c) What is TDMA? Explain.

d) Draw the complete frame structure of TDMA and explain functions of each frame.

OR

Briefly discuss each of the main component of the link budget and discuss the calculation of link margin.

******

Total No. of Questions :5] *[Total No. of Printed Pages :4*

Roll No .....

EI/IC-503

B.E. V Semester

Examination, December 2016

Communications Engineering

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) What is the relationship between sinusoidal and exponential Fourier series?

b) Relate Gaussian and Rayleigh probability density function.

c) Make comparison between energy and power signals.

d) Find the probability of 4 to 7 heads inclusive in 10 tosses of a fair coin.

OR

The joint density function of two continuous random variables x and y is given by

$$f(x, y) = \begin{cases} 2 & for\ 0 < x < 1, 0 \le y < x \\ 0 & otherwise \end{cases}$$

Find

i) The marginal density function

ii) Conditional density function.

Unit - II

2. a) What is the role of modulation index in AM modulated signal?

b) What is the need of pre and de-emphasis circuit? Explain in detail.

c) Establish the relationship between phase and frequency modulation and differentiate them.

d) A carrier $V_c \cos \omega_c t$ is modulated by $V_{in} \cos \omega_m t$

Find

i) Total modulated power

ii) Transmission efficiency for 100% modulation.

OR

A modulating signal $5 \cos 2\pi 15 \times 10^3 t$, angle modulates a carrier $A \cos \omega_c t$

Find

i) Modulation index

ii) Bandwidth.

Unit - III

3. a) How performance of a TRF receiver is improved by heterodyning? Explain.

b) What is figure of merit of AM system? Show that it is identical in synchronous and envelope detection.

c) State two limitations of a balanced slope detector.

d) Draw the block diagram of AGC and explain function of each block. Also draw decay characteristics of AGC system.

OR

Enlist different factors that influence the choice of the intermediate frequency in detail.

Unit - IV

4. a) Explain the necessity of nonlinear equalizer.

b) What is the effective noise temperature? Explain in detail.

c) Explain the role of compounding process in PCM.

d) Draw a complete PSK system with Input/Output waveform and explain its working principle.

OR

Two resisters each of 2.5 kΩ are at temperature 250°k and 350°k respectively. Find the power density spectrum of noise voltage at the terminals formed by

i) Series combination

ii) Parallel combination of these resister

Unit - V

5. a) Explain satellite frequency band for communication.

b) What is transponder? Explain in detail.