

AMIETE – ET (OLD SCHEME)

Code: AE21

Subject: DIGITAL COMMUNICATIONS

Time: 3 Hours

Max. Marks: 100

DECEMBER 2009**NOTE: There are 9 Questions in all.**

- Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.
- Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.
- Any required data not explicitly given, may be suitably assumed and stated.

Q.1 Choose the correct or the best alternative in the following: (2x10)

a. Which of the following requires a synchronizing signal?

- (A) single channel PPM system (B) PAM
(C) PDM (D) all of the above

b. In delta modulation, which of the following drawbacks are existing?

1. Slope overload 2. Serration noise 3. Granular noise

- (A) 1 and 2 only (B) 2 and 3 only
(C) 1 and 3 only (D) 1,2 and 3

c. In an PCM the amplitude levels are transmitted in a 7 unit code. The sampling is done at the rate of 10 Hz. The bandwidth should be

- (A) 5 kHz (B) 5 MHz
(C) 70 kHz (D) 35 kHz

d. The purpose of source coding is to

- (A) Increase the information Transmission rate
(B) Decrease the information Transmission rate
(C) Decrease the S/N ratio
(D) Decrease the probability of error

e. If carrier modulated digital bit stream had one of the possible phases of 0, 90, 180 and 270 degrees, then the modulation scheme used is

- (A) BPSK (B) QPSK
(C) QAM (D) MSK

f. Aperture effect in the reconstructed signal from samples is due to loss of

- (A) High frequency components (B) midrange frequency components
(C) low frequency components (D) None of these

g. Which of the following gives the minimum probability of error

- b. For a (n, k) linear block code which corrects single error per code vector, prove that, $n \geq k + \log_2(n+1)$ and hence design a linear block code with a minimum distance of three and a message block size of eight bits. **(8)**

- Q.7** a. Explain the Viterbi algorithm for decoding of convolutional codes. **(8)**
b. The generator polynomial of a $(7,4)$ cyclic code is $G(p)=p^3+p+1$. Find all the code vector for the code in systematic form. **(8)**
- Q.8** a. Explain the operation of FHSS system with block diagram. Also mention the limitations of DS-SS and FH-SS systems. **(12)**
b. Determine the processing gain and Jamming margin in a DS-SS system. Given $T_b = 4.095 \text{ msec}$, $T_c = 1 \mu\text{sec}$. Assume a maximum of P_e is less than equal to 10^{-5} . Also, calculate the number of feedback stages required. **(4)**
- Q.9** a. With the help of example, explain the DPSK modulation technique of digital transmission. **(8)**
b. Explain PN sequence. Also, describe three randomness properties which makes it to be appear as random. **(8)**