BITS, Pilani – Dubai Campus, Knowledge Village, Dubai.
IV Year First Semester 2006-2007
Degree: B.E. Hons. Branch: C.S. / EIE / EEE
QUIZ II **(Set A)**
Course No : EAUC473 Course Title: MULTIMEDIA COMPUTING
Date: 12, Dec., 2006 Tuesday Time: 1.30-2.00 noon Total marks: 10
Weightage: 10% Venue : 204 ***Closed Book***.
Use the backside of this sheet only for rough work.

IDNO: Name:

Write answers in the space provided in question paper. Answer all questions.
Note:_____ means one or more words to be filled within a line.

1. In WME, a multimedia file Input/Output service provides

---------- ---------- and ---- ---------- ----------

file I/O.

[1 M]

2. In WME, mention any two device drivers available for multimedia applications.

[1 M]

3. What is the function of SEQUENCE GRABBER component in QUICKTIME?

[1 M]

4. In Quick Time, ---------- - allows you to define and register types of components and communicate with components using a standard interface.

[0.5 M]

5. The standard data type of QUICKTIME is ---------- ----------. [0.5 M]

6. What is a *heterogeneous query* over a multimedia database ? Give an example. [1 M]

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7. In QUICKTIME, ---------- provide timing services defined for QuickTime applications. [0.5 M]

8.MDBMS's _____ and

---

allow for new storage technologies to be used without changing the current multimedia database applications. [1 M]

9. An application gains access to the capabilities of QuickTime by calling functions in the

---. [0.5 M]

10. What is a Long Transaction in MDBMS ? Give an example. [1 M]

11.What is descriptive search method in a MDBMS? Give an example. [1 M]

12. In WME (windows multimedia extensions), what is the function of a MCI (media control interface) device driver ? [1 M]

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IV Year First Semester 2006-2007

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Comprehensive Examination Question Paper

Course No : EA UC473 Course Title: Multimedia Computing

Date: 28/12/06 Time: 10 am – 1 noon Total marks: 60

Weightage: 40% Data provided are complete. ***Closed Book***. This qn paper has 2 pages

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

1. What is PRESENTATION & REPRESENTATION MEDIUM ?
2. What is a Macro-Block in MPEG-1?
3. What is an INBETWEEN PROCESS in ANIMATION?
4. What is PREFIX PROPERTY in Huffman Coding ? Write the formula to find the expected number of bits per letter in Huffman Coding.
5. A photograph of (**6** X **8** 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?
6. **Find** the **AUDIO DATA RATE** in KB/sec. for **CD-DA** for the following input data:
   - 16 BIT Linear Quantization
   - 2 channels
   - 44100 samples / second for each channel.

   What will be the TIME required to transmit a **2 minutes** portion of the above audio data using a Transmission Channel of bit rate **2 Mbps**?
7. Distinguish between COMPONENT VIDEO and COMPOSITE VIDEO.
8. Draw the TREE Diagram pertaining to CLASS HIERARCHY of MHEG objects.
9. What is *Multi-Domain Relations* in multimedia user interface? Give examples.
10. What are Haptic Displays? Where are they used?

Part B. Answer all questions.

11. Explain (with diagrams for run-length possibilities) the basic principle of coding in Digitized Documents using PASS MODE, VERTICAL MODE and HORIZONTAL MODE. [6 marks]

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

p(**T**)=0.15 p(A) = 0.25 p(M) = 0.10 p(R) = 0.30 p(S)=0.20

Using ARITHMETIC CODING,

a) Encode the string **RAST**

b) Decode 0.4051 [into a 4 letter string] [7 marks]

P.T.O.

13. Explain with appropriate diagrams the basic operation of Text & Image CSCW [computer supported cooperative work].

[5 marks]

14. Explain the **basic principle** of the *Magnetic-Optical Method* and **Areas** of the CD-MO [compact disk magneto optical]. [5 marks]

15. Discuss Pointer Synchronization w.r.t. CSCW (computer supported co-operative work) application. [5 marks]

16. a) DRAW the block diagram (schematic) corresponding to JPEG ENCODER. (diagram alone is sufficient) 3 marks.
b) Explain Minimum Coded Units with an example with four components as derived from the JPEG standard. 3 marks.

