

BITS, Pilani – Dubai Campus, Knowledge Village, Dubai.

IV Year SECOND Semester 2005-2006

Degree: B.E. (Hons.) Branch: C.S./EEE/EIE

TEST I Question Paper [Makeup]

Course No : EA UC473 Course Title: Multimedia Computing

Date:

Time: 50 minutes

Total marks: 20

Data provided are complete. **Closed Book.**

1. Explain the DISPLAY of . ROTATION ANIMATION with RASTER SYSTEMS. [5 marks]
2. Explain the action of the following Image Recognition Steps:
a) Labeling b) Grouping c) Extracting [3 marks]
3. Write down the functions of CHANNEL MESSAGES & SYSTEM MESSAGES In a Music Instrument Digital Interface. [5 marks]
4. Distinguish between STRONGLY REGULAR and WEAKLY REGULAR Stream. [2 marks]
5. Explain the operation of *Text and Image CSCW* [computer supported cooperative working]. [3 marks]

6. The following Question refer to Huffman Coding using the data given in the table shown below: [2 marks]

Letter	Frequency	CODE	Bits
C	32	1110	4
D	42	101	3
E	120	0	1
F	24	11111	5
K	7	111101	6
L	42	110	3
V	37	100	3
Z	2	111100	6

Find the CODEs for each of the following words:

Qn. A). KCZ : _____

Qn. B). EVEZV : _____

DECODE each of the following bit strings and get the corresponding words:

Qn. C). 1110111101110100 : _____

Qn. D). 111110101111100 : _____

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TEST I Marking / Answering Scheme

Course No : EA UC473 Course Title: Multimedia Computing

Date: 12/3/06

Time: 50 minutes

Total marks: 20

Data provided are complete. *Closed Book.*

5. MIDI Synthesizer: SND GEN, MicroProc, KB, Cont. Panel, Aux. Cont., Memory
1+1 marks.

6. symbolic rep. Transmission time is short.

Pixmap representation. Longer transmission time. 1+1 marks

7. Update Dynamics: Actual change of shape, color or other properties of the objects
being viewed. 1 mark.

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1. Explain the DISPLAY of . ROTATION ANIMATION with RASTER SYSTEMS.

[5 marks]

Background color settings, Scan convert , Load, Rotate for image 0 and image 1

Steps : 5*1=5 marks.

2. Explain the action of the following Image Recognition Steps:

a) Labeling b) Grouping c) Extracting [3 *1 = 3marks]

a) Edge Detection, what kind of spatial events each pixel participates.

b) Grouping: identifies events by collecting together maximum connected set of pixels participating in the same kind of event.

c) Extracting: computes for each group of pixels a list of properties.

3. Write down the functions of CHANNEL MESSAGES & SYSTEM MESSAGES

In a Music Instrument Digital Interface. [5*1=5 marks]

Description about Channel Voice messages, Channel Mode Messages

System Real-Time messages, System Common Messages, System Exclusive Messages

4. Strongly Regular: Constant data size for all packets

Weakly Regular: Data Size of Packets changes periodically. 2 marks

5. CSCW : Diaram + explanation: 1.5+1.5 marks.

6. Correct Coding and Decoding Steps : 4*0.5=2 marks]

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TEST I Question Paper [Makeup for Makeup Test]

Course No : EA UC473 Course Title: Multimedia Computing

Date: 17/5/06

Time: 8.15-9.05 am

Total marks: 20

Data provided are complete. *Closed Book.*

1. The following character string is to be transmitted using HUFFMAN CODING:

MULTIMEDIADATABASESYSTEMSSOFTWAREENGINEERINGDATAMINING

Construct the HUFFMAN Coding Tree step by step for the letters present in the above string and *determine* the number of bits required to code each letter. [5M]

2. Explain the VARIATION of CONSECUTIVE PACKET AMOUNT
in Data Streams. [3 marks]

3. What is FLICKER EFFECT? What is the function of a
DISPLAY REFRESH BUFFER ? [2]

4. Explain with a diagram the Components of a Speech Transmission System (Source
Coding in parameterized systems) . [4 marks]

5. What is INBETWEEN PROCESS in ANIMATION? Give an example. [2 marks]

6. Explain the operation of MULTIMEDIA ELECTRONIC MAIL
STRUCTURE. [4 Marks]

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Construct the HUFFMAN Coding Tree step by step for the letters present in the above string and *determine* the number of bits required to code each letter. [5M]

