



# **EAST AFRICAN SCHOOL OF AVIATION**

## **EXAMINATION**

### **SAFETY SECTION**

**DIPLOMA IN FLIGHT DISPATCH**

**EWAC NO.05**

**FINAL EXAMINATION**

**SUBJECT: RADIO NAVIGATION**

Duration: 02 hrs.

DAY/DATE:

TIME: 0830HRS – 1030HRS

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1. Amplitude modulation is;

- A. varying the frequency of the carrier in accordance with the change in the amplitude of the audio, keeping the amplitude of the carrier constant
- B. varying the amplitude of the audio frequency in accordance with the change in Amplitude of the carrier, keeping the frequency of the carrier constant
- C. varying the amplitude of the carrier wave in accordance with the change in amplitude of the audio modulating signal keeping the carrier frequency constant
- D. All of the options °

2. If the wavelength of a radio wave is 3.75 metres, the frequency is:

- a. 80 kHz
- b. 8 MHz
- c. 80 MHz
- d. 800 kHz

3. If the frequency of a radio wave is 1 439 kHz, the wavelength is

- A. 2.0847 cm
- B. 208.47 meters
- C. 208.47 cm
- D. 0.20847 meters

4. The frequency band containing the frequency corresponding to 29.1 cm is:

- a. HF
- b. VHF
- c. SHF
- d. UHF

5. The maximum range an aircraft at 2500 feet can communicate with a VHF station at 196 feet is:

- a. 79 NM
- b. 64 NM
- c. 52 NM
- d. 51 NM

6. It is intended to increase the range of a VHF transmitter from 50 NM to 100 NM. This will be achieved by increasing the power output by a factor of:

- a. 2
- b. 8
- c. 16
- d. 4

7. The process which causes the reduction in signal strength as range from a transmitter increases is known as:

- a. absorption
- b. diffraction
- c. attenuation
- d. ionization

8. Concerning HF communications, which of the following is correct?

- a. The frequency required in low latitudes is less than the frequency required in high latitudes
- b. At night a higher frequency is required than by day
- c. The frequency required is dependent on time of day but not the season
- d. The frequency required for short ranges will be less than the frequency required for long ranges

9. Which of the following is an advantage of single sideband (SSB) emissions?

- a. More frequencies available
- b. Reduced power requirement
- c. Better signal/noise ratio
- d. All of the above

10. When considering factors affecting radio wave propagation it can be said that;

- A. as frequency is increased surface attenuation increases
- B. as frequency is increased ionospheric attenuation increases
- C. as frequency is increased ionospheric attenuation decreases
- D. as frequency is increased surface attenuation decreases

11. The factor which determines the maximum range of a radar is:

- a. pulse repetition rate
- b. pulse width
- c. power
- d. beam width

12. The factor which limits the minimum detection range of a radar is:

- a. pulse repetition interval
- b. transmitter power
- c. pulse width
- d. pulse repetition frequency

13. A frequency used by airborne weather radar is:

- a. 8800 MHz
- b. 9.375 GHz
- c. 93.75 GHz
- d. 1213 MHz

14. Airborne Weather Radar is an example ..... of radar operating on a frequency of ..... in the ..... band.

- a. primary 8800 MHz SHF
- b. secondary 9.375 MHz UHF
- c. secondary 9375 MHz SHF
- d. primary 9375 MHz SHF

15. Airborne weather radar operates on a frequency of:

- a. 8 800 MHz because gives the best returns from all types of precipitation
- b. 13 300 MHz
- c. 9 375 MHz because it gives the best returns from rainfall associated with Cb
- d. 9.375 GHz because this frequency is best for detecting aircraft in flight

16. The special SSR codes are as follows: emergency ..... , radio failure ..... , unlawful interference with the conduct of the flight .....

- a. 7700 7600 7400
- b. 7700 7600 7500
- c. 7600 7500 7700
- d. 7500 7600 7700

17. Secondary Surveillance Radar is a form of ..... radar with .....type emissions operating in the ..... band.

- a. primary pulse SHF
- b. primary pulse UHF
- c. secondary FM SHF
- d. secondary pulse UHF

18. Secondary radars require:

- a. a target which will respond to the interrogation, and this target will always be an aircraft
- b. a target which will respond to the interrogation, and this target will always be ground based
- c. a target which will respond to the interrogation, and this target may be either an aircraft or a ground based transponder
- d. a quiescent target

19. A basic 2D RNAV system will determine tracking information from:

- a. twin DME
- b. VOR/DME
- c. twin VOR
- d. any of the above

20. Which of the following is a valid frequency (MHz) for a VOR?

- a. 107.75
- b. 109.90
- c. 118.35
- d. 112.20

21. The frequency band of VOR is:

- a. VHF
- b. UHF
- c. HF
- d. LF & MF

22. An aircraft is flying at FL 330. What is the maximum range that a signal can be received from a transmitter at pressure altitude 5500 ft ?

- A. 115.4 NM
- B. 309.7 NM
- C. 319.7 NM
- D. 450.3 NM

23. A typical DME frequency is:

- a. 1000 MHz
- b. 1300 MHz
- c. 1000 kHz
- d. 1575 MHz

24. A category III ILS system provides accurate guidance down to:

- a. the surface of the runway
- b. less than 50 ft
- c. less than 100 ft
- d. less than 200 ft

25. The ILS localizer is normally positioned:

- a. 300 m from the downwind end of the runway
- b. 300 m from the threshold
- c. 300 m from the upwind end of the runway
- d. 200 m abeam the threshold

26. The frequency band of the ILS glide path is:

- a. UHF
- b. VHF
- c. SHF
- d. VLF

27. Which of the following is an advantage of MLS?

- a. Can be used in inhospitable terrain
- b. Uses the same aircraft equipment as ILS
- c. Has a selective access ability
- d. Is not affected by heavy precipitation

28. The frequency band of MLS is:

- a. UHF
- b. VHF
- c. SHF
- d. VLF

29. The use of the AWR on the ground is:

- a. not permitted
- b. permitted provided reduced power is used
- c. permitted provided special precautions are taken to safeguard personnel and equipment
- d. only permitted to assist movement in low visibility conditions

30. The SSR ground transceiver interrogates on ..... and receives responses on .....

- a. 1030 MHz 1030 MHz
- b. 1030 MHz 1090 MHz
- c. 1090 MHz 1030 MHz
- d. 1090 MHz 1090 MHz

**SECTION B**

1. a) List and explain the five parts of a Radio transmitter (5 Marks)  
b) List 5 factors affecting propagation of Radio waves (5Marks)  
c) Explain the effects of ionization in the D, E and F layers in regards to radio Navigation (3 marks)  
d.) What are the factors to be considered when carrying out a phase comparison? (3marks)
2. a) Give five advantages of Secondary Radar over Primary Radar (5 Marks)  
b) With aid of diagram explain how an ILS works (5 marks)  
c) State 3 advantages of MLS over ILS (6 Marks)  
d) List 3 properties of Radio waves (3marks)
3. List at least 5 factors affecting VDF accuracy (5Marks)