

[4]

OR

Explain the following

- i) Noise bandwidth
- ii) Noise figure
- iii) Noise temperature

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Roll No .....

**EC - 405****B.E. IV Semester**

Examination, June 2015

**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.

1. a) What do you understand by Fourier transform?
- b) What is a Distortion less system?
- c) State and prove Parseval's energy theorem.
- d) Find the Fourier transform of a damped sinusoidal wave form of frequency  $\omega_0$  show in fig 1.

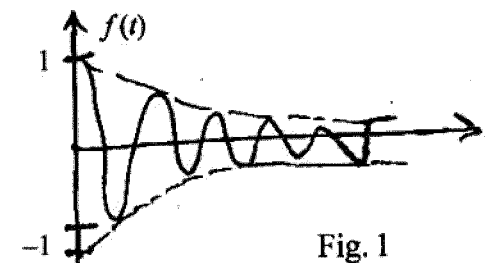


Fig. 1

OR

Find the inverse Fourier transform of

- i)  $\text{Sgn}(\omega)$
- ii)  $u(\omega)$

2. a) What is the necessity of modulation?
- b) What is the USB transform?
- c) Derive an expression for amplitude modulation and modulation Index.
- d) Explain the synchronous detection method of SSB-SC signal. Explain the effect of phase and frequency error in synchronous detection.

OR

A multiple-tone modulation signal  $f(t)$  consisting of three frequency components is given by

$$f(t) = E_1 \cos \omega_1 t + E_2 \cos \omega_2 t + E_3 \cos \omega_3 t$$

$\omega_3 > \omega_2 > \omega_1$  and  $E_1 > E_2 > E_3$  this signal  $f(t)$  modulates a carrier  $e_c = E_c \cos \omega_c t$

- i) Derive the expression for Am wave
  - ii) Draw a signal sided spectrum and find the bandwidth of the Am wave.
3. a) Find the bandwidth of a commercial FM transmission if frequency deviation  $\Delta f = 75$  kHz and modulating frequency  $f_m = 15$  kHz.
  - b) Distinguish between wideband FM and Narrow band FM.
  - c) How the PM signal can be generated with the FM signal?

- d) Explain the Foster-Seeley method of FM detection.

OR

Explain the parameter variation method of FM generation.

4. a) What do you mean by Carrier shift?
- b) What is tracking error?
- c) Write a short note on Automatic Volume Control (AVC).
- d) With the help of block diagram explain the working of high level transmitters.

OR

Explain the principle working of superheterodyne receiver.

5. a) What do you mean by Signal to Noise ratio?
- b) Explain different sources of Noise.
- c) Explain white Noise in brief.
- d) An antenna having a noise temperature  $30^\circ\text{K}$  is connected at the input of a receiver which has an equivalent input noise temperature of  $270^\circ\text{K}$ . The midband available gain of the receiver is  $10^{10}$  and the corresponding noise bandwidth is 1.5 MHz. Find the available output noise power.