Huffman Coding : Table Generation, Initial Tree, Intermediate steps & Final Tree, codes
1 + 1+2 + 1 marks

2. strongly regular, weakly regular, irregular
diagram+description 1.5+1.5

3. Periodic fluctuation of brightness perception, through a slow motion.
Display Refresh buffer eliminates / reduces flicker effect. [1+1]

4. diagram+description: 2+2 marks

5. Inbetween process: composition of frames with intermediate positions between key frames. Motion of a ball. 1+1 mark

6. diagram+description 2=2 marks

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TEST II Question Paper [Makeup] *Marking / Ans Scheme*

Course No : EA UC473 Course Title: Multimedia Computing

Date: 8/5/06 Time: 1.30-2.20 Total marks: 20

Data provided are complete. **OPEN Book.**

1. Explain the elements of the *Multimedia Document Architecture* w.r.t. the following
Application: WEBSITE DEVELOPMENT for an UNIVERSITY. 5 marks.

Presentation Model, Manipulation Model, Representation Model, Links, Content,
Structure, Synchronization: 1+1+1+0.5+0.5+0.5+0.5=5 marks

Emphasis is w.r.t. application.

2. Consider the transmission of a message comprising a string of characters. The probabilities of each character is given below:

$p(A)=0.45$ $p(F)=0.33$ $p(I)=0.12$ $p(R)=0.10$

Using ARITHMETIC CODING,

a) Encode the string FAIR

b) Decode 0.621 [assume 4 character string] [8 M]

Initial Step, successive steps, Coding / Decoding : $2 * (0.5+3+0.5) = 8$ marks

3. Write briefly,

a) three practical applications that make use of LIVE SYNCHRONIZATION.

b) three practical applications that make use of SYNTHETIC

SYNCHRONIZATION..

1.5+1.5 marks.

3 practical applications for each. $6*0.5=3$ marks.

(Conversational services, application involving decoupling of capturing & presentation, application with specification & presentation phases, runtime specification of synchronization and two more apps.)

4. What are the benefits of MPEG PSYCHOACOUSTICAL MODEL ? [2 marks]

MPEG stores only values which humans hear best - doesn't store "softer" sounds near "loud" ones and uses such anomalies that we *perceive* sounds at higher frequencies to be louder.. 1+1 marks

5. The following Table refers to JPEG QUANTIZATION STEP w.r.t. LUMINANCE data. Fill UP the last row entries in your answer sheet. [2 marks]

DCT coefficients before quantization	172	100	84	40	60	100	120	140
Quantization table entries	4	10	4	8	5	20	3	2
DCT coefficients after quantization	43	10	21	5	12	5	40	70

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Comprehensive Examination Question Paper

Course No : EA UC473 Course Title: Multimedia Computing

Date: 01, June, 2006 Thursday Time: 3 hours Total marks: 60

Weightage: 40% Data provided are complete. **Closed Book.**

This question paper has 2 pages.

Part A Answer all Questions. 10*2=20 marks

1. Distinguish between CONTINUOUS STREAM and DISCRETE STREAM for a multimedia system. Give an example for each.
2. Complete the following sentences:
The frequency range for HUMAN HEARING is _____.
The frequency range for INFRA-SOUND is _____.
3. Mention the names of the major categories of MIDI software applications.
4. A multimedia presentation has 30 minutes of CD-Quality Digital Audio [Sampling Rate=44.1 KHz, 16 bit resolution and stereo] in .wav files. What is the storage required for these files in MB?
5. Distinguish between MOTION DYNAMICS and UPDATE DYNAMICS.
6. Write the equations corresponding to the component division for YUV signal.
7. Draw the Class Hierarchy Diagram for MHEG objects.
8. What is MULTI-DOMAIN RELATION in a multimedia user interface ?
9. What is Persistence of Data in a Multimedia Database management System ?
10. The following is the quantized sequence of Samples for an audio signal.

22, 24, 24, 28, 28, 28, 25, 26, 26, 26, 21, 19, 20, 20, 22, 24, 24, 24, 23, 24, 20, 16, 10, 10, 8, 11, 6, 9, 9, 12, 15, 19

Encode the quantized sequence using DPCM.

Part B. Answer all questions. 1*10=10 marks

11. Explain with appropriate diagrams the steps involved in JPEG compression process in the lossy sequential DCT-based mode (baseline process).

