Seat No.: _____   Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
PDDC - SEMESTER–IV • EXAMINATION – WINTER • 2014

Subject Code: X41101   **Date: 24-12-2014**
Subject Name: Electronic Communication
Time: 02:30 pm - 05:00 pm   **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)**	What is thermal noise? Three resistors have values 10, 24 and 14 $K\Omega$. It is known that the thermal noise voltage generated by $10k\Omega$ is $0.3\mu V$. Calculate the thermal noise voltage generated by (a) the three resistors connected in series and (b) connected in parallel.	**07**
	(b)	Explain pre-emphasis and De-emphasis.	**07**
Q.2	**(a)**	What is modulation? What is need of modulation?	**07**
	(b)	Explain diode reactance modulator with necessary equations.	**07**
		OR	
	(b)	Explain Armstrong method for FM generation with block diagram.	**07**
Q.3	**(a)**	Explain the double conversion super-heterodyne receiver with block diagram.	**07**
	(b)	Explain envelop detector for AM demodulation. What is the effect of large value of RC time constant?	**07**
		OR	
Q.3	**(a)**	What is AGC? Explain simple AGC and delayed AGC with proper graph.	**07**
	(b)	In a broadcast super-heterodyne receiver having no RF stage, the loaded Q of antenna coupling circuit is 125. If the IF is 465KHz calculate:	**07**
		i. The IF and its rejection at 1 MHz and 30 MHz.	
		ii. The IF required to make the image rejection as good at 30 MHz as it is at 1 MHz.	
Q.4	**(a)**	Define the following terms:	**07**
		1) Noise figure 2) Sensitivity 3) Selectivity	
		4) Tuning range 5) Solar noise 6) Image Frequency	
		7) Double Spotting	
	(b)	List all the properties of Fourier transform. Explain differentiation and time shifting properties.	**07**
		OR	
Q.4	**(a)**	Find the Fourier transform of the signal: $$x(t) = e^{-a|t|} sin\omega_0 t$$	**07**
Q.4	**(b)**	Define AM. Derive the expression for amplitude modulated wave.	**07**
Q.5	**(a)**	Give difference between SSB and DSBSC. Explain phase shift method for SSB generation with necessary block diagram.	**07**
	(b)	Explain tapped capacitor and tapped inductor.	**07**
		OR	
Q.5	**(a)**	Draw parallel tuned circuit and derive equation for resonant frequency and Q-factor.	**07**
	(b)	Classify noise? Define Industrial noise, Solar noise and partition noise	**07**

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