d) Define figure of merit for evaluating noise performance of a communication system and derive an expression for figure of merit for AM-SC system.

OR

Give noise performance of angle modulation as compared to AM.

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Roll No ....

EC-405

B.E. IV Semester

Examination, December 2016

Analog Communication

Time : Three Hours

Maximum Marks : 70

Note: i)   Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.

ii) All parts of each question are to be attempted at one place.

iii) All questions carry equal marks, out of which part A and B (Max. 50 words) carry 2 marks, part C (Max. 100 words) carry 3 marks, part D (Max. 400 words) carry 7 marks.

iv) Except numericals, Derivation, Design and Drawing etc.

Unit-I

1. a) Determine Fourier transform of impulse function.

b) Define and explain distortionless system.

c) Distinguish between causal and non causal system with example.

d) State and prove the following properties of Fourier transform.

    i)   Time shifting property

    ii) Time differentiation property

    iii) Time convolution property

OR

Evaluate the following integral using the convolution theorem

$$I = \int_{-\infty}^{\infty} \frac{\sin 4x}{x} \cdot \frac{\sin (t-x)}{(t-x)} dx$$

Unit-II

2. a) What is the need of Modulation in Communication System? Explain.

b) Explain modulation index in AM.

c) What are the various types of amplitude modulation techniques? Give their relative merits and demerits.

d) A single tone modulating signal $e_m = E_m \cos \omega_m t$ amplitude modulates a carrier $e_c = E_c \cos \omega_c t$

i) Derive an expression for AM wave.

ii) Derive an expression for modulation index.

OR

Draw and explain the circuit of envelope detector and derive a condition for choice of time constant.

Unit-III

3. a) Give a comparison between AM and FM.

b) Define frequency modulation and phase modulation.

c) Explain the concept of frequency deviation modulation index and bandwidth in an FM system.

d) A single tone modulating signal $\cos (15 \pi 10^3 t)$ frequency modulates a carrier of 10MHz and produces a frequency deviation 75 KHz.

Find :

i) The modulation index and

ii) Phase deviation produced in the FM wave

iii) If another modulating signal produces a modulation index of 100 while maintaining the same deviation find the frequency and amplitude of the modulating signal, assuming $K_f = 15$ KHz per Volt

OR

Explain the principle of FM generation by parameter variation method.

Unit-IV

4. a) Define Fidelity and Sensitivity.

b) What is the use of AVC and AFC?

c) How does Low level and high level transmitters differ? Explain.

d) Draw the block diagram of a super heterodyne receiver and give its merit over TRF. Why it is called super heterodyne? Why is Local oscillator frequency kept higher?

OR

Draw and explain the schematic diagram of FM transmitter.

Unit-V

5. a) Define Noise and give its classification.

b) Define White Gaussian noise.

c) Explain the terms

i) Noise bandwidth

ii) Noise temperature

iii) Noise figure