

**AMIETE – ET/IT (Current & New Scheme)**

Time: 3 Hours

**June 2018**

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. The aspect ratio used in NTSC Video is \_\_\_\_\_  
(A) 4:3 (B) 3:4  
(C) 4:3:1 (D) 3:4:1
- b. Which one of the following is a Video Editing Tool?  
(A) Macromedia Fireworks (B) Macromedia Freehand  
(C) Adobe Photoshop (D) Adobe After Effects
- c. A transition with sudden replacement of random pixels in a checkerboard pattern is called  
(A) Dissolve (B) Dither dissolve  
(C) Wipe (D) Interleave
- d. A 640 x 480 grayscale image requires \_\_\_\_\_ Kilo Bytes of storage.  
(A) 526.8 (B) 384  
(C) 300 (D) 307.2
- e. Sampling in the amplitude or voltage dimension is called \_\_\_\_\_.  
(A) Sampling rate (B) Sampling frequency  
(C) Quantization (D) Nyquist frequency
- f. In vector quantization, collection of code vectors forms the \_\_\_\_\_.  
(A) Encoder (B) Code expander  
(C) Decoder (D) Codebook
- g. The unit of SNR is  
(A) Hz (B) dpi  
(C) dB (D) MB

- h. Example for static media is  
 (A) Images (B) Audio  
 (C) Video (D) Animation
- i. RTP runs over  
 (A) UDP (B) TCP  
 (C) IP (D) None of these
- j. Sub band filtering is the process of applying a bank of \_\_\_\_\_ to the analog signal.  
 (A) Median filters (B) High-pass filters  
 (C) Low-pass filters (D) Band-pass filters

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

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- Q.2** a. Describe how colour look-up tables can be used to implement simple computer animations. Illustrate your answer with the following example: In an 7x7 image you have to animate a 3x3 red square moving from left to right at a rate of 2 pixels per frame. The square is centered vertically within the image and the image background is black. (8)
- b. Explain Multimedia Authoring Metaphors and give an example for each. (8)
- Q.3** a. Give four colour models and explain the benefits of using the model by showing a practical application for each model. (8)
- b. Briefly explain how the human visual system senses colour. How is colour exploited in the compression of multimedia graphics, images and video? (8)
- Q.4** a. Prove the following statement: (8)  
 "If bit-depth is increased by 1 during digitization, the signal-to-noise ratio increases by 6 dB"
- b. An analog signal has bandwidth that ranges from 15Hz to 10 KHz. What is the rate of sampler and the bandwidth of band limiting filter required if: (8)  
 (i) the signal is to be stored within computer memory.  
 (ii) the signal is to be transmitted over a network which has a bandwidth from 200Hz to 3.4 KHz.  
 (iii) Assuming that each signal is sampled at 8bits per sample, what is the difference in the quantisation noise and signal to noise ratio expected for the transmission of the signals in (i) and (ii).
- Q.5** a. Briefly explain any four JPEG modes of operation. (8)
- b. Consider the four 3D input vectors  $X_1 = (4,4,5)$ ,  $X_2 = (3,2,5)$ ,  $X_3 = (5,7,6)$ , and  $X_4 = (6,7,7)$ . Find the KLT transform. (8)

- Q.6** a. A multimedia presentation must be delivered over a network at a rate of 1.5 Mbits per second. The presentation consists of digitized audio and video. The audio has an average bit rate of 300 Kbits per second. The digitised video is in PAL format is to be compressed using the MPEG-1 standard. Assuming a frame sequence of: **IBBPBBPBBPBBI.....** and average compression ratios of 10:1 and 20:1 for the I-frame and P-frame, what is the compression ratio required for the B-frame to ensure the desired delivery rate?  
You may assume that for PAL the luminance Signal is sampled at the spatial resolution of 352x288 and that the two chrominance signals are sampled at half this resolution. The refresh rate for PAL is 25Hz. You should also allow 15% overheads for the multiplexing and packetisation of the MPEG-1 video. (8)
- b. List and explain any four optional H.263 Coding Modes. (8)
- Q.7** a. Explain Binary Shape Coding in detail. (8)
- b. Discuss about MPEG-7 Descriptors. (8)
- Q.8** a. Explain the operation of channel vocoder. (8)
- b. Write detailed notes on MPEG-4 Audio. (8)
- Q.9** a. Explain in detail about RTP/RTCP protocols. (8)
- b. Write a brief note on QoS multimedia data transmission, Multimedia service classes, Perceived QoS. (8)