

M. TECH.-I (ELECTRONICS V.L.S.I.) (CBCS – 2015 COURSE)

: SUMMER - 2018

SUBJECT : ADVANCED DIGITAL COMMUNICATION SYSTEM

Day : **Monday**
Date : **28/05/2018**

S-2018-2974

Time : **11.00 AM TO 02.00 PM**
Max. Marks : 60

N. B. :

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the sections should be written in the **SEPARATE** answer books.
- 4) Draw neat and labeled diagram **WHEREVER** necessary.
- 5) Assume suitable data, if necessary.

SECTION - I

Q. 1 With a suitable block diagram explain the working of Binary Frequency Shift Keying (BFSK). Draw signal space representation and power spectral density. **(10)**

OR

Draw and explain signal space diagram and spectral diagram of following digital CW modulation schemes and state the bandwidth requirement. **(10)**

- a) 16- ary PSK
- b) QPSK

Q. 2 Derive an expression for the probability of error for coherent and non coherent FSK. **(10)**

OR

Derive the expressions for signal to noise ratio and error probability of matched filter in presence of white Gaussian noise. **(10)**

Q. 3 Consider a (7, 4) linear code vector whose generator matrix is: **(10)**

$$G = \left[\begin{array}{cccc|ccc} 1 & 0 & 0 & 0 & 1 & 0 & 1 \\ 0 & 1 & 0 & 0 & 1 & 1 & 1 \\ 0 & 0 & 1 & 0 & 1 & 1 & 0 \\ 0 & 0 & 0 & 1 & 0 & 1 & 1 \end{array} \right]$$

- i) Find all code vectors of this code.
- ii) Find parity check matrix for this code.
- iii) Find minimum weight of this code.

OR

Give the specifications of the following codes: **(10)**

- a) Reed Soloman codes
- b) Turbo codes

P. T. O.

SECTION - II

Q. 4 What are the most important effects of small scale multi path propagation? (10)
Briefly explain the concept of slow fading.

OR

What is frequency selective fading? How to avoid it? (10)

Q. 5 The direct sequence spread spectrum communication system has following (10)
parameters:

Data sequence bit duration, $T_b = 4.095 \text{ ms}$

Pin chip duration $T_c = 1 \mu\text{s}$

$\frac{E_b}{N_o} = 10$ for average probability of error less than 10^{-5}

Calculate processing gain and Jamming margin.

OR

With a neat block diagram discuss the operation at IS-95 forward link. (10)

Q. 6 Explain in detail receiver antenna diversity technique (SIMO). (10)

OR

What is orthogonal frequency division multiplexing? Discuss in detail the (10)
concept of Time Diversity.

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