SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA

School of Electronics & Communication Engineering

B. Tech. (ECE) Minor-I Examination (Odd) 2019-20

Entry No: 1 S B E C 0 6 1

Date: 27.09.2019

Total Number of Pages:[01]

Total Number of Questions: [04]

Course Title: Analog Communication Engineering

Course Code: ECL 2151

Time Allowed 1.5 Hours

Max Marks: [30]

Instructions / NOTE

i. Attempt All Questions.

ii. Support your answer with neat sketches/diagrams, wherever appropriate.

iii. Assume any missing data to suit the case / derivation / answer.

Section - A

Q1.	a)	What is the Limitation of Fourier Series? Does Fourier Transform overcome this?	[01]	CO1
	b)	What are the Bandwidth of the following baseband signals		
		i. TV Signal Picture	[01]	CO1
		ii. Voice Signal Telephony	[01]	CO1
		iii. Music Signal		
	c)	Two Major barriers to human communication are_____	[01]	CO1
	d)	(True or False) Radio Transmission does not occur in the Very Low Frequency (VLF) & LF Ranges.	[01]	CO1
	e)	List five Major Usage of the UHF Band.		
Q2.	a)	For a continuous time periodic signal $x(t) = 2 + \cos\left(\frac{2\pi}{3}t\right) + 4\sin\left(\frac{5\pi}{3}t\right)$. Determine the fundamental frequency ω_0 and the exponential Fourier series C_n components. For n= 0, 1,3,5,7	[05]	CO1

Section - B

Q3.	a)	For a Signal Shown in Figure 1. Write the function and evaluate its even and odd parts graphically.	[04]	CO1
	b)	Show that a time shift in time domain is equal to a phase shift in frequency domain.	[04]	CO1
	c)	If $x(t) = e^{-t}$ for $t \geq 0$, $y(t) = \alpha e^{-\alpha t}$ for $t \geq 0$. Evaluate convolution of $x(t)$ and $y(t)$	[04]	CO1
Q4.	a)	An AM signal is generated by modulating the carrier frequency f_c=800kHz by the signal $m(t) = \sin(2000\pi t) + 5\cos(4000\pi t)$. The AM signal is $u(t) = 100[1 + m(t)]\cos 2\pi f_c t$ is fed to a load of 50Ω.		
		i. Determine and Sketch the spectrum of the AM signal		
		ii. Determine the Average power in the carrier and in the sidebands		
		iii. What is the Modulation Index?	[06]	CO2
		iv. What is the peak power delivered to the load?		
	b)	Explain the importance & Applications of High and Low Level Modulation in respect of AM modulators.	[02]	CO3

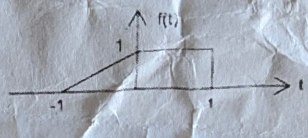

Figure 1

Course Outcomes

CO1 Able to understand Communication System with signals and their transform

CO2 Able to learn amplitude modulation and angle modulation.

CO3 Able to learn the basic design concept of communication transmitters and receivers.

CO4 Able to learn noise analysis in communication systems.

CO	Questions Mapping	Total Marks	Total Number of Students (to be appeared in Exam)
CO1	1(a,b,c,d, e), 2(a), 3(a,b,c)	22	
CO2	4(a)	6	
CO3	4(b)	2	
CO4			

SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA

School of Electronics & Communication Engineering

B. Tech. (ECE) Major Examination (Odd) 2019-20

Entry No: 18BEC066 **Total Number of Pages:[02]**

Date: 04.12.2019 **Total Number of Questions: [05]**

Course Title: Analog Communication Engineering

Course Code: ECL 2151

Time Allowed 2.5 Hours **Max Marks: [50]**

Instructions / NOTE

iv. ***Attempt All Questions.***

v. ***Support your answer with neat sketches/diagrams, wherever appropriate.***

vi. ***Assume any missing data to suit the case / derivation / answer.***

		Section - A		
Q1.	a)	What are relative merits and demerits of FM and AM?	[02]	CO2
	b)	Explain what double spotting is and how it arises .What is its nuisance value?	[02]	CO3
	c)	What is transit time effect? How it is generated?	[02]	CO4
	d)	The value of a resistor creating thermal noise is doubled. The noise power generated is therefore_____	[01]	CO4
	e)	A message signal has a frequency of 15 kHz. What will be the height of antenna required for its transmission?	[01]	CO1
	f)	The instantaneous value of the DSBSC wave is _____	[01]	CO2
	g)	Define percentage Modulation & Modulation Index.	[01]	CO2
Q2.	a)	Compute Energy & Power of the following Signals i. $x(t) = \sqrt{t}$ ii. $x(t) = \cos(t) + j\sin(t)$	[05]	CO1
	b)	State & Prove Convolution in time domain property of Fourier Transform.	[05]	CO1
		Section - B		
Q3.	a)	A tuned circuit is having a 15μH coil with a resistance of 25Ω is connected in parallel with a 67.6pF variable capacitor. Calculate the bandwidth of the tuned circuit.	[02]	CO3
	b)	When a superhetrodyne receiver is tuned to 555 kHz, its local oscillator provides the mixer with an input at 1010 kHz. What is the image frequency? The antenna of this receiver is connected to the mixer via a tuned circuit who's loaded Q is 40. What will be the rejection ratio of the calculated image frequency?	[04]	CO3
	c)	Calculate the value of a padder capacitor and oscillator inductor to give two points tracking for s superhetrodyne receiver working in medium wave band from 500 kHz to 1600 kHz; with IF of 465 kHz. Assume maximum gang capacitor of 350 pF. Also find the error in oscillator tracking frequency for a signal frequency of 1 MHz	[04]	CO3
Q4.	a)	With a neat circuit diagram explain the principle of operation of "reactance modulator". Derive an expression for the equivalent reactance offered by this circuit. Discuss how it can be used for generation of FM wave.	[05]	CO2
	b)	It is required to provide a maximum deviation of 75 kHz for the 88 MHz carrier frequency of VHF transmitter. A FET is used as a capacitor reactance modulator and the linear portion of its g_m -V_{gs} curve lies from 320 μS (at which V=-2V) to 830 μS (at which Vgs1= -0.5 V).Assume R_{gs}= 1/10th of Xc_{gd}, Calculate		

		i. The r.m.s value of required modulating voltage. ii. The value of fixed capacitance and inductance of the oscillator tuned circuit across which the reactance modulator is connected.	[1+4]	CO3
Q5	a)	Draw the practical circuit of a balanced ratio detector, and show how it is derived from the basic circuit. Explain the improvement effected by each of the changes.	[05]	CO3
	b)	Derive the relation between noise figure and temperature.	[05]	CO4

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CO	Questions Mapping	Total Marks	Total Number of Students (to be appeared in Exam)
CO1	1(e) ,2(a,b)	11	
CO2	1(a,f,g),4(a)	9	
CO3	1(b),3(a,b,c),4(b) 5(a)	22	
CO4	1(c, d), 5(b)	8	