charge of a transmitting system?

A.A copy of the Proof-of-Passing Certificate (PPC) must be on display at the transmitter location

B.The original license or a photocopy must be posted or in the operator's personal possession and available for inspection

C.The FCC Form 756 certifying the operator's qualifications must be readily available at the transmitting system site

D.A copy of the operator's license must be supplied to the radio station's supervisor as evidence of technical qualification

6A592

C

What is the experience requirement of a First Class Radiotelegrapher?

A.The applicant must have been employed as a radio operator on board a United States ship for at least six months

B.The operator must have held a Second Class Radiotelegraph Operator's Certificate for at least six months

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

D.Both A & B

6A593

C

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

A.Written Element 1 (radio law), Element 3 (electronic fundamentals), Element 5 (radiotelegraph operations) and sending/receiving 16/20 words per minute

B.Telegraphy Element 1 (sending/receiving 16 code groups per minute) and Telegraphy Element 2 (16 code groups and 20 words per minute text.)

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

D.Successful completion of written test Elements 1, 3, 5 and 6 on basic radio law and operating practices plus telegraphy Elements 1 and B

6A594

A

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

A.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

B.Applicant must send and receive radiotelegraphy at the prescribed speed and be at least 21 years old

C.By the successful completion of radiotelegraphy Elements 1 and 2 plus written examinations on radio law, telegraphy practices and transmitter maintenance

D.By passing a written examination on radio law, electronic fundamentals and radiotelegraph practices plus a telegraphy receiving examination

6A595

C

What examination credit is accorded Amateur Extra Class operators?

A.20 code groups and 25 text words per minute

B.Amateur radio operators are not eligible for commercial radio operator examination credit

C.Commercial radio operator telegraphy Elements 1 and 2

D.Written Element 1, basic radio law and operating practices

6A596

D

What must every examination for the code portion of a radiotelegraph license contain?

- A.Applicants for Commercial Radiotelegraph licenses must be examined using a message format that they are likely to receive aboard ship
- B.Both a telegraphy sending and a receiving distress signals
- C.The proper transmission of radiotelegraph distress signals
- D.All alphabet letters, all numerals, period, comma, question mark, slant mark and prosigns AR, BT, and SK

6A597

C

What answer format is accepted on commercial radiotelegraph license contain?

- A.The examiner may use any answer format which ascertains that the examinee can comprehend the message transmitted
- B.Any of the following: one minute solid copy, answering seven out of ten question, fill-in-the-blank, or multiple choice questions
- C.Examinees are required to receive international Morse code messages by ear for a period of one minute without error
- D.Examinees must obtain a passing mark of 75% or higher on questions concerning the transmitted telegraphy message

6A598

C

What is a requirement of all transmitting apparatus used aboard United States vessels?

- A.Equipment must be approved by the U.S. Coast Guard for maritime mobile use
- B.Certification is required by the International Maritime Organization (IMO)
- C.Only equipment that has been type accepted by the FCC for Part 80 operations is authorized
- D.Programming of all maritime channels must be performed by a licensed Marine Radio Operator

6A599

C

What happens to a lower grade of Commercial Radiotelegraph License when a licensee qualifies for a higher grade?

- A.The lower grade is allowed to expire and may not be renewed
- B.The Second or Third Class Radiotelegraph license is modified to a higher class
- C.The lower grade is canceled. Only one unexpired radiotelegraph operator's certificate may be held at the same time
- D.Licensees are permitted to hold any number of radiotelegraph operator certificates at the same time

6A600

A

What is an operating control requirement of a ship station using telegraphy?



- A. The ship station must be capable of automatically changing from telegraphy transmission to telegraph reception
- B. A ship station control operator must stand watch on emergency channels at all times
- C. Only a licensed First Class Radiotelegraph Operator may operate a ship station
- D. The ship station must be capable of changing from one radio channel to another within five seconds

6A601

B

How does a radiotelegraph operator transmit a routine call to another station?

- A. The letters "CQ" are followed by the call sign of the station called and the call sign of the originating station
- B. The station is called not more than twice, followed by the word "DE" and the call sign of the calling station not more than twice
- C. The originating station must obtain permission from the nearest public coast station
- D. Routine calls are initiated by using the appropriate service abbreviation

6A602

B

What is the proper procedure to conduct a radiotelegraph equipment test?

- A. By transmitting "EI" on the test frequency as a warning that a test transmission is about to be made
- B. Sending a series of "VVV" followed by the call sign of the testing station at about 10 words-per-minute
- C. The test transmission may not proceed until all stations on frequency have signalled their consent
- D. The nearest public or private coast station must be notified of an impending test

6A603

A

How often must a radiotelegraph station transmit its call sign when a transmission is maintained for more than 20 minutes in the band 405-525 kHz?

