Reg. No.



## V SEMESTER B.TECH. (PRINT AND MEDIA TECHNOLOGY) END SEMESTER EXAMINATIONS, NOV 2019 SUBJECT: COLOR ANALYSIS AND REPRODUCTION [PMT 3103]

REVISED CREDIT SYSTEM (22/11/2019)

Time: 3 Hours

MAX. MARKS: 50

## Instructions to Candidates:

- ✤ Answer ALL the questions.
- ✤ Assume the missing data.
- 1A. The most prestigious Print-Media Award Committee has requested the participants to print the color with CIE L\*a\*b\* values of 65,50,90. This color is out of gamut for both Sneha's and Shreya's presses who are amongst the participants. Sneha uses Adobe Color Engine to manage the out of gamut colors which gives her the following rendering options Perceptual 63,45,72, Saturation 62,47,71, Relative Colorimetric 63,45,75, and Absolute Colorimetric 60,38,65. Shreya uses Microsoft Color Engine to manage the out of gamut colors which gives her the following rendering options Perceptual 63,45,72, Saturation 61,48,71, Relative Colorimetric 63,45,76, and Absolute Colorimetric 59,40,60.
  - a) Name the color allotted by the committee that participant's need to print.
  - b) Rewrite this color mentioned by the committee in CIE LCH color space.
  - c) Which is the best rendering option for Sneha?
  - d) Who wins the best print award?
- **1B.** Define bitmap and vector graphics with pictorial representation. List out three pros and cons each.
- 1C. Elaborate on profile classes and its various classifications.

[04+03+03]

- 2A. For maintaining consistent color reproduction on the press floor, what are the four variable factors that is necessary to control, explain.
- 2B. Elaborate on the following color libraries:a) Trumatchb) Pantone Color Matching System
- **2C.** Explain the genesis of Color Management. Explain the functioning of Color Management Module and discuss why should you care about CMM?

[04+03+03]

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**3A.** On the Christmas eve, dad purchased two set of 150 crayons pastel set and gave both an identical rainbow effect picture to color. Both Sneha and Shreya had to count the number of colors in the picture to pick the crayons from the set. Sneha counted 48 colors while Shreya Counted 63 colors in the picture. They asked their dad to count, and dad said the picture had 54 color. Since they could not decide how many colors were needed they slept. The next day when they held both their rainbow effect picture next to each other, they both were surprised to see that it was not matching anymore.

a) Explain the phenomena that is making them count different numbers in the same picture.

b) Explain the phenomena that made the identical looking picture, not matching the next day.

- **3B.** Bring out the relationship between the red, green, and blue tristimulus values of the original and the cyan, magenta, and yellow halftone dot values of the reproduction for a scanner as per Hans Neugebauer.
- **3C.** Mention the mathematical versions for the following parameters Print Contrast, Tone areas and dot area as per Murray-Davis. Illustrate the test patches/charts needed to measure the process inks for the following parameters Tone reproduction control, dot size, Grey balance, and density.

[04+03+03]

- **4A.** If the printer resolution is 1170 dpi and the image resolution is 130 lpi, calculate the required halftone cell matrix to represent graphically the following halftones: 15%, 25%, 50%, 75% and 85%. Also, represent them with the dot gains of 10% in mid-tones and 15% gain in highlight and shadow areas. Assume halftone shape is square.
- **4B.** Explain the concepts of under color removal (UCR) and gray component replacement (GCR). List four main causes of additivity failure.
- **4C.** Explain the experiment performed (1931 and 1964) by Wright and Guild to assess color vision and conceptualize the standard observer. Define "Standard Observer".

## [04+03+03]

- **5A.** With a neat schematic representation, explain chromaticity diagram. Also give significance of tristimulus values and chromaticity coordinates with respect to chromaticity diagram. Display their mathematical relationship.
- **5B.** Discuss blackbody and color temperature. Mention four examples for color temperature. Bring out the difference between Metameric match and Spectral match.
- **5C.** Explain in detail the retinal photoreceptor that is functioning behind the photopic vision. Mention its functional zone.

[ 04 + 03 + 03 ]