Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

(A constituent unit of MAHE, Manipal 576104)

V SEMESTER B. Tech (BME) DEGREE END SEMESTER EXAMINATIONS NOVEMBER 2019

SUBJECT: TELEMEDICINE (BME 3105)

(REVISED CREDIT SYSTEM)

Wednesday, 20th November 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) Explain in detail the causes of signal impairments in the transmission media. (4)

(ii) A video image of size 300 x 200 pixels, having a pixel depth of 8 bits is transmitted at a frame rate of 15 frames/ sec. Determine the data rate required to transmit the data signal. (3)

(b) Differentiate ground propagation from sky propagation mode of communication. Give one application for each of these propagation methods. (3)

2. (a) (i) Identify and explain a linear modulation scheme which is ideal (considering efficient use of bandwidth) for the transmission of voice signals, and explain a method for generating this signal. (2+3)

(ii) The power transmitted by a SSB transmitter is 10 KW. It is required to be replaced by standard AM transmission having modulation index of 0.8 and same power. Determine the power contents of the carrier and each of the sidebands. (3)

(b) Give reason: Envelope detector cannot be used for the detection of DSB-SC modulated wave. (2)

3. (a) (i) Generally, FM is considered as non- linear modulation technique. Under what conditions FM behaves as a linear modulation technique. Explain. (2+3)

(ii) Consider an angle modulated signal

$X_c(t) = 20 \cos [100x10^6\pi t + 5 \sin (2x10^3\pi t)]$ using phase modulation technique. Find the carrier signal frequency and the maximum phase deviation.

(b) (i) Differentiate narrow band FM from Wide band FM. (2+3)

(ii) Consider an analog information signal,

$S(t) = 3 \cos(50\pi t) + 10 \sin(300\pi t) - \cos(100\pi t)$. Find the highest- frequency component present in the signal, the nyquist rate and the Nyquist interval.

4. (a) (i) Explain in detail, the recovery process of Pulse-Time modulated signals. (4+3)

(ii) A television signal having a bandwidth of 4.2 MHz is transmitted using binary PCM system. Given that there are 512 quantization levels, determine the code word length, transmission bandwidth and the final bit rate.

(b) Differentiate Frequency Division multiplexing (FDM) from Frequency Division Multiple Access (FDMA). Mention the drawbacks of the FDMA technique. (2+1)

5. (a) What are the two different standards used in healthcare? Explain the standard used for exchanging clinical data with a suitable example. (1+3)

(b) (i) Mention the drawbacks of symmetric key encryption. Explain how public key encryption can be done along with authentication of data. (1+3)

(ii) Explain the different modalities used in Tele-pathology. (2)