Day	Monday	Time : 10.00 AM TO 01.00 PM
Date:	13/05/2019 S-2019-2702	Max. Marks : 60

N. B. ;

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Draw neat and labeled diagram **WHEREVER** necessary.
4) Assume suitable data, if necessary.

Q. 1 **a)** Derive the expression for maximum signal to noise ratio in PCM system. **(06)**

b) Explain speech synthesis using LPC. **(04)**

OR

a) What is DPCM? Explain in detail. **(06)**

b) Write a short note on quantization **(04)**

Q.2 **a)** What is autocorrelation? State properties of autocorrelation function. **(06)**

b) Marginal power density functions of two random variables X and Y : **(04)**

$$f_X(x) = \begin{cases} 4(1-x)^2 & 0 \le x \le 1 \\ 0 & elsewhere \end{cases}$$

$$f_Y(y) = \begin{cases} 4(1-y)^2 & 0 \le y \le 1 \\ 0 & elsewhere \end{cases}$$

OR

a) What is cross correlation function? State properties of cross correlation function. **(06)**

b) Define power spectral density and energy spectral density. **(04)**

Q.3 **a)** What is need of equalization? Explain any one type of equalizer. **(06)**

b) State properties of line codes. **(04)**

OR

a) 30 voice channels of 4 KHZ bandwidth, is sampled at nyquist rate and encoded into 8 bit PCM are multiplexed with 1 bit/frame as synchronization bit.What is resultant bit rate at the output of multiplexer? Sketch the frame configuration. **(06)**

b) What is need of scrambler? **(04)**

P. T. O.

Q.4	**a)**	With the help of block diagram explain DPSK system.	**(06)**
	b)	Explain block diagram of FSK generator with neat waveforms.	**(04)**

<div align="center">OR</div>

	a)	What is QAM? Explain in detail.	**(06)**
	b)	Explain block diagram of PSK receiver with neat waveforms.	**(04)**

Q.5	**a)**	Derive equation for error of probability of BFSK.	**(06)**
	b)	State properties of matched filter.	**(04)**

<div align="center">OR</div>

	a)	Derive equation for error of probability of BPSK using matched filter.	**(06)**
	b)	Derive an equation of integrate and dump filter.	**(04)**

Q.6	**a)**	What is multiple access techniques? Explain its various types.	**(06)**
	b)	Explain performance parameters of DSSS system?	**(04)**

<div align="center">OR</div>

	a)	Explain block diagram of DSSS system.	**(06)**
	b)	Explain fast frequency hopping spectrum.	**(04)**

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