Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
A Constituent Institution of Manipal University

VII SEMESTER B.TECH. (COMPUTER SCIENCE AND ENGINEERING)

END SEMESTER EXAMINATIONS, NOVEMBER 2017

SUBJECT: MULTIMEDIA APPLICATIONS [CSE 4004]

REVISED CREDIT SYSTEM
(28/11/2017)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitably assumed.

1A. With neat diagrams, explain the principles of a signal encoder and decoder. **4**

1B. Explain any two QOS parameters associated with each of the following networks.
(i) packet-switched network **3**
(ii) circuit switched network

1C. Assuming the bandwidth of a speech signal is from 50Hz through to 10kHz and that of a music signal is from 15Hz through 20 kHz, derive the bit rate that is generated by the digitization procedure in each case assuming the Nyquist sampling rate is used with 12 bits per sample for the speech signal and 16 bits per sample for the music signal. Derive the memory required to store a 10 minute passage of stereophonic music. **3**

2A Consider the following block of frequency domain values from a video frame arising during MPEG compression:

196	207	1	129
1	7	129	199
11	73	73	194
75	78	139	135

Apply successively to this block:
(i) MPEG quantization using a constant quantization value of 64.
(ii) Zigzag scanning. **3**
(iii) Run length encoding.

2B. With a neat diagram, explain the operation of Predictive DPCM audio coder. **4**

2C. Using Huffman coding, encode the following set of tokens: **3**
AAABDCEFBBAADCDF

3A. Explain the principle of P frame encoding in video compression.
Assume 2 X 2 macroblock is used. For the following macroblock

# # # #
5 3
2 3
5

the corresponding intensities in the reference frame are given as follows:

5 3 6 2
1 4 7 2
4 5 3 3
3 2 3 2

Calculate the motion vector, with complete search within ±1 pixel search window. Indicate all the steps.

3B. Explain the notion of synchronization in correspondence to
(i) Content Relation
(ii) Spatial Relation
(iii)Temporal Relation **3**
with examples.

3C. Differentiate between Intra object and Inter object synchronization **2**

4A. What is synchronization specification? For the multimedia application given in Fig. Q.4.A. give the synchronization specification based on

(i) Global Timer
(ii) Petrinets
(iii) Heirarchical model

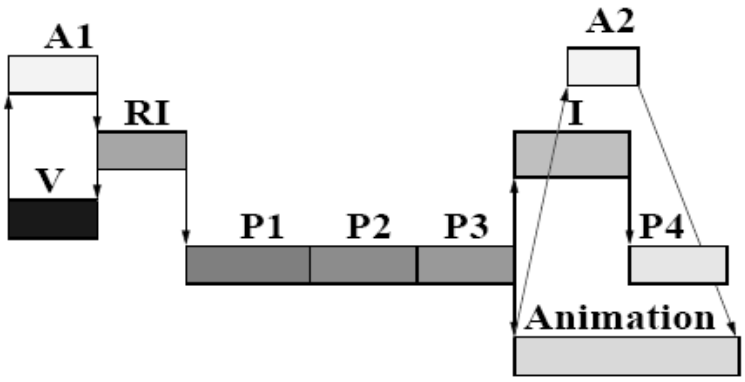

Fig. Q 4 A. **4**

4B. With neat schematic, explain the centralized and replicated Application Sharing architectures. Bring out one advantage and disadvantage of each of the two architectures. **4**

4C. Determine the propagation delay associated with the following communication channels.

(i) a connection through a PSTN of 500 Km
(ii) a connection over a satellite channel of 20000 Km.

Assume that the velocity of propagation of a signal in case (i) is $2*10^8$m/s and in case (ii) is $3*10^8$ m/s **2**

5A. Explain the following broadcast schemes for video on demand
(i) Staggered **5**
(ii) Harmonic

5B. Explain Real Time Control Protocol along with the various types of RTCP packets. **3**

5C. What are the characteristics of multimedia data that necessitates the usage of efficient communication protocols? **2**