Scheme of Valuation/Answer Key

(Scheme of evaluation (marks in brackets) and answers of problems/key)

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

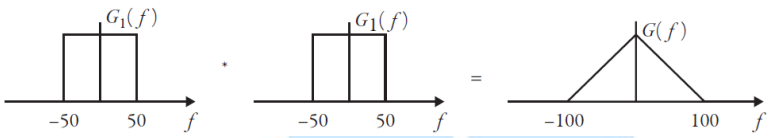
SIXTH SEMESTER B.TECH DEGREE EXAMINATION, May 2019

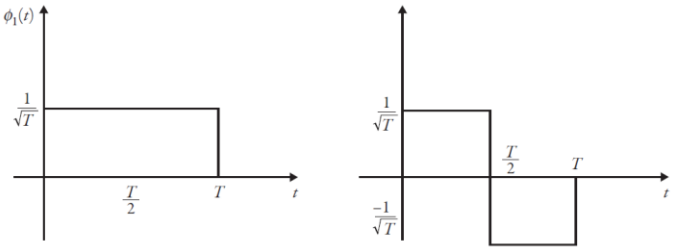
Course Code: EC302

Course Name: Digital Communication

Max. Marks: 100		Duration: 3 Hours

PART A

		Answer any two full questions, each carries 15 marks	Marks
1	a)	Proof-8	(8)
	b)	Mean square Value= 13	(4)
	c)	$G(f) = \text{rect}\left(\frac{t}{100}\right) * \text{rect}\left(\frac{t}{100}\right)$ 	(3)
2	a)	Impulse response-3, frequency response-3	(6)
	b)	Frequencies appearing the output of LPF are 180, 200, 300, and 320 Hz	(5)
	c)	Line coding schemes-4	(4)
		OR	
3	a)	Raised cosine spectrum, Expression in frequency domain-2, Time domain-2	(4)
	b)	bit rate for DM, $r_{DM} = 604$ kbps. $r_{PCM} = 64$ kbps. Thus, to transmit the same voice signal, DM needs a very large bit rate. Hence, PCM is chosen for this application.	(5)
	c)	Slope Overload Error and Condition for avoiding SoE -4, granular noise-2	(6)
		PART B	
		Answer any two full questions, each carries 15 marks	

4	a)	 Fig. 6.9 Plot for $\phi_1(t)$ and $\phi_2(t)$	(7)
	b)	Mean-2, variance-3	(5)
	c)	MAP rule-1.5, ML Rule-1.5	(3)
5	a)	BER for QPSK-2, $\text{BER} = \frac{1}{2}\text{erfc}\left(\sqrt{\frac{E_b}{N_0}}\right)$, Derivation-6	(8)
	b)	Constallation diagram for QPSK-2, QPSK generation-2, QPSK detection-3	(7)
6	a)	Explanation-3 Derivations-5	(8)
	b)	BER for BFSK-2, $P_e = \frac{1}{2}\text{erfc}\left(\sqrt{\frac{E_b}{2N_0}}\right)$, Derivation-5	(7)
		PART C	
		Answer any two full questions, each carries 20 marks	
7	a)	Block diagram for FHSS-3, Explaination-3, SHFSS-2, FHFSS-2	(10)
	b)	Jamming Margin-4	(4)
	c)	(a) PN sequence length $= 2^m - 1 = 2^{10} - 1 = 1023$ (b) Chip duration, T_c $= \frac{1}{10^7} = 0.1\ \mu s$ (c) Time period of PN sequence, T $= 1023 \times 0.1\ \mu s = 102.3\ \mu s.$	(6)
8	a)	flat fading-2.5, frequency selective fading-2.5	(5)
	b)	Different diversity techniques-10	(10)

	c)	$\text{PG} = \frac{T_b}{T_c} = \frac{R_c}{R_b}$ $= \frac{12\times10^6}{6\times10^3} = 2000$ $(\text{PG})_{\text{dB}} = 10\log_{10} 2000$ $= 33 \text{ dB}.$ $\text{Jamming Margin}, (\text{JM})_{\text{dB}} = (\text{PG})_{\text{dB}} - 10\log\left(\frac{E_b}{N_0}\right)$ $= 33 - (\text{SNR})_{\text{dB}}$ $= 33 - 10$ $= 23 \text{ dB}.$	(5)
9	a)	Block diagram for Rake Receiver-5, Explanation-5	(10)
	b)	Block diagram for OFDM-4, Explanation-6	(10)
		****	