Enrollment No: _____   Exam Seat No:_____

C.U.SHAH UNIVERSITY
Summer Examination-2016

Subject Name : Analog Communication

Subject Code : 4TE04ACM1   **Branch: B.Tech (EC)**

Semester : 4   **Date :12/05/2016**   **Time : 02:30 To 05:30**   **Marks : 70**

Instructions:
(1) Use of Programmable calculator & any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

Q-1   **Attempt the following questions:**   **(14)**
a) What is skin effect?
b) What do you understand by Q-factor?
c) Provide any two needs of modulation
d) What is the need of SSB?
e) Define Vestigial Side band.
f) Provide full form of SNR
g) Define Shot noise
h) What is the purpose of Automatic Gain Control (AGC) circuits in superheterodyne receiver?
i) What is self & mutual inductance?
j) What is the purpose of Phase Lock Loop (PLL) in FM demodulation?
k) Why suppression of carrier frequency is important in modulation?
l) Give two applications of amplitude modulation.
m) What do you understand by fading effect?
n) Provide the frequency range of FM wave.

Q-2   **Attempt all questions**   **(14)**
(a) Draw the block diagram of Superheterodyne Receiver. Explain each block in detail.   **(07)**
(b) Derive the equation of Friis's Formulla to determine the overall noise factor of amplifiers. (Assume that amplifiers are connected in cascade environment.)   **(05)**

(c) The equivalent noise resistance for an amplifier is 300 Ω, and the equivalent shot noise current is 5µA. The amplifier is fed from a 150Ω, 10µV rms sinusoidal signal source. The noise bandwidth is 10 MHz. Calculate: **(02)**
(1) Individual Noise voltages at the input.
(2) Input Signal to Noise ratio.

Q-3		**Attempt all questions**	**(14)**
	(a)	Derive an expression for single-tone amplitude modulated wave.	**(05)**
	(b)	A carrier wave of frequency 10MHz and peak value of 10 V is amplitude modulated by a 5KHz sine wave of amplitude 6V.	**(02)**

          (1) Determine the modulation index.
          (2) Draw the amplitude spectrum.

| | **(c)** | A high-frequency transformer has identical primary and secondary circuits for which $L_p = L_s = 150$ µH, $C_p = C_s = 470$ pf and the Q-factor for each circuit alone is 85. The coefficient of coupling is 0.01. The load resistance is 5000Ω, and the constant current source feeding the transformer has an internal resistance of 75kΩ. Determine the transfer impedance at resonance. | **(04)** |
| | **(d)** | 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. Find : | **(03)** |

          (1) Image Frequency.
          (2) Image Rejection in decibels.

Q-4		**Attempt all questions**	**(14)**
	(a)	Explain the Armstrong Method for the Generation of Wideband FM.	**(07)**
	(b)	Explain any one balanced modulator	**(07)**

Q-5		**Attempt all questions**	**(14)**
	(a)	Describe any one method SSB Generation	**(07)**
	(b)	Using neat sketch, describe and compare pre-emphasis & de-emphasis	**(07)**

Q-6		**Attempt all questions**	**(14)**
	(a)	Describe double-sideband suppressed carrier (DSBSC) modulation	**(07)**
	(b)	Explain coherent detection of DSBSC modulated waves	**(07)**

Q-7		**Attempt all questions**	**(14)**
	(a)	Provide differences among AM, FM and PM	**(07)**
	(b)	Describe Quadrature detector method for FM signal demodulation	**(07)**

Q-8		**Attempt all questions**	**(14)**
	(a)	Write a note on propagation through troposphere	**(07)**
	(b)	Comparatively describe Very low frequency (VLF) and extremely low frequency(ELF) propagation.	**(07)**