

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V (NEW) EXAMINATION – SUMMER 2021****Subject Code:2151004****Date:20/09/2021****Subject Name:Electronic and Communication****Time:10:30 AM TO 01:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		MARKS
Q.1	(a) What is modulation? Why modulation is required?	03
	(b) Explain different types of noise related to communication.	04
	(c) Draw the general block diagram of a super heterodyne receiver and briefly explain the function of each block.	07
Q.2	(a) Compare AM, FM and PM.	03
	(b) Discuss block diagram of filter method for SSB-SC generation.	04
	(c) Explain Armstrong method of FM generation with neat diagram	07
OR		
	(c) Explain Amplitude modulation with required waveforms. Also give mathematical representation of amplitude modulated wave.	07
Q.3	(a) Explain pre-emphasis and de-emphasis in relation to FM	03
	(b) Draw the waveforms at input and output of envelop detector.	04
	(c) Explain the indirect method of generating FM signal with neat block diagram and relevant mathematical expressions	07
OR		
Q.3	(a) Explain use of frequency multiplier and mixing for FM generation.	03
	(b) Explain any one method for generation of SSB signals in detail.	04
	(c) An FM wave is given by $e(t) = 20\sin(6 \times 10^8 t + 7\sin 1250t)$. Determine (i) carrier frequency (ii) modulating frequency (iii) modulation index and (iv) maximum deviation	07
Q.4	(a) What are the advantages of delayed AGC.	03
	(b) state and prove the Time shifting properties of Fourier transform.	04
	(c) Draw the general block diagram of a communication system and briefly explain the function of each block.	07
OR		
Q.4	(a) Define the following terms related with radio receiver: (i) selectivity (ii) fidelity (iii) sensitivity	03
	(b) Explain self-capacitance of a coil.	04
	(c) Two resistors $20 \text{ k}\Omega$ and $50 \text{ k}\Omega$ are at room temperature (290K) for a bandwidth of 100kHz. Calculate thermal noise for each resistor, if two resistors are in series and if two resistors are in parallel.	07

- Q.5** (a) What do you mean by image frequency in radio receiver? **03**
(b) Express an equation for impedance of series tuned circuit in terms of quality factor? **04**
(c) Find overall noise figure of three stage cascaded amplifier, each stage having a power gain of 10 dB and noise figure of 4 dB. **07**

OR

- Q.5** (a) Define shot noise. **03**
(b) An AM broadcast receiver has an IF of 455 KHz and is tuned to 1400 KHz and the RF stage has one tuned circuit with a Q of 150. (a) Find the image frequency; (b) Find the image rejection in decibels. **04**
(c) Determine the Friis's formula to define noise factor of amplifiers in cascade. **07**
