

Federal University of Technology, Minna
School of Science and Technology Education
Industrial and Technology Education Department
Second semester Examination, 2019/2020 session

Course Code/Title: ITE 362 Electronics Communication

Instruction: Answer three (3) questions only

Time: 2 hours

1a. Explain the following terms **(5 marks)**

- i. Frequency modulation
- ii. Amplitude modulation
- iii. Modulation
- iv. Transmitter
- v. Receiver

1b. A modulating signal $M(t) = 20\cos(2\pi \times 10^3 t)$ is amplitude modulated with a carrier signal $C(t) = 100\cos(2\pi \times 10^5 t)$. Find: **(10 marks)**

- a. The modulation index
- b. The carrier power and
- c. The power required for transmitting AM wave

Let $R = 1\Omega$

1c. List five (5) radio frequency used by different communication system include their frequency, wave length, designation and uses. **(5 marks)**

2a. With the aid of diagram explain the AM transmitter **(5 marks.)**

2b. The unmodulated carrier current to the aerial of transmitter is 200A. Determine the increase in current which result from the application of 90% modulation. **(8 marks)**

2c. Use diagram to explain satellite communication. **(7 marks)**

3a. List and explain in details five (5) properties of radio waves. **(10 marks)**

3b. Explain the significant of modulating factor in respect to (No modulation, Under modulation, Perfect modulation and Over modulation) using mathematical proofing. **(8 marks)**

3c. Briefly explain noise and fading in electronic communication. **(2 marks)**

4a. Explain satellite transponders using diagram. **(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. A frequency modulated signal which is modulated by a 5KHz sine waves reaches a maximum frequency of 200.02MHz and minimum frequency of 88.89 MHz. Determine the carrier frequency. **(3 marks)**