A Constituent Institution of Manipal University V SEMESTER B.TECH (BME) DEGREE MAKE-UP EXAMINATIONS DEC/JAN 2016-17 SUBJECT: TELEMEDICINE (BME 3105) (REVISED CREDIT SYSTEM) Saturday, 31 st December 2016: 2 PM to 5 PM					
TIM	1E: 3 l	HOURS MAX. M	ARKS: 100		
An	swer A	Instructions to Candidates: ALL questions			
1.	(a)	(i) Write a note on the nyquist bit rate for a noiseless channel and the Shannon capacity for a noisy channel.	(5)		
		(ii) Consider a noiseless channel with a bandwidth of 3000Hz, transmitting a signal with 2 levels. What is the maximum bit rate?	(2)		
	(b)	Write a note on infrared communication. Mention one application of this communication media.	(3+1)		
	(c)	(i) Write a note on circuit switched network and give one application of this	(4+1)		
		(ii) Differentiate BAN from LAN.	(4)		
2.	(a)	(i) Explain how a FM signal can be generated using a phase modulator.	(4)		
		(ii) Consider an angle-modulated signal generated by frequency-modulation process: $V_{FM}(t) = 20 \cos [2\pi 10^6 t + 0.1 \sin (10^4 \pi t)]$. Given $k_f = 10\pi$, derive the expression for the modulating signal. [Assume $V_m(t) = V_m \cos (10^4 \pi t)$]	(5)		
	(b)	(i) Define modulation. Explain the need for modulation.	(1+5)		
		(ii) A carrier signal having 10V peak amplitude is amplitude modulated by three different modulating frequencies with peak amplitude levels of 2V, 3V and 4V respectively. Compute the modulation index of the resultant complex AM signal.	(3)		
	(c)	What is wide band FM? What is the important property of wide band FM.	(2)		

3.	(a)	Explain the process of generation of Differential phase shift keying signal.	(5)
	(b)	Explain the process of PTM generation.	(6)
	(c)	(i) Consider a pulse amplitude modulated-Time Division Multiplexed (PAM-TDM) system. There are five messages multiplexed in the system and the time period of one cycle is 1msec. (i) Assuming the pulse width to be 150µsec, find the guard time. (ii) Maintaining the same guard time, if there is a need to transmit 10 PAM messages (time multiplexed), how narrow should the pulses	(3+3)
		be? (ii) Differentiate PAM, PWM and PPM.	(3)
4.	(a)	Write a note on HL-7 standard used in healthcare.	(4)
	(b)	(i) Explain the process of frequency division multiplexing.(ii) Five channels each with a 100 KHz bandwidth are to be multiplexed together. What is the minimum BW of the link if there is a need for a guard band of 10KHz between the channels to prevent interference?	(5) (4)
	(c)	Explain in detail any four wireless networks and mention any one application of each.	(7)
5.	(a)	(i) What are the software threats that can be encountered on the computerized patient data? Write a note on the commonly used security devices.	(3+3)
		(ii) Differentiate monoalphabetic from polyalphabetic ciphers and give an example for each.	(3)
	(b)	Write a note on telepathology.	(6)
	(c)	Explain the public key cryptography in detail.	(5)