

CDARC FOUNDATION COURSE – WORKBOOK

Name:

Date:

1. Rigging The Antenna: This is the first activity.

The feeder type is balanced (twin wire feeder) or unbalanced (co-axial) ?

The antenna is a dipole or is it a vertical ?

2. HF On-Air Practical:

(a) Connecting The Station Prior To Transmitting

I can name the various pieces of equipment in the system.

I can correctly connect together the station.

(b) Antenna Matching

I know what matching the antenna means.

I understand the need to match the antenna.

I know why I must match the antenna at low power and without interfering with other stations.

I know the process to follow in order to match the antenna.

I can match the antenna in at least two bands.

I know the cause of a high SWR reading.

(c) Transmitting

I can set the microphone gain to the correct level using a dummy load and the ALC meter.

I can set the transmitter output power level to 10W or less.

I can find a clear frequency (or select the given operating frequency).

I can select the correct transmission mode for the part of the band I am in.

I understand the need to listen first before calling on a seemingly clear frequency.

I know what to do if the answer to my question *“Is this frequency busy?”* is *“Yes”*.

I know how to call *“CQ”* in a clear, measured fashion and the correct words to use.

I know how to respond to a call using both my callsign and the other station’s callsign.

I know how to give my location correctly.

- I can read the S-meter and give a signal strength report.
- I can estimate the signal readability.
- I can set the squelch control
- I know how to end the contact.
- I know how to enter the contact details in the log book.

2. FM Simplex

- I can set the radio to the correct frequency.
- I can set the squelch control.
- I know how to make a CQ call on the calling frequency.
- I know how to move off the calling channel to a clear frequency and communicate the new frequency to the other station.
- I know how to check that the new working frequency is clear (A and B ends).
- I know how to give a signal report and my location.
- I know how to end the contact.
- I know how to record the contact in the log book.

3. LED Connection

- I know how to size the resistor given the battery voltage and the LED forward voltage drop.
- I can correctly connect an LED, resistor and battery and demonstrate that the circuit works.
- I can explain why connecting another resistor of the same value in parallel with the first resistor results in a doubling of the current through the LED.

4. Variable Dipole

- I can adjust a variable dipole and obtain the lowest SWR reading.
- I understand the relationship between the overall length of the antenna and its resonant frequency and minimum SWR.

5. Morse Code.

- I can receive and write down slow Morse as dots and dashes, separate the words and then decode the text from a suitable look-up table.
- I can convert a given text into Morse code and then transmit it (audio) to others.

6. Basic Electrical Theory

- I can describe what a flow of current is in a conductor.
- I know why a voltage source causes a current to flow in a conductor.
- I know the difference between a conductor and an insulator.
- I can write down Ohms Law using the symbols V, I and R.
- I can calculate the value of any one of the three quantities given the other two.
- I know that Watts = Amps x Volts and I can find the value of any one of these quantities given the other two.
- I understand that where a supply feeds a number of circuits the total supply current is the sum of the currents in the individual circuits.
- I understand that the sum of the voltage drops across a number of series resistors forming a circuit is equal to the applied voltage across the circuit (supply voltage).
- I understand the importance of polarity for the correct functioning of a circuit and that damage can result if the supply polarity is incorrect.
- I know the difference between AC and DC.
- I know what a sine wave looks like and how it represents the graphical rise and fall of voltage or current in an AC circuit.
- I know what is meant by frequency, amplitude, wavelength and velocity of RF waves.
- I can use the frequency – wavelength chart.
- I know the wave equation: $\text{Velocity} = \text{Frequency} \times \text{Wavelength}$
- I know how to accurately describe the UK mains supply.
- I know the frequency range of normal hearing. (20Hz to 15kHz)
- I know the frequency range needed for communications quality audio. (300Hz to 3kHz)
- I know that radio waves (RF) extend below 30kHz and above 3000MHz.
- I know the frequency bands for HF, VHF and UHF.
- I know the difference between an analogue signal and a digital signal.
- I know what a DAC does.
- I know what an ADC does.

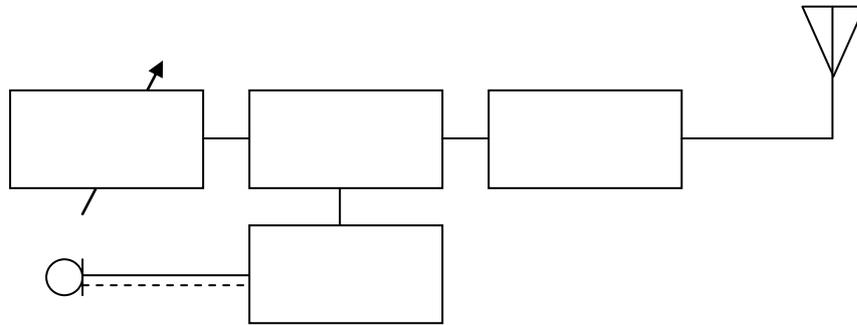
7. Cells and Batteries:

- I know that a battery is a combination of cells (usually in series).
- I know that a battery converts stored chemical energy to electrical energy and that it has a potential difference across its terminals.
- I know that a primary cell cannot be recharged once its chemistry is exhausted..
- I know that a secondary cell has a reversible chemical process and may be recharged when depleted.
- I know that I must dispose of batteries safely and legally.
- I know the hazards associated with rechargeable batteries. (Explosion, acid burns, fire.)

