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**UNIVERSITY EXAMINATIONS
2023/2024 ACADEMIC YEAR**

**END OF SEMESTER EXAMINATIONS
YEAR TWO SEMESTER ONE EXAMINATIONS**

**FOR THE DEGREE OF
BACHELOR OF SCIENCE
IN
COMPUTER SCIENCE**

COURSE CODE : CSC 216

**COURSE TITLE : DIGITAL AND ANALOG
COMMUNICATION SYSTEMS**

DATE: 11/12/2023

TIME: 09:00 HRS – 11:00 HRS

INSTRUCTIONS TO CANDIDATES

ANSWER QUESTION ONE AND ANY OTHER TWO QUESTIONS

QUESTION ONE (COMPULSORY) [30 MARKS]

- a. Differentiate between digital and analog communication on the following basis: [8 Marks]
- Type of signals used
 - Major components
 - Signal representation
 - Noise
- b. In electronics, acoustics, and related fields, the waveform of a signal is the shape of its graph as a function of time, independent of its time and magnitude scales and of any displacement in time. Explain two types of periodic waveforms [4 Marks]
- c. There are lot of concepts related to analog to digital conversion and vice-versa. Explain the difference between Sampling and Quantization [4 Marks]
- d. Baseband in the transmission of communications signals means only one path is available to send and receive digital signals between devices. Describe the various ways in which baseband is used [4 Marks]
- e. Explain how an analog filter works [4 Marks]
- f. Explain the following terms a applied to digital and analog communication systems: [6 Marks]
- Signal
 - Transducer
 - Amplifier
 - Modulator
 - Wave
 - Demodulator

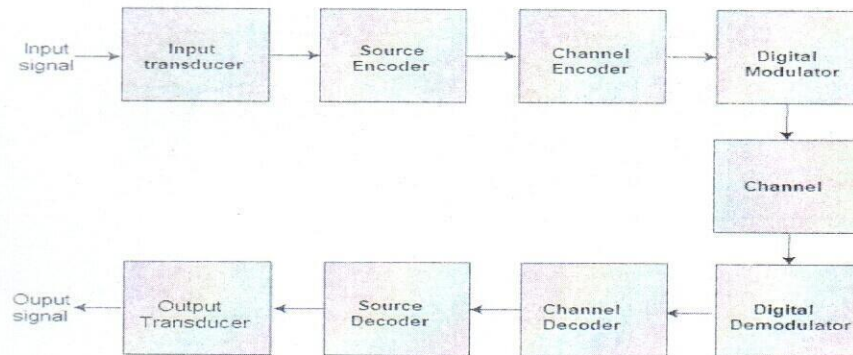
QUESTION TWO [20 MARKS]

- a. In order to transmit computer data and other digitized information over a communications channel, an analog carrier wave can be modulated to reflect the binary nature of the digital baseband signal. Explain ASK, FSK and PSK digital modulation techniques [6 Marks]
- b. There are two main categories of frequency filters. Name and describe each one of them [4 Marks]
- c. Define demodulation and explain how demodulation is carried out in AM radio AND FM radio [6 Marks]
- d. Digital Communication is the communication in which the information is transferred by using digital signals in between transmitter and receiver. Give 4 advantages of digital communication [4 Marks]

QUESTION THREE [20 MARKS]

- a. Modulation in electronics, technique for impressing information (voice, music, pictures, or data) on a radio-frequency carrier wave by varying one or more characteristics of the wave in accordance with the information signal. Explain three modulation techniques in Analog systems [6 Marks]

- b. Draw a well labelled diagram of the basic structure of a Digital Communication System and explain the function of each part [8 Marks]



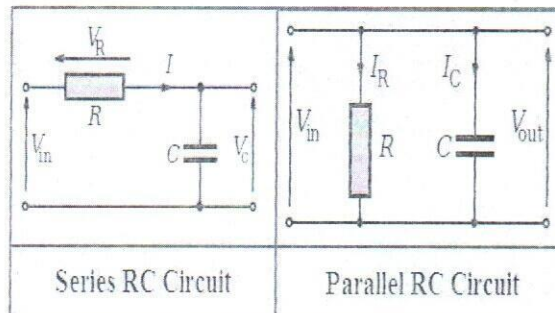
- c. There are three types of signals in the modulation process. State and explain each type [6 Marks]

QUESTION FOUR [20 MARKS]

- Periodic waveforms are those that vary periodically, they repeat regularly at consistent intervals. State 4 Parameters of Periodic Wave Forms [4 Marks]
- What is a signal source? [2 Marks]
- Compare and Contrast Analog and Digital Modulation techniques [6 Marks]
- Describe 3 types of noise in telecommunication and electronics [8 Marks]

QUESTION FIVE [20 MARKS]

a.



- Explain how the above RC Filter works [4 Marks]
- b. State some of the advantages for implementing modulation in the communication systems [4 Marks]

Reduction of antenna size
No signal mixing
Increased communication range
Multiplexing of signals
Possibility of bandwidth adjustments
Improved reception quality

- Differentiate between narrowband FM and wideband FM [6 Marks]
- List 3 key elements of CDMA technology [6 Marks]