MANIPAL INSTITUTE OF TECHNOLOGY

(A constituent unit of MAHE, Manipal)

## FOURTH SEMESTER B.TECH. (PME) DEGREE END SEMESTER EXAMINATION APRIL/MAY 2019

## SUBJECT: AUDIO AND VIDEO SIGNALS (ECE - 2231)

## **TIME: 3 HOURS**

**Instructions to candidates** 

- Answer **ALL** questions.
- Missing data may be suitably assumed.
- 1A. With the help of block diagram, explain the components and functions of video conferencing system.
- 1B. Define media. What are the different media available? Explain.
- 1C. i) Find the minimum sampling frequency required to sample the signal  $x(t) = 2\cos(1000\pi t) + 4\cos(5000\pi t) + 2\cos(8000\pi t)$ 
  - ii) If this signal is passed through a LPF with cut-off 3kHz, what is the sampling frequency required to sample the resulting signal?

(4+3+3)

MAX. MARKS: 50

- 2A. Explain the speech production mechanism by mentioning the role of each part. Also explain how pitch period can be calculated using the glottal waveform.
- 2B. Obtain the Huffman code for set of symbols (a, b, c, d, e, f) which occur with frequency (44, 12, 13, 5, 9, 27) respectively. What is the amount of compression achieved compared to binary codes?

(5+5)

- 3A. With a block diagram explain the JPEG image compression technique.
- 3B. Explain how data streams can be classified based on the time interval between successive packets.
- 3C. Explain the working of loud speaker.

(4+3+3)

- 4A. Explain the working of 8-bit flash ADC.
- 4B. Consider a document which is to be scanned using a scanner with resolution 120dpi. The first three pages are scanned using colour scanning and next four pages are scanned using gray scale scanning. Assume the size of each page is 15inch x 12inch.
  - i) Find the size of resulting file.
  - ii) If Bi level image compression is used only on last four pages of the document, what will be resulting file size?
- 4C. The sequence  $x = \{1.2, -0.2, -0.5, 0.4, 0.89, 1.3\}$  is quantized using uniform quantizer in the range (-1.5, 1.5) with 4 levels. Write the quantized sequence.

5A. Explain the block diagram of multimedia distributed processing model.

- 5B. What is audio latency? Explain the factors that decide audio latency.
- 5C. Briefly explain any one protocol for multimedia communication over internet.

(4+3+3)

(4+3+3)