C U SHAH UNIVERSITY
FACULTY OF TECHNOLOGY AND ENGINEERING

SUMMER EXAMINATION 2015

Branch: Electronics and Communication   **Semester:** 4
Subject Code: 4TE04ACM1   **Subject Name:** Analog Communication
Total marks : 70

Instructions:
1. The question paper comprises two sections.
2. Draw neat figures wherever required.

SECTION – I

Q - 1   **Answer the questions below.**   **[07]**

a.   What is flicker noise?

b.   Describe the term adjacent channel selectivity.

c.   What is skin effect?

d.   Draw diagram of parallel tuned circuit and give equation of parallel impedance.

e.   Define Q-factor.

f.   Why modulation in communication is required?

g.   What is the requirement of image rejection in communication receivers?

Q – 2.a   The equivalent noise resistance for an amplifier is 300 Ω and the equivalent shot noise current is 5 µA. The amplifier is fed from 150Ω, 10µV rms sinusoidal signal source. Calculate the individual noise voltages at the input and the input signal-to-noise (SNR) in decibels. The noise bandwidth is 10 MHz   **[04]**

Q – 2.b   **Answer any two questions.**   **[10]**

(i)   Derive the noise factor for cascade amplifiers.

(ii)   Explain super heterodyne receiver tracking methods

(iii)   Derive the equation of 3-dB bandwidth in respect to frequency selection of tuned circuit.

Q - 3 .a   The RC load for a diode detector consists of 1000pF capacitor in parallel with 10kΩ resistor. Calculate the maximum modulation depth that can be handled for sinusoidal modulation at a frequency of 10kHz if diagonal peak clipping is to be avoided.   **[04]**

Q – 3.b   **Answer any two questions.**   **[10]**

(i)   Describe any one type of amplitude demodulator circuits.

(ii)   Using neat sketch describe BJT collector modulator circuit.

(iii)   Describe pre-emphasis and de-emphasis

SECTION – II

Q - 4   **Answer the question below.**

a.   What is the benefit of SSBSC modulation over SSB modulation   **[01]**

b.   Draw basic diode envelope detector circuit and output voltage waveform   **[02]**

c.   Mention the significance of modulation index.   **[02]**

d.   Mention secant law in respect to maximum usable frequency of skywave propagation.   **[02]**

Q – 5.a   Draw figure of superheterodyne receiver.   **[04]**

Q – 5.b   Explain the indirect method of generating FM signal   **[05]**

OR

Q – 5.b   Describe any one type of balanced modulators.   **[05]**

Q – 5.c   Describe Phasing method for SSB Generation.   **[05]**

OR

Q – 5.c   Draw and explain block diagram of frequency stabilized FM oscillator.   **[05]**

Q – 6.a   Describe sinusoidal frequency modulation. Derive equation of modulation index (β) for   **[04]**
FM.

Q – 6.b   Provide the equation of field strength at a distance (d) from surface wave propagation.   **[05]**
Describe surface wave propagation.

OR

Q – 6.b   Describe Varactor diode Phase modulator.   **[05]**

Q – 6.c   In respect to sky wave propagation provide brief contribution of D Layer, E Layer, E_s **[05]**
Layer, F_1 Layer and F_2 Layer

OR

Q – 6.c   Derive equation of average power in sinusoidal FM. Provide equation of Carson's rule for   **[05]**
Non-sinusoidal modulation.

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