

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)