Code: AT65/AE132/AT116   **Subject: MULTIMEDIA SYSTEMS**

AMIETE – ET/IT (Current & New Scheme)

Time: 3 Hours   **JUNE 2017**   **Max. Marks: 100**

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE: There are 9 Questions in all.

- **Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.**
- **The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.**
- **Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.**
- **Any required data not explicitly given, may be suitably assumed and stated.**

Q.1   **Choose the correct or the best alternative in the following:**   **(2×10)**

a. "Temporal redundancy" refers to the fact that
   (A) Neighboring pixels in a frame have varying intensities.
   (B) Neighboring pixels in a frame have similar intensities.
   (C) Pixels in the same location across successive frames have varying intensities.
   (D) Pixels in the same location across successive frames have similar intensities.

b. Video indexing and retrieval problem is addressed by the following standard
   (A) JPEG   **(B)** MPEG-2
   (C) MPEG-4   **(D)** MPEG-7

c. Real-time processing is a tough challenge for
   (A) Video   **(B)** Audio
   (C) Text   **(D)** Animation

d. A monochrome video sequence uses a frame-size of 176 x 144 pixels and is having 8-bits/pixel. It is captured at a frame rate of 10 frames/ sec. The video is transmitted through a leased line of 64 Kbits/ sec bandwidth. The compression ratio would be
   (A) 6.93   **(B)** 3.96
   (C) 9.36   **(D)** 3.69

e. Real time streaming protocol is used
   (A) to control streaming media servers
   (B) for establishing and controlling media sessions between endpoints
   (C) to provide real time control of playback of media files from the server
   (D) All of these

f. The characteristic of the eye to retain the image for a short time after it has been presented is known as :
   (A) persistence of vision   **(B)** learning power
   (C) memory mapped input   **(D)** None of these

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g. The first phase of JPEG is _____.
   (**A**) DCT transformation   (**B**) quantization
   (**C**) data compression   (**D**) None of these

h. _____ encoding is based on the science of psychoacoustics, which is the study of how people perceive sound.
   (**A**) Predictive   (**B**) Perceptual
   (**C**) Both (**A**) and (**B**)   (**D**) None of these

i. _____ audio/video refers to the broadcasting of radio and TV programs through the Internet.
   (**A**) Interactive   (**B**) Streaming live
   (**C**) Streaming stored   (**D**) None of these

j. MIDI files are _____ than CD quality digital audio files.
   (**A**) larger   (**B**) too large
   (**C**) smaller   (**D**) equal

Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.

Q.2 a. What Multimedia Authoring paradigms exist? Describe each paradigm briefly.(**6**)

b. Discuss the categories of sensors that can be used in VRML to obtain input from user.   (**6**)

c. What is a colour look-up table and how is it used to represent colour?   (**4**)

Q.3 a. What characteristics of the human visual system can be exploited in relation to the compression of colour images and video?   (**5**)

b. What is the *YIQ color model* and why is this an appropriate color model used in conjunction with compression methods such as JPEG and MPEG?   (**6**)

c. Write a short note on HDTV.   (**5**)

Q.4 a. Show how you would use Huffman coding to encode the following set of tokens:
            BABACACADADABBCBABEBEDDABEEEBB
   How is this message transmitted when encoded?   (**8**)

b. Briefly state the LZW compression algorithm and show how you would use it to encode the following stream of characters:
            MYMEMYMO
   You may assume that single character tokens are coded by their ASCII codes, as per the original LZW algorithm. However, for the purpose of the solution you may simply output the character rather than the ASCII value.   (**8**)

Q.5 a. Explain briefly why JPEG compression is not always suitable for compression of images that contain sharp edges or abrupt changes of intensity (such as black text on a white background). **(7)**

   b. Briefly explain how the Discrete Cosine Transform Operates and why is it so important in data compression in Multimedia applications. **(9)**

Q.6 a. Explain briefly what motion compensation is used in MPEG video compression. **(5)**

   b. What is the key difference between I-Frames, P-Frames and B-Frames? **(5)**

   c. Discuss H.261 Video Bitsream syntax. **(6)**

Q.7 a. List two psychological phenomena that are exploited in MPEG audio compression. Briefly explain their meanings. **(6)**

   b. Explain the following terms: **(5×2)**
      (i) Texture Coding   (ii) Shape Coding

Q.8 a. Discuss the two types of prediction used in CELP coders. **(7)**

   b. Explain MPEG audio compression algorithm. **(9)**

Q.9 Write brief notes on any **four** of the following: **(4×4)**
      (i) Internet Telephony
      (ii) IP-Multicast
      (iii) RTP
      (iv) RSVP
      (v) Media on Demand