DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular & Supplementary Winter Examination-2023

Branch : Electronics and Telecommunication Engineering/ Electronics and Communication Engineering

Course: B. Tech.   Semester : V

Subject Code & Name: BTETC503 Analog Communication

Max Marks: 60   Date: 05/01/2024   Duration: 3 Hr.

Instructions to the Students:
1. All the questions are compulsory.
2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.
3. Use of non-programmable scientific calculators is allowed.
4. Assume suitable data wherever necessary and mention it clearly.

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following.**		12
A)	Draw block diagram of communication system. Explain all the elements of communication system in detail.	CO01	6
B)	Define the sampling theorem and explain its significance in signal processing and modulation. Also explain different pulse analog modulation techniques in detail.	CO01	6
C)	Define modulation? Explain need of modulation in detail.	CO02	6
Q.2	**Solve Any Two of the following.**		12
A)	Derive expressions for sideband frequency, modulation index and instantaneous voltage equation for SSBSC wave. Also draw time domain and frequency domain (frequency domain) representation for the same.	CO03	6
B)	Explain Generation of DSBSC signal using of Balanced modulator.	CO03	6
C)	A 300 W carrier is amplitude modulated to a depth of 100%. Calculate the total power in case of AM and DSBSC techniques. How much power saving is achieved for DSBSC? If depth of modulation is changed to 75%, then how much power is required for DSBSC in both the cases?	CO03	6
Q. 3	**Solve Any Two of the following.**		12
A)	Define pre-emphasis and de-emphasis in FM systems. Why are they necessary?	CO04	6
B)	Explain Frequency Modulation in detail with the help of mathematical expression of FM, modulation index and frequency deviation.	CO05	6
C)	In an FM system, when the audio frequency is 525 Hz, and AF voltage is 2.8 V, the deviation is 3 kHz. If the AF voltage is now increased to 8 V, What is new deviation? Also find the Modulation index in each case.	CO05	6

Q.4 Solve Any Two of the following.   12

A) Define tracking and double spotting in the context of receiver tuning. Explain   CO04   6
how tracking and double spotting affect the performance of a receiver.

B) Describe the principle, operation, and advantages of superheterodyne   CO07   6
receivers in radio communication systems with the help of block diagram.

C) Explain the concept and significance of Automatic Gain Control (AGC) in   CO07   6
communication systems.

Q. 5 Solve Any Two of the following.   12

A) Solve: CO07   6

(i) Calculate the noise voltage at the input of a television RF amplifier, using
a device that has a 200 Ω equivalent noise resistance and a 350 Ω input
resistor. The bandwidth of the amplifier is 5 MHz, and the temperature is
17°C.

(ii) The first stage of two stage amplifier has a voltage gain of 10, a 900Ω
input resistor, 1800Ω equivalent noise resistance and an 18 Ω output
resistor. For the second stage, these values are 25Ω, 81kΩ, 10kΩ and 1
MΩ, respectively. Calculate the equivalent input noise resistance of this
two stage amplifier.

B) Define Noise. Write short note on (i) Extraterrestrial Noise, (ii) Industrial   CO06   6
Noise, and (iii) Transit-time-noise.

C) Explain (i) Practical Diode Detector, (ii) Ratio Detector   CO06   6

*** End ***