Seat No.: _____ **Enrolment No._____**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V (NEW) - EXAMINATION – SUMMER 2017

Subject Code: 2151004 **Date: 12/05/2017**

Subject Name: Electronic and Communication

Time: 02:30 PM to 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.**

			MARKS
Q.1		**Short Questions**	**14**
	1	Radio broadcasts are generally (a) Amplitude modulated (c) Both (a) and (b) (b) Frequency modulated (d) none of the above	
	2	If AM modulation is 100% then signal amplitude is …….. carrier amplitude (a) Equal to (c) Less than (b) Greater than (d) None of the above	
	3	For a tuned circuit, if a Q factor is high means bandwidth will be _____ comparatively. (less , high)	
	4	List out properties of Fourier transform.	
	5	Modulation is done in …….. (a) Transmitter (b) Receiver (c) Between transmitter and receiver (d) None of the above	
	6	The major advantage of FM over AM is …….. (a) Reception is less noisy (b) Higher carrier frequency (c) Smaller bandwidth (d) Small frequency deviation	
	7	What is image frequency?	
	8	Pre-emphasis and de-emphasis networks are essential in (a) frequency modulation system (b) amplitude modulation system (c) pulse amplitude modulation system (d) none of the above	
	9	Define partition noise.	
	10	Define signal to noise ratio.	
	11	A series tune circuit offers …….. impedance (a) Zero (c) Minimum (b) Maximum (d) None of the above	
	12	Express frequency tuning range ratio and capacitor tuning range ratio in relation to receivers.	
	13	Define and state properties of sinc(x) function in relation to Fourier transform.	
	14	Define modulation index for Amplitude modulation.	
Q.2	**(a)**	What is modulation? Why modulation is required?	**03**
	(b)	A 10 kW carrier wave is amplitude modulated at 80% depth of modulation by a	**04**

sinusoidal modulating signal. Calculate the sideband power, total power and transmission efficiency of the AM wave.

(c) What are the different methods for generation of SSB signals? Explain any two methods in detail and compare them. **07**

OR

(c) Draw the waveforms at input and output of envelop detector and explain its operation. Also explain importance of RC time constant. **07**

Q.3 (a) Compare AM, FM and PM. **03**

(b) A 20 MHz carrier is modulated by a 400Hz modulating signal. The carrier voltage is 5V and the maximum deviation is 10 kHz. Write down the mathematical expressions for the FM and PM waves. If the modulating frequency is increased to 2 kHz keeping everything else constant write down the expressions for the FM and PM waves. **04**

(c) Discuss basic principle of FM detection and Explain foster seeley discriminator with neat diagram. **07**

OR

Q.3 (a) Discuss drawbacks of direct method for FM generation. **03**

(b) An FM wave is given by e(t) = 10sin (5×10^8 t + 4sin1250t).Determine (i) The carrier frequency (ii) Modulating frequency (iii) The modulation index (iv) The maximum deviation. **04**

(c) Explain Armstrong method of FM generation with neat diagram **07**

Q.4 (a) Draw and explain Padder tracking in relation to Super heterodyne receiver. **03**

(b) A receiver tunes signals from 550 to 1600 kHz with an IF of 455 kHz. Find the frequency tuning range ratio and capacitor tuning range ratio for the oscillator section . **04**

(c) Determine the Friis's formula to define noise factor of amplifiers in cascade. **07**

OR

Q.4 (a) Discuss different noise sources exhibits in bipolar transistor. **03**

(b) Two resistors 20 kΩ and 50 kΩ 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. **04**

(c) Draw the general block diagram of a super heterodyne receiver and briefly explain the function of each block. **07**

Q.5 (a) State Parseval's theorem. **03**

(b) Express an equation for impedance of series tuned circuit in terms of quality factor? **04**

(c) State and prove time shifting property of Fourier transform. Using same property show that **07**

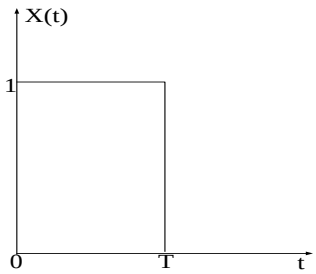
$g(t-T) + g(t+T) = 2G(\omega)\cos(\omega T)$

OR

Q.5 (a) Mention the transfer function of the system required for distortion less transmission. **03**

(b) What is skin effect? How to reduce it? **04**

(c) Determine the Fourier transform of rectangular pulse shown below. **07**



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