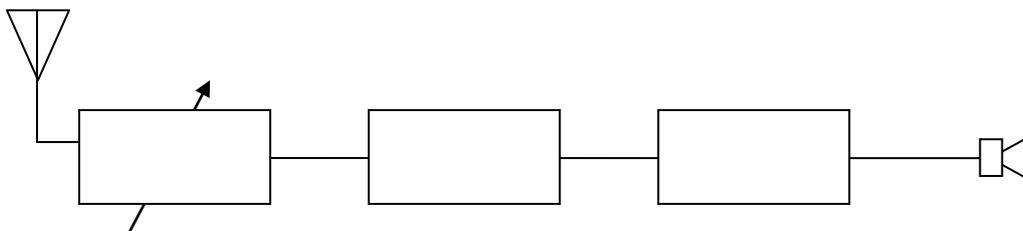
8 Transmitters, Modulation and Receivers.

- I know the function of the transmitter is to send information from one place to another using electromagnetic waves (RF).
- I know that the process of adding information to a radio frequency carrier is known as modulation.
- I know that the audio or data signal is applied to the carrier in the modulation stage of the transmitter. (Modulator).
- I know that modulating the amplitude of the carrier is called Amplitude Modulation (AM).
- I know that varying the frequency of the carrier is called Frequency Modulation (FM).
- I know that information can be carried by FM, AM or SSB modes (Single Side Band)
- I know that data may be transmitted by modulating the carrier with audio tones. Usually two are used to represent 1s and 0s. These tones may be generated in a computer sound card.
- I know that when a radio signal is mixed (modulated) with an audio signal that new frequencies called side bands are generated.
- I know that an AM signal has two side bands – an upper (USB) and a lower (LSB) either side of the carrier.
- I know that SSB mode only uses one of the sidebands.
- I can recognise the form of an AM and FM wave. I can also recognise a CW wave.
- I understand the terms carrier, audio waveform and modulated waveform.
- I can recognise and draw the block diagram of a simple transmitter and name each of the blocks.
- I can recognise and draw the block diagram of a simple receiver and name each of the blocks.

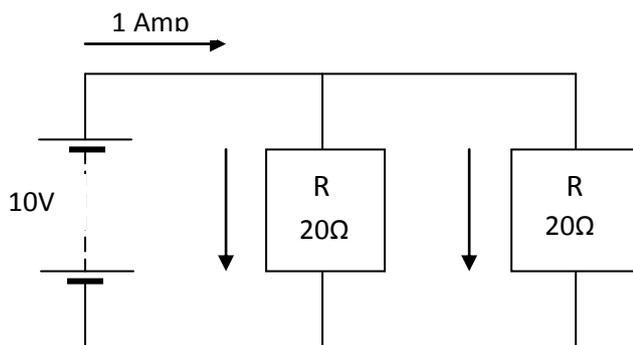
- I know that the RF oscillator in the transmitter sets the transmission frequency.
- I know that incorrect setting of the RF oscillator, particularly near the band edges, can result in out of band signals which can cause interference to other users.



Identify the block diagram above and label the blocks and components.



Identify the block diagram above and label the blocks and components.



Is the current through each resistor R the same? If “Yes” then what is the value of each current?

What is the voltage across each resistor?

Whose law do you use to calculate the current in each resistor?

What is the power being dissipated by each resistor?

What is the total power being dissipated by the circuit?

I know the values of the following prefixes:

Mega means a million times;

kilo means

milli means

micro means

Giga means

I can write the following as powers of 10

1,600,000

234

47,000

0.007

0.000123

I can do calculations in powers of 10

$$(1.23 \times 10^2) \times (3.62 \times 10^4) =$$

Give your answer in standard form.

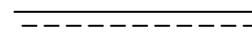
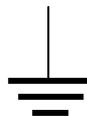
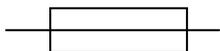
$$(1.23 \times 10^5) / (3.62 \times 10^2) =$$

Give your answer in standard form.

$$(1.23 \times 10^3) + (3.62 \times 10^3) =$$

Give your answer in standard form

I know what these symbols mean.



I know what this is: 230V ac 50Hz

I know that my first action on discovering a casualty in contact with a live wire should be to.....?

I know that my next action should be to.....?

I know two hazards associated with headphones. They are.....

I know how to calculate the correct size of fuse to protect the cable. You do it as follows.....

What would you not do in the vicinity of overhead live wires? Why?