[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 6142 F-9

Unique Paper Code : 2343703

Name of the Paper : CS703 Principles of Communication Engineering

Name of the Course : **Computer Science: Allied Course**

Semester : VII

Duration : 3 hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. There are **two** parts of the question paper **Part I** and **Part II.**
3. **Part I** has one question which is compulsory.
4. From **Part II** attempt any **four** out of **six** questions.

PART I

Section A

1. **(a) Define** modulation. What is the need for modulation? (5)

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(b) How many AM broadcast stations can be accommodated in 1 MHz bandwidth of the highest frequency modulating a carrier is 5 KHz? (5)

(c) What are the advantages and disadvantages of FM and AM? Give applications, of FM and AM. (5)

(d) Compare wide band FM and narrow band FM. (5)

(e) Define VSWR. Find the value of VSWR for a short circuit line. (5)

(f) Thermal noise power from a resistor is measured as 4×10^{-17} Watt, for a given bandwidth and temperature of 20°C What will the noise power be when the temperature is changed to 50°C. (5)

(g) What is companding? Draw the companding curve. (5)

Section B

2. (a) What are the advantages of SSB over DBSFC. Give the applications of SSB. (3)

(b) Calculate the percentage power saving when carrier and one of the side bands are suppressed in a AM wave modulated to a depth of 100%. (4)

(c) A certain transmitter radiates 9 kW with the unmodulated carrier and 10.125 kW when the carrier is sinusoidally modulated. Calculate the modulation index. (3)

3. (a) What are the drawbacks of Direct method of FM generation? Explain the Armstrong method of FM generation and its advantages over direct method. (7)

(b) The equation of an FM wave; $v(t) = 10\cos(10^8t+4\sin10^4t)$. Calculate the carrier and modulating frequencies and the bandwidth. (3)

4. (a) Draw the block diagram of a PCM system. (3)

(b) Compare PWM and PPM. (3)

(c) For 11001010 draw the following line codes :

(i) Bipolar NRZ

(ii) Unipolar RZ

(iii) Unipolar NRZ

(vi) Manchester (4)

5. (a) State the sampling theorem. (3)

(b) What are the advantages of digital modulation over analog modulation? (3)

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(c) For a BPSK modulator with a carrier frequency of 70 MHz and input bit rate of 10 Mbps. Determine the maximum and the minimum upper and lower side band frequency, bandwidth and baud. (4)

6. (a) Define lossless line and distortion less line. Give the necessary conditions for both. (3)

(b) A distortion less transmission line has $Z_0 = 60\Omega$, $\alpha = 20$ mN/m, wave velocity = 1.8×10^8 m/s. Find the line parameter L and C. (3)

(c) Find reflection coefficient and hence the VSWR of a transmission line having characteristic impedance 30 ohms and load impedance of 70 ohms. (4)

7. (a) Derive expression for the characteristics impedance (Z_0) of a transmission line in terms of R, G, L, and C. (7)

(b) Find the value of reflection coefficient and vswr for a matched line. (3)

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