Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

V SEMESTER B.Tech (BME) DEGREE END SEM EXAMINATIONS NOV/DEC 2016

SUBJECT: TELEMEDICINE (BME 3105)

(REVISED CREDIT SYSTEM)

Tuesday, 29th November 2016: 2 PM to 5 PM

TIME: 3 HOURS **MAX. MARKS: 100**

Instructions to Candidates:

Answer ALL questions

1.	**(a)**	(i) A digitized voice channel is made by digitizing a 4 KHz BW analog voice channel. The voice signal is sampled at the nyquist rate and each sample is represented by 8 bits. What is the required bit rate?	**(2)**
		(ii) Differentiate analog and digital transmission.	**(4)**
		(iii) What is the data communication equipment (DCE) required to transmit a digital data over an analog communication channel?	**(1)**
	(b)	(i) Define the following terms: Throughput of the network ; Latency & Jitter.	**(3)**
		(ii) If the signal has a power of 2mW at the beginning of a cable, what is the power of the signal at 5Km. [Given: the loss in the cable is -0.3db/Km].	**(2)**
		(iii) Explain with examples the different signal impairments that can affect the signal as it travels through the transmission media.	**(5)**
	(c)	Give a comparison of the different guided media.	**(3)**
2.	**(a)**	(i) Give reason and explain which type of AM modulation would be ideal for the transmission of voice.	**(2)**
		(ii) Write a note on each of the following propagation methods: Ground wave propagation; sky wave propagation & Line of sight propagation.	**(3)**
	(b)	(i) Calculate the maximum amplitude of the modulated wave for each of the following conditions of the modulation index: m=1; m=0.5 & m=0. [Consider the amplitude of the modulating signal and the carrier to be A_m & A_c respectively and $A_m=A_c$]. Also, draw the corresponding modulated waves.	**(4)**
		(ii) Explain the process of detection of AM-DSB-FC using envelope detector.	**(5)**

	(c)	(i) An FM modulator operates at carrier frequency of 500 KHz with frequency sensitivity of 1.5KHz/V. A PM modulator also operates at the same carrier frequency with a phase sensitivity of 0.75 rad/V. If both FM and PM modulators are modulated by the same modulating signal having peak amplitude of 2V and modulating frequency of 2 KHz, then show that frequency modulation index and phase modulation index have the same values.	**(3)**
		(ii) Differentiate NBFM from WBFM.	**(3)**
3.	**(a)**	(i) How is pulse modulation different from analog modulation?	**(1)**
		(ii) Explain the process of PTM detection	**(6)**
	(b)	(i) Explain in detail, the steps in the PCM transmitter. Mention the advantages and disadvantages of increasing the quantization levels in the transmitter.	**(4+2)**
		(ii)An audio signal is required to be digitally transmitted with a sampling rate of 40 KHz and 14 bits per sample using PCM system. Calculate the minimum transmission data rate needed in the communication channel.	**(2)**
	(c)	(i) Draw the ASK waveform for the following binary data: 0 1 1 0 1 0 1	**(2)**
		(ii) Explain the non-coherent detection method for BASK	**(3)**
4.	**(a)**	(i) What is the need for multiplexing? Explain the process of Time-Division multiplexing in detail.	**(1+5)**
		(ii) Consider three voice signals, each having frequency range of 300 Hz- 3400 Hz, are frequency division multiplexed using 20KHz, 24KHz and 28KHz analog carrier signals. Find the minimum channel bandwidth of the resultant FDM signal, assuming 1KHz as guard band between the channels to avoid interference.	**(3)**
	(b)	Write a note on the following wireless networks and give one application of each. (i) Bluetooth (ii) Infrared (iii) Broadband wireless Access	**(6)**
	(c)	What the two main standards used in healthcare? Explain any one in detail.	**(1+4)**
5.	**(a)**	(i) What ate the important aspects in data security?	**(2)**
		(ii) Define encryption. Differentiate ‘private key’ and ‘public key’ encryption.	**(1+3)**
		(iii) Explain in detail, how digital signature can be used for authentication of data.	**(6)**
	(b)	What are the different parameters that can be used for biometric security & identification? Explain any one in detail.	**(3)**
	(c)	Explain the application of telemedicine in safeguarding the elderly and aging population.	**(5)**