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MANIPAL INSTITUTE OF TECHNOLOGY
MANIPAL
(A constituent unit of MAHE, Manipal)

V SEMESTER B.TECH. (PRINT AND MEDIA TECHNOLOGY)

END SEMESTER EXAMINATIONS, NOV 2018

SUBJECT: COLOR ANALYSIS AND REPRODUCTION [PMT 3103]

REVISED CREDIT SYSTEM
(26/11/2018)

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitably assumed.

1A. Elaborate on the statement: sensation alone is an incomplete event. Define Metamerism. Explain the two types of color constancy.

1B. Brief on the five factors that affect the ability to see color accurately. Explain the genesis of tristimulus values and give the equations.

1C. Define visual acuity of color. Explain the concept of phasic arousal and Tonic arousal. Explain the important distinction between the two photoreceptors.

[03 + 03 + 04]

2A. Elaborate on the significance of colorants. Explain the impact of tone reproduction characteristics on display devices, input devices and output devices.

2B. Identify and explain the following rendering intents: (i) Rendering intent selected when we have a small amount of out-of-gamut colors. (ii) Rendering intent selected when most of the out-of-gamut colors are the significant colors in the image.

2C. Color cannot be regarded as a characteristic feature of an object, as can its shape. Why? Explain the relationship between Pure Hues and Value.
Name the color that will be perceived for the following:
(a) Green and blue light falls on magenta object and viewed under a blue filter
(b) Red and cyan light falls on green object and viewed under a yellow filter
(c) Blue and red light falls on yellow object and viewed under a cyan filter
(d) Yellow and magenta light falls on cyan object and viewed under a magenta filter

[03 + 03 + 04]

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3A. Explain the two kinds of method used for measuring or comparing printed color with a reference color. Schematically represent the CIELUV color space and bring out the difference from its older version.

3B. List eight causes for additivity failure. What are the two measures to obtain a better correlation of dot size to density after considering the proportionality failure? Give reasons for using polar filters in our measurement devices.

3C. List four each pros and cons of the two computer graphic images. Explain color depth and resolution. If the printer resolution is 1500dpi and the image resolution is 150lpi, calculate the required halftone cell matrix to represent graphically the following halftones: 0%, 25%, 50%, 75% and 100%.

[03 + 03 + 04]

4A. Give the three-color Neugebauer equation for green. Give the four-color version of the Neugebauer equations for blue developed by Hardy and Wurzburg.

4B. Explain the relationship between dot gain and ink trap. Discuss the two concepts utilized to improve this relationship.

4C. Define and explain the calculations of CIE tristimulus values X, Y, and Z that quantify the trichromatic characteristics of color stimuli. Explain the Munsell Color System developed by Munsell in 1905.

[03 + 03 + 04]

5A. Explain the influence of optical properties of the printed ink films on the four-process color ink sequence.

5B. “We Cannot Truly Measure Color, only Light. Measuring color is really an oxymoron.” Elaborate on this idea. Define and explain densitometry and density measurement.

5C. The reference color which is out-of-gamut, has the L*a*b* value of 60,60,60. The rendering values for the two engines are as follows: For adobe color engine: L*a*b* values for perceptual is 67,68,68, for saturation is 68,65,67, for relative colorimetric is 66,68,63 and for absolute colorimetric is 66,66,67. For Microsoft color engine: L*a*b* values for perceptual is 67,72,74, for saturation is 74,71,73, for relative colorimetric is 72,73,73 and for absolute colorimetric is 63,63,63. Suggest the best color engine amongst the two and the most suitable rendering intent. Explain the working principle of this best rendering intent selected.

[03 + 03 + 04]