PART C Answer all questions.

6 * 5 = 30 marks

12. Explain with appropriate diagram, the functions of MOVIE TOOLBOX, IMAGE COMPRESSION MANAGER and COMPONENT MANAGER in

QUICKTIME.

[5 marks]

13. Explain the requirements for **Lip Synchronization** with suitable diagrams.

[5 marks]

14. Draw the **diagrams** for INTERACTIVE TELEVISION application using **cable distribution network** and **satellite/terrestrial broadcast network**. [5 marks]

15. Discuss briefly the basic features and principles of CD-MO (compact disk magneto optical) basis .

[5 marks]

16. Explain the basic features of Haptic Displays and Auditory Displays. [5 marks]

17. a) Distinguish between BITMAP and VECTOR GRAPHICS. [2 marks]

b) A photograph of (9 X 12 inches) is scanning in 300 dpi resolution and 8 bit colour. The image is then saved in a JPEG file with 1:20 compression ratio. It is then used on a web page. If a viewer connecting to internet uses a modem of transfer rate 256 Kilobits / sec., how long will it take to download the compressed image to his/her computer? [3 marks]

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TEST II Question Paper

Course No : EA UC473 Course Title: Multimedia Computing

Date: 30, April, 2006 Sunday Time: 50 minutes Total marks: 20

Data provided are complete. **OPEN Book.**

1. a) Draw the TIME DIAGRAM for an INTERACTIVE MULTIMEDIA PRESENTATION on VIRTUAL TOUR of an UNIVERSITY which offers undergraduate degree programmes in Engineering. The tour is expected to highlight facilities, courses in each engg. discipline & university's achievements. [3 M]
- b) Describe the CONTENT, BEHAVIOUR, USER INTERACTION and CONTAINER for the above mentioned multimedia application (1 a). [3 M]
2. What are the major influencing factors for LIP SYNCHRONIZATION? [3 M]
3. Consider the transmission of a message comprising a string of characters. The probabilities of each character is given below:
 $p(A)=0.40$ $p(F) = 0.30$ $p(I) = 0.20$ $p(R) = 0.10$
Using ARITHMETIC CODING,
a) Encode the string AIR
b) Decode 0.639 [assume 3 character string] [6 M]

4. Find SSD [sum of squared differences] correlation and SAD [sum of absolute differences] correlation for the following data pertaining to MPEG P-Frames:

MATCH WINDOW [macroblock]	SEARCH WINDOW
6 9 6 8	6 9 5 9
5 4 8 6	4 6 7 6
9 10 9 2	10 9 10 3

[3M]

5. The following problem relates to the dimensions of a compressed image using JPEG format:

You are given the following data: $X_{max} = 1024$ pixels ; i.e. the maximum of all X_i .
 $Y_{max} = 768$ pixels; i.e. the maximum of all Y_i .
 $H_{max} = 4$ i.e. Maximum Horizontal sampling ratio.
 $V_{max} = 4$ i.e. Maximum Verical sampling ratio.

Now calculate (X_i, Y_i) for each of the following pairs of (H_i, V_i) :

H_i	V_i	X_i	Y_i
2	1		
4	1		
2	4		
1	2		

Here, (H_i, V_i) refer to relative horizontal and vertical sampling ratio for each component. [2 marks]

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Date: 12/3/06

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Data provided are complete. *Closed Book.*

1. The following character string is to be transmitted using HUFFMAN CODING:

ENTERTAINMENTAPPLICATIONSINTERACTIVE

Construct the HUFFMAN Coding Tree step by step for the letters present in the above string and *determine* the number of bits required to code each letter. [5M]

2. Tabulate the main characteristics of following Transmission Modes w.r.t. transmission of multimedia information:

a) Asynchronous b) Synchronous c) Isochronous

Mention an example application in each category. [3 M]

3. Explain with appropriate diagrams the basic operation of MOVIE/VIDEO-ON-DEMAND.

[5 marks]

4. Derive the time required to transmit the following digitized images at both 512 kbps and 2 Mbps:

a) a (640 X 480 X 8) VGA compatible image.

b) a (1024 X 768 X 24) SVGA compatible image. [2 marks]

5. Mention the names of the common components of a MIDI Synthesizer device.

[2 marks]

6. What approaches are used for the *transmission of animation* over computer networks?

[2 marks]

7. What is Update Dynamics?

[1 mark]