Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE – SEMESTER – V (NEW) EXAMINATION – WINTER 2015

Subject Code: 2151004 **Date:08/12/ 2015**

Subject Name: Electronic Communication

Time:10:30am to 1:00pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1	**(a)**	State the Parseval's theorem. Verify Parseval's theorem for the signal $g(t) = e^{-at}u(t)$ $(a>0)$.	**07**
	(b)	Draw and explain circuit of envelope detector for AM.	**07**
Q.2	**(a)**	Derive the Friis's formula for noise factor when amplifiers are in cascade connection.	**07**
	(b)	A receiver has a noise figure of 12 dB, and it is fed by a low-noise amplifier that has a gain of 50 dB and a noise temperature of 90 K. Calculate the noise temperature of the receiver and the overall noise temperature of the receiving system.	**07**
		OR	
	(b)	Draw series tuned circuit and derive the equation for resonant frequency and Q factor.	**07**
Q.3	**(a)**	Explain different types of noise related to communication.	**07**
	(b)	Explain AGC and discuss difference between simple AGC and Delayed AGC.	**07**
		OR	
Q.3	**(a)**	With respect to receivers explain Image rejection and double spotting in detail.	**07**
	(b)	Discuss Quadrature Amplitude Modulation (QAM) with the help of block diagram.	**07**
Q.4	**(a)**	An AM broadcast receiver has an IF of 465 KHz and is tuned to 1000 KHz and the RF stage has one tuned circuit with a Q of 50. (a) Find the image frequency; (b) Find the image rejection in decibels.	**07**
	(b)	Explain Amplitude modulation with required waveforms. Also give mathematical representation of amplitude modulated wave.	**07**
		OR	
Q.4	**(a)**	The total power content of an AM signal is 1000 W. Determine the power being transmitted at the carrier frequency when the percentage modulation is 100%.	**07**
	(b)	Determine the fourier transform of a gate pulse of unit height, unit width and centred at t=0.	**07**
Q.5	**(a)**	Define the following terms related with radio receiver: (i) selectivity (ii) fidelity (iii) sensitivity and gain (iv) tracking (v) double spotting (vi) image frequency (vii) spurious response.	**07**
	(b)	Explain pre-emphasis and de-emphasis in relation to FM.	**07**
		OR	
Q.5	**(a)**	Explain the Armstrong method of FM generation with neat diagram.	**07**
	(b)	An FM wave is given by $e(t) = 20\sin(6*10^8t + 7\sin 1250t)$. Determine (i) carrier frequency (ii) modulating frequency (iii) modulation index and (iv) maximum deviation.	**07**

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