17. What are the advantages of Scalable Compression in MPEG-2? 2 marks

18. Mention the *application areas* (functional partition) based on *Content-Based Interactivity, Universal Access & Improved Coding Efficiency* in MPEG-4. 2 marks.

19. Mention the design issues relating to MULTIMEDIA AUTHORING. 2 marks.

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IV Year First Semester 2006 -2007

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TEST II Question Paper

Course No : EA UC473 Course Title: Multimedia Computing

Date: 07, Dec., 2006 Thursday Time: 8.00 am.- 8.50 am Total marks: 20

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

Text, References, Lecture Notes allowed..

1.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 [macro-block]				SEARCH WINDOW			
8	5	7	8	7	6	5	8
6	7	9	2	5	7	8	3
9	8	9	3	10	7	10	4
10	11	6	5	9	10	6	6

[3M]

2. An University has campuses located at 6 locations in the world. The students studying the course MULTIMEDIA SYSTEMS in each campus wish to interact with each other and also interact with the concerned Course Faculty in each campus. The course lecture is conducted in the conference room in each campus. Assume that each faculty takes turns (round robin fashion or cyclic) to deliver the lecture. Each conference room has full fledged support for MULTIMEDIA HARDWARE, SOFTWARE and MULTIMEDIA CONFERENCING SYSTEM. A high speed communication network connects all the 6 campuses.

As a creative Multimedia Systems Designer, **EXPLAIN** in detail the aspects of LIVE SYNCHRONIZATION and SYNTHETIC SYNCHRONIZATION for the above mentioned application. [3 + 3 marks]

3. Given a scanned line of PELS (black or white), assuming a one-dimensional coding scheme, **find** the CODE-WORD for each of the following situations, (You can refer the table w.r.t. Group 3 and Group 4 facsimile conversion codes) in a digitized document. [3 marks]

Number of PELS (run-length)	TYPE	CODE-WORD
327	BLACK	
2700	WHITE	
2750	BLACK	
1745	WHITE	

P.T.O.

4. What is the purpose of SCALABLE MODES in MPEG-2 ? Differentiate between the various SCALABILITY MODES of MPEG-2. [3 marks]

5. Mention an example application for each of the following MPEG-4 AUDIO-VISUAL Scenes:

a) 2D audio-visual scene involving the contents namely, *audio, video, still images* and *scrolling text.*

b) 3D audio-visual scene involving the contents namely, *audio, video* and *3D objects.*

[2 marks]

6. In what layer of MPEG-1, you can distinguish between the *order of images in a data stream* and the *order during display* ? [1 mark]

7. Mention an example application for each of the *Multiple Communication Relations* [i.e. 1:1, n:1, 1:n, n:m], *for* establishing synchronization in a distributed environment. [2 marks]

Figure 3.11 ITU–T Group 3 and 4 facsimile conversion codes: (a) termination-codes, (b) make-up codes.

(a)

White run-length	Code-word	Black run-length	Code-word
0	00110101	0	0000110111
1	000111	1	010
2	0111	2	11
3	1000	3	10
4	1011	4	011
5	1100	5	0011
6	1110	6	0010
7	1111	7	00011
8	10011	8	000101
9	10100	9	000100
10	00111	10	0000100
11	01000	11	0000101
12	001000	12	0000111
13	000011	13	00000100
14	110100	14	00000111
15	110101	15	000011000
16	101010	16	0000010111
17	101011	17	0000011000
18	0100111	18	0000001000
19	0001100	19	00001100111
20	0001000	20	00001101000
21	0010111	21	00001101100
22	0000011	22	00000110111
23	0000100	23	00000101000
24	0101000	24	00000010111
25	0101011	25	00000011000
26	0010011	26	000011001010
27	0100100	27	000011001011
28	0011000	28	000011001100
29	00000010	29	000011001101
30	00000011	30	000001101000
31	00011010	31	000001101001
32	00011011	32	000001101010
33	0010010	33	000001101011
34	00010011	34	000011010010
35	00010100	35	000011010011
36	00010101	36	000011010100
37	00010110	37	000011010101
38	00010111	38	000011010110
39	00101000	39	000011010111
40	00101001	40	000001101100
41	00101011	41	000001101101
42	00101011	42	000011011010
43	00101100	43	000011011011
44	00101101	44	000001010100
45	00000100	45	000001010101
46	00000101	46	000001010110
47	00001010	47	000001010111
48	00001011	48	000001100100
49	01010010	49	000001100101
50	01010011	50	000001010010
51	01010100	51	000001010011
52	01010101	52	000000100100
53	00100100	53	000000110111
54	00100101	54	000000111000
55	01011000	55	000000100111

