Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent institution of MAHE, Manipal)

VI SEMESTER B.TECH. (INFORMATION TECHNOLOGY / COMPUTER AND COMMUNICATION ENGINEERING)

END SEMESTER EXAMINATIONS, APRIL 2018

SUBJECT: PROGRAM ELECTIVE – II: MULTIMEDIA COMMUNICATION

[ICT 4002]

REVISED CREDIT SYSTEM
(24/04/2018)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

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

1A. Using arithmetic encoding, compress the data *ITCCE$*: Also give the binary representation of compressed data. Make use of probability distribution given in Table Q.1A. 5

Table: Q.1A

Character	Probability	Range
C	0.4	[0, 0.4)
E	0.2	[0.4, 0.6)
I	0.1	[0.6, 0.7)
T	0.2	[0.7, 0.9)
$	0.1	[0.9, 1)

1B. Discuss different error resilient and concealment techniques used in multimedia transmission. 3

1C. Compare and contrast between MPEG 1 and MPEG 4 compression technique. 2

2A. Encode and decode **01010001011100000101** using LZW compression technique. 5

2B. With a neat diagram explain 4 layers of synchronization reference model. 3

2C. Give the data stream characteristics of continuous media with respect to time interval between consecutive packets. 2

3A. With a neat block diagram explain JPEG compression technique. 5

3B. Check whether the set of tasks given in Table Q.3B is schedulable using earliest deadline first and rate monotonic scheduling algorithms? If yes, show the schedule diagrammatically (Show schedule till time equal to 200ms). 3

Table: Q.3B

Process	CPU Time in ms	Period in ms	Deadline in ms
A	20	100	100
B	40	100	100
C	20	100	100
D	20	100	100

3C. Define entropy of information? How is it useful in lossless compression? 2

4A. Explain MP3 compression technique with a diagram. 5

4B. Encode and decode the following data using differential pulse code modulation technique. Make use of default predictor function. Quantization function for error is given as $Q(e_n) = 25 + e_n \bmod 75$
Data: 150, 355, 555, 590, 350, 250, 150, 100 3

4C. Why do we need RTCP in multimedia data transmission? Name 5 types of RTCP packets. 2

5A. Explain H.264 compression technique. 5

5B. Using 2D-DCT find DC and highest frequency AC coefficient for the data given in Table Q.5B. Based on DCT value, is it possible to specify the type of signal given in Table Q. 5B? Justify.

Table: Q.5B

50	50	50	50
50	50	50	50
50	50	50	50
50	50	50	50

3

5C. What is Dithering or halftoning? Why do we need it? If 1 bit/pixel quantization is used to specify values of each components of R, G and B, then how many different colors can be produced using block size of 3 x 3 by dithering? 2