Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

(A constituent unit of MAHE, Manipal 576104)

V SEM B. Tech. (BME) DEGREE MAKE-UP EXAMINATIONS DEC/JAN 2018-19

SUBJECT: TELEMEDICINE (BME 3105)

(REVISED CREDIT SYSTEM)

Wednesday 26th December 2018: 2 PM to 5 PM

TIME: 3 HOURS **MAX. MARKS: 50**

Instructions to Candidates:

1. Answer ALL questions.
2. Draw diagram wherever necessary.

1. (a) (i) Calculate the theoretical highest bit rate of a regular telephone line, having bandwidth of 3000 Hz. Assume the SNR of the channel to be 3162. Calculate the channel capacity. (2+3)
(ii) Give a comparison of the different guided media.

(b) Explain the effect of frequency error in the locally generated carrier of the coherent detector used in the detection of SSB signal. Also, give the solution to the problem. (5)

2. (a) (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. (3)

(ii) Explain the process of detection of AM-DSB-FC using envelope detector. (3)

(b) (i) Differentiate NBFM from WBFM. (2+2)

(ii) A sinusoidal modulating wave of amplitude 5 V and frequency 1 KHz is applied to a frequency modulator. The frequency sensitivity of the modulator is 40 Hz/V. The carrier frequency is 100 KHz. Calculate a) Frequency deviation. b) Modulation index c) Bandwidth.

3. (a) A 4 KHz voice signal is to be digitally transmitted with a standard word size of 8 bits. Calculate the maximum transmission bit rate for telephony system using Pulse Code Modulation. (3)

	(b)	(i) Explain the method of generating a DPSK signal. In this context, assume the binary message data to be 11010010 and the initial bit to be 1.	(6)
		(ii) Sketch the output of the DPSK detector.	(1)
4.	(a)	Differentiate Local Area Network (LAN) from Wide Area Network (WAN)	(3)
	(b)	(i) What are the risks involved while using technologies for safeguarding medical data. Also, mention the important aspects in data security?	(2+2)
		(ii) Define encryption. Differentiate 'private key' and 'public key' encryption.	(1+2)
5.	(a)	What are the two main standards used in healthcare? Explain any one in detail.	(5)
	(b)	Explain the application of telemedicine in safeguarding the elderly and aging population.	(5)