

AMIETE – IT (NEW SCHEME)**DECEMBER 2011**

Time: 3 Hours

Max. Marks: 100

NOTE: There are 9 Questions in all.

- Please write your Roll No. at the space provided on each page immediately after receiving the Question Paper.
- 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. This language is a tool to create 3D environments on the web.

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|--------------------|----------------------|
| (A) VRML | (B) Dreamweaver |
| (C) Adobe Premiere | (D) Macromedia Flash |

b. _____ is an analog process that uses smaller or larger filled circles of black ink to represent shading.

- | | |
|--------------------------|----------------|
| (A) Spatial resolution | (B) Halftoning |
| (C) Intensity resolution | (D) Bitmap |

c. _____ is an image format for digital cameras.

- | | |
|----------|----------|
| (A) GIF | (B) TIFF |
| (C) EXIF | (D) PDF |

d. The _____ come into play when light levels are low and produce an image in shades of gray.

- | | |
|-------------------|------------------------|
| (A) cones | (B) luminance receptor |
| (C) blue receptor | (D) rods |

e. Subtractive color primaries are _____

- | | |
|---------|---------|
| (A) CMY | (B) RGB |
| (C) YIQ | (D) YUV |

f. HDTV has an aspect ratio of _____

- | | |
|----------|----------|
| (A) 9:16 | (B) 16:9 |
| (C) 3:4 | (D) 4:3 |

Code: AT65

Subject: MULTIMEDIA SYSTEMS

- g. If the true frequency is 5.5 kHz, sampling frequency is 8 kHz, what is the alias frequency?
- (A) 11 kHz (B) 16 kHz
(C) 2.5 kHz (D) 13.5 kHz
- h. _____ JPEG delivers low quality versions of the image quickly followed by higher quality passes.
- (A) Hierarchical (B) Sequential
(C) Lossless (D) Progressive
- i. This can be generated using image stitching and warping techniques.
- (A) Sprite Panorama (B) Texture
(C) Synthetic object (D) Mesh
- j. A CD-ROM contains 333000 blocks to be played back in 74 minutes. Calculate the capacity of the CD-ROM when operating in Mode 1.
- (A) 150 KB (B) 650.39 MB
(C) 150 MB (D) 650.39 GB

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

- Q.2** a. Describe different categories of multimedia software tools. (8)
- b. Explain the following popular image file formats:
(i) PNG
(ii) EXIF
(iii) TIFF (8)
- Q.3** a. Describe CIELAB color model for images with necessary figures and equations. (8)
- b. NTSC video has 525 lines per frame and 63.6 μ sec per line with 20 lines per field of vertical retrace and 10.9 μ sec horizontal retrace. Where does the 63.6 μ sec come from? Which takes more time, horizontal retrace or vertical retrace and how much more time? (8)
- Q.4** a. Derive the SQNR in dB for quantization accuracy of N bits/sample using a uniform quantizer with M levels. For AM radio with a mono channel and frequency band of 5500 Hz, calculate the uncompressed data rate if it is coded using 8 bits/sample. (8)

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- b. Explain adaptive Huffman coding algorithm. (8)
- Q.5** a. Describe the various steps of JPEG image compression algorithm with a block diagram. (10)
- b. Consider the four 3D vectors $\mathbf{x}_1 = (4, 4, 5)$, $\mathbf{x}_2 = (3, 2, 5)$, $\mathbf{x}_3 = (5, 7, 6)$, $\mathbf{x}_4 = (6, 7, 7)$. Derive the KLT transform matrix and the transformed vectors using KLT. (6)
- Q.6** a. A video sequence is given to be encoded using H.263 in PB-mode, having a frame size of 4CIF, frame rate of 30fps, and video length of 90 minutes. On average, two I frames are encoded per second. The video at the required quality has an I-frame average compression ratio of 10:1, an average P-frame compression ratio twice as good as I-frame, and an average B-frame compression ratio twice as good as P-frame. Assuming the compression parameters include all necessary headers, calculate the encoded video size. (8)
- b. Describe the different scalabilities in MPEG 2. (8)
- Q.7** a. Explain the following in reference to MPEG 7 video compression standard:
(i) Descriptor (ii) Description Scheme. (8)
- b. What is a hybrid excitation vocoder? Describe MELP technique for audio compression. (8)
- Q.8** a. Describe the basic MPEG audio encoder and decoder with a block diagram. (8)
- b. Explain the following protocols used for communicating multimedia over IP
(i) RTP (ii) RTCP
(iii) RSVP (iv) RTSP (8)
- Q.9** a. Explain the different rendering algorithms for animation. (8)
- b. Explain the working principle of a DVD. Describe the various DVD formats. (8)