ASSIGNMENT 1

Answer all the questions

QUESTION 1 **[17 marks]**

(a) What is terrestrial communication? [2 marks]
(b) Describe radio bands in terms of frequency and wavelength and give the relationship between frequency and wavelength. [6 marks]
(c) With the help of diagrams, name and explain 3 types of wave Propagations. [9 marks]

QUESTION 2 **[14 marks]**

a) illustrate how the following transmission parameters occur during wave propagation. [8 marks]
   i. Interference
   ii. Reflection
   iii. Refraction
   iv. Defraction
b) Describe terrestrial limitations for frequencies around 30 MHz [3 marks]
c) A transmitting antenna is at a height of 30 m and the receiving antenna is at a height of 70 m. Calculate the maximum distance between the transmitting and the receiving antennas for reliable communication. [3 marks]

QUESTION 3 **[9 marks]**

a) Explain how each of the following type of fading occurs in terrestrial communication [6 marks]
   i. Selective fading
   ii. Slow fading
   iii. Fast fading
b) Explain how does fading occurs in long range communications. [3 marks]

QUESTION 4 **[14 marks]**

a. Name and explain two types of radio transmitters. [4 marks]
b. Draw the block diagram of an FM transmitter and explain the different stages. [10 marks]

QUESTION 5 **[10 marks]**

a) Explain the functions of crystal oscillator. [2 marks]

b) Explain the causes of drift in inductance- capacitance oscillator circuits. [4 marks]

c) Explain the main features that allow a crystal to replace an LC circuit. [4 marks]

QUESTION 6 **[12 marks]**

a) Give the function of radio frequency amplification in a transmitter. [3 marks]

b) Explain consequences of failing to match the transmitter output stage to its load. [4 marks]

c) Explain the operation of low level AM transmitter [5 marks]

QUESTION 7 **[12 marks]**

a) Explain the recovery process of the signal information in DSB system. [3 marks]

b) Differentiate between the double sideband system and single sideband system. [6 marks]

c) Explain the effects on frequency spectrum of frequency modulated waves when the modulating signal parameters are increased. [3 marks]

QUESTION 8 **[12 marks]**

a) Clearly explain how to generate frequency modulation using direct method. [4 marks]

b) Explain the principle of pre-emphasis and de-emphasis. [4 marks]

c) A typical VHF/UHF two-way radio signal using FM mode, with5 kHz peak deviation, and a maximum audio frequency of 3 kHz, calculate approximate bandwidth would be required by the radio. [4 marks]

THE END!