Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

(A constituent unit of MAHE, Manipal 576104)

V SEMESTER B. Tech. (BME) DEGREE MAKE-UP EXAMINATIONS DEC/JAN 2019-20

SUBJECT: TELEMEDICINE (BME 3105)

(REVISED CREDIT SYSTEM)

Tuesday, 24th December 2019: 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) Give a comparison of the different types of guided media used in communication.	4
		(ii) A digitized voice channel, is made by digitizing a 4 KHz bandwidth analog voice signal. It is recommended to have 256 quantization levels for good voice intelligibility. Determine the bit rate required to transmit this data.	3
	(b)	Identify the mode of propagation which is most suitable for the transmission of signal above 30 MHz. Also, mention the application of this mode of propagation.	3
2.	(a)	(i) Explain the square law detector for the detection of AM-DSB-FC. Also, show that for distortionless recovery of the baseband signal, the modulation index should be very small.	4+1
		(ii) A broadcasting station broadcasts with an unmodulated carrier power of 9 KW. The transmitted power increases to 10.125 KW when the carrier is modulated by a sinusoidal baseband signal. Find the modulation index. If another modulated signal with modulation index 0.4 is added to the previous signal and used to modulate the carrier, find the total radiated power.	3
	(b)	Give reason: VSB modulation is well suited for the transmission of TV signals.	2
3.	(a)	(i) Show that a Phase modulated signal can be obtained using a frequency modulator.	4
		(ii) A 100 MHz carrier is modulated by a sinusoidal signal of frequency 100 KHz so that the maximum frequency deviation is 1 MHz. Find the bandwidth if the modulating signal amplitude is doubled. Calculate the bandwidth if the frequency of the modulating signal is also doubled.	3

(b) Consider $X_c(t) = 10 \cos [10^8 \pi t + 5 \sin 2\pi (10^4) t]$. Calculate the maximum phase and frequency deviation. 3

4. (a) (i) Explain the generation method for the non-coherent version of PSK. 4

(ii) Define CDMA. Illustrate the concept of CDMA with an example. 3

(b) Consider that the maximum frequency in an analog information signal is 3.2 KHz. A binary channel of bit rate 36 kbps is available for PCM voice transmission. Determine the minimum sampling frequency, number of bits required per sample, and the number of quantized levels. 3

5. (a) (i) What are the ethical issues involved in telemedicine? 2

(ii) Explain the following terms with reference to their importance in telemedicine: Firewall; Phisher; Jurisdiction; confidentiality of data; HL7 4

(b) Explain the application of telemedicine in safeguarding the elderly and aging population. 4