C6-R4: MULTIMEDIA SYSTEMS

NOTE:

1. **Answer question 1 and any FOUR from questions 2 to 7.**
2. **Parts of the same question should be answered together and in the same sequence.**

Time: 3 Hours **Total Marks: 100**

1.

a) What is meant by static and dynamic media? Give examples of each type of media.
b) Explain the compression methodology used in MPEG-4.
c) Differentiate between inter and intra - object synchronization.
d) Describe various attributes of multimedia systems.
e) Explain card and page based authoring tools.
f) Is the Program Change MIDI message a Channel Message? What does this message accomplish? Based on the Program Change message, how many different instruments are there in General MIDI? And state the number of bits, it requires.
g) Write the advantages and disadvantages of using GIF in animations.

(7x4)

2.

a) How does the human eye sense color? What characteristics of the human visual system can be exploited for the compression of color images and video?
b) Multimedia Databases (MMDBs) have to deal up with the increased usage of a large volume of multimedia data being used in various software applications. Explain the major challenges in designing multimedia databases.
c) Define MIDI. List its attribute. Compare and contrast the use of MIDI and digitized audio in multimedia production.

(5+5+8)

3.

a) Briefly describe, using a suitable diagram if necessary, the MPEG-1 audio compression algorithm, outlining how frequency masking and temporal masking are encoded.
b) Huffman coding is an entropy encoding algorithm used for lossless data compression. Generate binary Huffman tree for frequency (5, 7, 10, 15, 20, 45) and value (1, 2, 3, 4, 5, 6) respectively. Calculate Huffman code for 4 and 6.

(9+9)

4.

a) The Video Compression is possible by eliminating this redundant information from the sequence of incoming video frames. Explain four important types' redundancies in video compression. Explain the Factors associated with video compression.
b) Various codecs are fundamental to many file formats and transmission methods. What is codec? Explain the MP3 encoding process.

(9+9)

5.

a) What is Run Length Encoding? Give example of Run Length Encoding.
b) Explain the real-time challenge in multimedia networking. Draw the format of RTP header fields.
c) What is multimedia? What are the hardware and software requirement that can be used as a terminal to display? What are the hardware and software components needed for development of multimedia system?

(4+6+8)

6.

a) Present and explain a general purpose architecture to support a Multimedia System.

b) Distributed multimedia systems consist of multimedia databases, proxy and information servers, and clients, and are intended to for the distribution of multimedia content over the networks. What are the challenges other than networking issues in distributed multimedia?

c) Explain the JPEG compression scheme. “JPEG isn't always an ideal compression solution.” Justify the statement.

(4+6+8)

7.

a) A major distinction of VR (Virtual Reality) systems is the mode with which they interface to the user. Describe some of the common modes used in VR systems.

b) Differentiate between 360° view, virtual reality and augmented reality.

c) What is the need of Orientation Tracking and Simultaneous Localization in VR/AR System? Propose methods to incorporate them.

(4+6+8)