



Name :

Roll No. :

Invigilator's Signature :

**CS/M.Tech(MMS)/SEM-1/MMS-103/2009-10
2009**

MULTIMEDIA ENGINEERING & APPLICATIONS

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

Answer any *five* questions taking at least two questions
from each group

(All the answers should be brief and to the point. State your
assumptions, if any clearly)

GROUP – A

1. a) What do you mean by quantization error in analog to digital conversions of signals ? What do you mean by non-linear quantization and what is its application ?

- b) In real world audio signal

$$f(t) = \sum_{h=1}^{\infty} c_h \sin(h\omega t - \phi_h) . \text{ Explain.}$$

- c) What are the roles of the Video Capture Cards in Multimedia Applications ? Compare between linear and animated Multimedia Application. 6 + 3 + 5



2. a) Discuss how the
- i) CMYK
 - ii) YUV and YCbCr colour formats are generated from the RGB colour information. Also specify their need. Why is CMYK also known as subtractive colour model ?
- b) State and explain some of the parameters for the measure of quality for a given compression algorithm.
- c) Assume you have 5 symbols A, B, C, D and E forming a message M . The distribution of probabilities in the message M is as follows : $P(A) = 0.1, P(B) = 0.4, P(C) = 0.2, P(D) = 0.1$ and $P(E) = 0.2$. Construct the Huffman code for the symbols in M . What do you mean by adaptive Huffman Coding ? 5 + 3 + 6
3. a) What do you mean by the spatial frequency of an image ? What are the characteristics of image regions where the spatial frequency are high ?
- b) Discuss on the key steps of JPEG compression of image. 4 + 10
4. a) What do you mean by temporal redundancy in context to video ? What are the significances of I, P and B frames in context to MPEG compression ?
- b) Explain in brief on the block search based motion estimation technique.
- c) Explain the process of linear predictive coding as applied in Audio Compression. 6 + 4 + 4

GROUP – B



5. a) Explain the differences between raster and vector display.
- b) Given the edges defining a polygon and the pixel colours of the polygon, develop an algorithm to fill up the pixels inside the polygon.
- c) Briefly discuss the merits and demerits of your algorithm.
- d) How do you overcome the demerits ? $4 + 4 + 2 + 4$
6. a) What do you mean by transformation of graphics object ?
- b) Why 3×3 matrix representation of any transformation equation is preferable than 2×2 matrix representation ?
- c) Distinguish between emissive and non-emissive display devices.
- d) Briefly discuss the working principle of any non-emissive display device. $3 + 2 + 4 + 5$



7. a) How do you represent spline in computer graphics ?
- b) Briefly discuss the properties of Bezier spline.
- c) What are the advantages of *B*-spline over Bezier spline ? 4 + 6 + 4
8. a) What is rendering ?
- b) How do you render an object using Z-buffer algorithm ? How does it differ from Painter's algorithm ?
- c) How does motion cycling help to create compact animation sequences ? 3 + 6 + 2 + 3

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