



**QUESTION 1: [15 Marks]**

**A. What** are the main types of multimedia data? [2 Marks]

**List** only the factors that affect multimedia content design? [2 Marks]

**B.** If you have image 24 bits per pixel with " 200" pixels width and aspect ratio " 4:3 " **How** many bytes are required for this image storage?

[3 Marks]. **Explain** how median cut algorithm can be used to convert 24 bits per pixel to 256 color image. [3 Marks]

**C.** Dithering is often used when converting grey scale images to monochrome. **Describe** the ordered dithering algorithm. [3 Marks]

**How** Dithering can also be carried out for color printers? [2 Marks]

**QUESTION 2: [15 Marks]**

**A. List** three distinct color models used in video signals [3 Marks]

**What** color models are used for analog video and what are used for digital video? [2 Marks]

**B.** One solution that removes the problems of interlaced video is to deinterlace. **Explain** video interlacing showing its advantages. [2 Marks]

**What** are some of its problems? [2 Marks]

**How** deinterlaced is performed? [2 Marks]

**C. Calculate the data rate,** if NTSC video signal sampled using the following values: 858 pixels per line, 4.2.2 chroma sub sampling and 8 bits color depth. [4 Marks]

**QUESTION 3: [15 Marks]**

**A. What** is meant by the terms Multimedia and Hypermedia? [2 Marks]

**B.** Chroma sub sampling currently used in video signal.

**What** are the benefits of doing chroma sub sampling? [2 Marks]

**Explain** different types of chroma sub sampling [2 Marks]

**Show how** different types of chroma sub sampling affect video transmission. **(how many frames will be sent for every type)** [2 Marks]

**C.** Different color models are often used in different applications.

**What** is the CMYK color model? [2 Marks]

**In which** CMYK color model is mostly used? [2 Marks]

Given a color represented in RGB color space as  $R = 0.2$ ,  $G = 0.6$ ,  $B = 0.3$ ,

**What** is its representation in the CMYK color model? [3 Marks]

#### **QUESTION 4: [15 Marks]**

**A. What** are the advantages of digital video over analog video? [4Marks]

**B.** Audio signal of Telephone sampled at 8 kHz. **What** are the maximum frequency in the input signal that can be fully recovered for this sampling rate? [2 Marks]

**Describe** the theory you use to obtain the result. [3 Marks]

**C. Put True or False and correct the false statement [6 Marks]**

1. Sampling frequency affects the quality of data.
2. HDMI supports RGB color model.
3. GIF standard is limited to 8-bit (256) color images only.
4. Quantization is sampling the analog signal in the time dimension.
5. human visual system is more sensitive to chrominance than luminance.
6. Pro Tools is publishing tool for creating and editing vector graphics.

*End of Examination*  
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