



**EAST AFRICAN SCHOOL OF AVIATION
EXAMINATION
SAFETY SECTION**

DIPLOMA IN FLIGHT DISPATCH

FLD 37/38

FINAL EXAMINATION

SUBJECT: RADIO NAVIGATION

Duration: 02 Hrs 00 Min

DAY/DATE:

TIME: 0830HRS – 1030HRS

Instructions to Candidate:

- a. Examination rules and regulations shall be adhered to
- b. Answer all the questions in section one and section two

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 aid 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 withtype 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)