(a) cont.

White run-length	Code-word	Black run-length	Code-word
56	01011001	56	0000001101000
57	01011010	57	0000001011000
58	01011011	58	0000001011001
59	01001010	59	0000001010111
60	01001011	60	0000001011100
61	00110010	61	0000001011010
62	00110011	62	0000001100110
63	00110100	63	0000001100111

(b)

White run-length	Code-word	Black run-length	Code-word
64	11011	64	0000001111
128	10010	128	0000011001000
192	010111	192	0000011001001
256	0110111	256	0000001011011
320	00110110	320	0000001110011
384	00110111	384	0000001110100
448	01100100	448	0000001110101
512	01100101	512	0000001101100
576	01101000	576	0000001101101
640	01100111	640	0000001001010
704	011001100	704	0000001001011
768	011001101	768	0000001001100
832	011010010	832	0000001001101
896	011010011	896	0000001110010
960	011010100	960	0000001110011
1024	011010101	1024	0000001110100
1088	011010110	1088	0000001110101
1152	011010111	1152	0000001110110
1216	011011000	1216	0000001110111
1280	011011001	1280	0000001010010
1344	011011010	1344	0000001010011
1408	011011011	1408	0000001010100
1472	010011000	1472	0000001010101
1536	010011001	1536	0000001011010
1600	010011010	1600	0000001011011
1664	011000	1664	0000001100100
1728	010011011	1728	0000001100101
1792	00000001000	1792	0000000001000
1856	00000001100	1856	0000000001100
1920	00000001101	1920	0000000001101
1984	000000010010	1984	0000000010010
2048	000000010011	2048	0000000010011
2112	000000010100	2112	0000000010100
2176	000000010101	2176	0000000010101
2240	000000010110	2240	0000000010110
2304	000000010111	2304	0000000010111
2368	000000011100	2368	0000000011100
2432	000000011101	2432	0000000011101
2496	000000011110	2496	0000000011110
2560	000000011111	2560	0000000011111
EOL	000000000001	EOL	000000000001

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III Year FIRST SEMESTER 2006-2007

Degree: B.E. (Hons.) Branch: C.S.

TEST I Question Paper

Course No : EA UC473 Course Title: Multimedia Computing

Date: 05, Nov., 2006 Sunday Time: 8 a.m.- 8.50 a.m. Total marks: 20

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

Answer all Questions.

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

p(I)=0.22 p(N) = 0.27 p(U) = 0.18 p(X) = 0.33

Using ARITHMETIC CODING, Encode the string **UNIX**

[4 marks]

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

DESIGNANDANALYSISOFALGORITHMSUSINGC

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]

3. 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]

4.Write the equation corresponding to 2D Forward DCT (discrete cosine transformation) in JPEG standard along with meaning of relevant co-efficients/parameters. [2 marks]

5. What are the different types of BUTTONS and MENUS in a multimedia user interface? [2 marks]

6. What is the function of SCRIPT, COMPOSITE & INTERACTION CLASS in MHEG? [2 marks]

7. Write the LZW (Lempel-Ziv-Welsh) COMPRESSION ALGORITHM for encoding an input string. [3 marks]