- A. At 20 minute intervals
- B. At least every 10 minutes
- C. At 15 minute intervals unless public correspondence is in progress
- D. At the beginning and end of each communication with any other station

6A604

C

When may a public coast station authorized to use high frequency narrow-band direct-printing (NB-DP) establish contact with a ship station using telegraphy?

- A. Never. Contact may only be established using NB-DP circuits
- B. When the ship is in excess of 300 gross tons
- C. When the radio station license reflects authority for this type of operation and harmful interference is avoided
- D. When it is known that the vessel does not have a selective ringing or calling device

6A605

C

Which operator is authorized to make equipment adjustments at maritime radio stations which may affect transmitter operation?

- A.The holder of a marine radio operator permit or higher class license
- B.The holder of a restricted radiotelephone operator permit when the radiated power is less than 100 watts
- C.Only the holders of a first or second class radiotelegraph of the general radiotelephone operator's license
- D.The holder of a GMDSS radio operator or higher class radiotelephone license

6A606

A

Who may install, maintain or adjust radiotelephone transmitters which radiate less than 50 watts carrier power?

- A.Anyone under the immediate supervision and responsibility of a person holding a first or second class radiotelegraph or general radiotelephone operator license
- B.Only a properly licensed radiotelephone operator
- C.Any holder of a marine radio operator permit or higher
- D.Only persons holding an operator certificate containing a ship radar endorsement

6A607

D

Who may program authorized frequency channels into a transmitter or transceiver used in the maritime service?

- A.Any person who has the authorization of the station licensee or ship's master
- B.A licensed marine radio operator or higher
- C.A person holding a restricted radiotelephone operator permit or higher
- D.Only persons holding a first or second class radiotelegraph operator's certificate or a general radiotelephone operator's license

6A608

A

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

- A.0.4 kHz
- B.0.2 kHz
- C.Minimum necessary to complete necessary communications
- D.1 kHz

6A609

C

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

- A. 400 W
- B. 2 kW, unless a passenger ship 5000 gross tons and over
- C. 3 kW
- D. 1 kW

6A610

C

Where must ship station logs be kept during a voyage?

- A. They must be secured in the vessel's strongbox for safekeeping
- B. In the personal custody of the licensed commercial radio operator
- C. At the principal radiotelephone operating position or radiotelegraph operating room
- D. All logs are turned over to the ship's master when the radio operator goes off duty

6A611

D

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

- A. When the vessel is placed in service and every 2 years thereafter
- B. At least every 3 years when the ship is within 75 miles of an FCC field office
- C. The ship's master is responsible for completion of the Annual Equipment Verification Report
- D. Equipment inspections are required at least once every 12 months

6A612

B

What is the antenna requirement aboard a survival craft equipped with a non-portable radiotelegraph installation?

- A. The minimum lifeboat antenna requirement is an HF half-wave dipole capable of efficiently tuning distress frequencies
- B. The antenna must be single wire inverted L type of maximum practicable length and height above the waterline
- C. The antenna must be tested at least once during each voyage and a minimum of once a week on longer voyages
- D. The antenna must be located a minimum of 8 meters above the waterline to insure the safety of passengers

6A613

C

What document is issued after a radio station inspection aboard a large ship that is not a passenger vessel?

- A. Great Lakes Radio Agreement surety authorization
- B. International Maritime Organization safety permit
- C. Cargo ship safety radiotelegraphy or radiotelephony certificate
- D. Safety Convention radio certification

6A614

B

What is the minimum radio operator license requirement of a chief radio officer on U.S. passenger ships?

- A. First or Second Class Radiotelegraph Operator Certificate with six month endorsement
- B. First Class Radiotelegraph Operator Certificate
- C. General Radiotelephone Operator License
- D. Marine Radio Operator Permit

6A615

C

What is the order of priority of radiotelegraph communications in the maritime services?

- A. Alarm, radio-direction finding, and health and welfare communications
- B. Navigation hazards, meteorological warnings, priority traffic
- C. Distress calls, and signals, followed by communications preceded by urgency and safety signals
- D. Government precedence, messages concerning safety of life and protection of property and traffic concerning grave imminent danger

6A616

B

What should a station operator do before making a transmission?

- A. Check transmitting equipment to be certain it is properly calibrated
- B. Except for the transmission of distress calls, determine that the frequency is not in use by monitoring the frequency before transmitting
- C. Ask if the frequency is in use
- D. Transmit a general notification that the operator wishes to utilize the channel