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**Presidency University**

**Bengaluru**

**SCHOOL OF ENGINEERING**

**MAKEUP EXAMINATION JULY 2024**

**Semester**: I

**Course Code**: ECE 1005

**Course Name**: Journey of Communication Systems.

**Program** : B. Tech &

**Date**: 01-07-2024

**Time**: 9:30 am – 12:30 am

**Max Marks**: 100

**Weightage**: 50%

**Instructions:**

1. *Read the all questions carefully and answer accordingly.*
2. *Do not write any matter on the question paper other than roll number.*

**PART A**

**Answer any SIX Questions. Each question carries 10 marks. (6Qx 10M= 60M)**

Q1**.** The conventional methods of communication used analog signals for long distance communications, which suffer from many losses such as distortion, interference, and other losses including security breach. In order to overcome these problems, the signals are digitized using different techniques. The digitized signals allow the communication to be more clear and accurate without losses. Differentiate between analog and digital Communication.

(C.O.No.3) [Application]

Q2. Modulation depth also referred as modulation index gives the quality and strength of the transmitted signal. If the modulation index is small, the extent of variation in the carrier amplitude will be small. Accordingly the audio signal being transmitted will not be strong.Greater the depth of modulation , clearer and stronger will be the audio signal. Draw and give the condition for perfect, under and over modulation process.

(C.O.No.3) [Application]

Q3. The receiver operates by taking the signal on the incoming frequency, mixing it with a variable frequency locally generated signal to convert it down to a frequency called as intermediate frequency, where it can pass through a high performance fixed frequency filter before being demodulated to extract the required modulation or signal. Develop the receiver circuit for the process involved

(C.O.No.3) [Comprehension]

Q4. All major Indian FM radio stations ready for you to enjoy free music and much more. If suppose you are a intended listener to Radio Mirchi station .The radio waves travel from the radio station to your position in a different form than they actually have. The message signals have a very low frequency due to which these signals cannot be transmitted over long distances. The need for modulation arises, state atleast three factors.

(C.O.No.3) [Application]

Q5. The process in which multiple signals coming from multiple sources are combined and transmitted over a single communication/physical line\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is used in cases where the signals of lower bandwidth and the transmitting media is having higher bandwidth. Explain the Process.

(C.O.No.1) [Application]

Q6 Modulation is a process of changing the characteristics of the wave to be transmitted by superimposing the message signal on the high-frequency signal, Explain the characteristics of the signal that holds the data that has to be transmitted.

(C.O.No.2) [Application]

Q7. In frequency modulation technique\_\_\_\_\_\_\_\_\_\_\_\_\_\_represents the maximum departure of the instantaneous frequency of the FM signal from the carrier frequency. Explain the process of frequency deviation.

[2] (C.O.No. 3) [Knowledge]

Q8. Nyquist rate defines ‘fs’ sampling frequency to be related to. Explain the importance of Nyquist criteria in communication Systems.

[2] ( C.O.No.3) [Application]

**PART B**

**Answer any TWO Questions. Each question carries 20 marks. (2Qx 20M= 40M)**

Q1. a) An antenna is a system of elevated conductors which couples the transmitter or the receiver to the communication channel. Thus it required at both the ends. For proper transfer of signal (modulation) the height of the antenna should be comparable to the wavelength of the signal which is to be transferred (at least one-fourth in length).

i.Find the wavelength of antenna required to transmit a radio signal of frequency 40MHz

ii.What is the minimum height of the antenna required.

iii.Find the Bandwidth of FM radio. Given frequency band 88MHz to 108MHz

b) A modulating signal 10sin(2πx10^3t) is used to modulate the carrier signal 20sin(2πx10^3t). Determine the frequency of the carrier signal and message signal, modulation index and also the type of modulation.

(C.O.No.3) [Comprehension]

Q2. Bluetooth is a short-range [wireless](https://en.wikipedia.org/wiki/Wireless) technology standard that is used for exchanging data between fixed and mobile devices over short distances using [UHF](https://en.wikipedia.org/wiki/Ultra_high_frequency) [radio waves](https://en.wikipedia.org/wiki/Radio_wave) in the [ISM bands](https://en.wikipedia.org/wiki/ISM_band), from 2.402 to 2.48 GHz. It is mainly used as an alternative to wire connections, to exchange files between nearby portable devices and connect [cell phones](https://en.wikipedia.org/wiki/Cell_phone) and music players with [wireless headphones](https://en.wikipedia.org/wiki/Wireless_headphone).

a) Which type of a network is designed for sending and receiving files between cell phone   
 and Laptop using Bluetooth technology.

b) Perform Decimal to Hexadecimal conversion of the number 64.

c) Perform binary subtraction using 1’s complement method (7 - 3).

(C.O.No.4) [Application]

Q3. Voice communications have traditionally been a very simple medium to intercept and monitor. Most voice communication systems are not designed to ensure the privacy of the conversations on them, so a new industry was created to provide solution. Develop a suitable communication system which can facilitate the mention needs

(C.O.No.4) [Application]