Federal University of Technology, Minna
School of Science and Technology Education
Industrial and Technology Education Department
Second semester Examination, 2021/2022 session

Course Code/Title: ITE 362 Electronics Communication

Instruction: Answer three (3) questions only

Time: 2 hours

1a. Explain in details the following types of communication **(5 marks)**
   i.   Point-to-point communication, ii. Point-to-multipoint communication, iii. Simplex communication, iv. Full-duplex communication v. Broadcasting

1b. For an amplitude-modulated signal, the carrier is 10 cos Wct and the message signal is Am cosWct. Determine the numeric value of modulation index μ and sketch the diagram of the modulated waveform if: **(10 marks).**
   i.   Am=4
   ii.   Am= 20

1c. Complet the propagation of wave's information on the table below.

FREQUENCY	WAVE LENGHT	DESIGNATION
3-30kHz		
30-300kHz		
3-30mHz		Simplex
300MHz-3GHz		
30GHz-300GHz		

(5 marks)

2a. List and explain in details five (5) properties of radio waves. **(10 marks**

2b. A 400W carrier is modulated to a depth of 75 percent. Calculate the total power in the modulated wave. **(5 marks)**

2c. Draw and explain F.M transmitter. **(5 marks)**

3a. Explain the following terms associating to ionosphere:
   i.   The virtual height, ii. Critical Angle, iii. The skip distance, iv. Critical Frequency and v. Maximum Usable Frequency. **(10 marks)**

3b. Explain satellite transponders using diagram. **(5 marks)**

3c. Explain in detail the three major elements of communication. **(5 marks)**

4a. A modulating signal M (t) $=10\cos(2\pi X10^{3})$ is amplitude modulated with a carrier signal of C (t)$=50\cos(2\pi X10^{5})$. Find: **(10 marks)**
   (a) The modulation index (b). The carrier power and (c).The power required for transmitting AM wave. Let R=1Ω

(5 marks)

4b. explain in details the following using diagram(s). **(12 marks)**
   i.   Ionosphere (sky wave), (ii) F1-layer, (iii). F2-layer, (iv). H-layer (v)D-layer

4c. explain the following terms in electronics communication:
   i.   Modulation, ii. Demodulation, iii, Transducer, iv. Selectivity, v. Sensitivity v.Noise.
           (3 marks)