

1A. It was a birthday party, and the hall was decorated using cyan and red lights which were flashing alternatively. Under this SCENARIO what colors are perceived under cyan light and under red light for the following: yellow balloons, red balloons, green balloons and blue balloons. Using spectral energy distribution curves illustrate these 4 balloons under 2 lights.

[04 MARKS]

1B. Discuss the two factors pertaining to color that follow the principle of linear and progressive?

[03 MARKS]

1C. Explain the concept of negative stimuli requirement.

[03 MARKS]

2A. During one of the offline lab sessions in the color science laboratory there was a small power failure and the college generator was also under repair. As it was dark, all students observed a ray of sun light entering the lab through the red curtains and falling on the faculty shirt which appeared reddish now. When faculty asked which color shirt he was really wearing and not what was visible, all students were able to answer correctly but one student who entered the lab just now found it difficult to name the color of the shirt. During the lab, the faculty showed a beautiful printed color image to the students and asked how many colors they could identify in the image. Some said it had 89 colors while a few said 102 colors. A few more argued they could easily see 134 color. Faculty answered that he could perceive 150 color and asked students to try harder.

(a) **IDENTIFY AND EXPLAIN** the phenomena that made all students to identify the correct shirt color

(b) EXPLAIN why the student who was late to lab had difficulty in identifying the shirt color

(c) **IDENTIFY AND EXPLAIN** the phenomena why students could see different colors

(d) Explain a situation/solution where all the above situations could have been avoided.

[04 MARKS]

2B. Explain the lifecycle of CIE x,y Chromaticity Diagram from 1931 to 1976. Convert the following into CIE LCH values : L =54, a =80 and b =7

2C. Discuss CIE Standard Illuminant A, B and C also illustrate them in spectral distribution. What's the difference between Illuminant and Source?

[03 MARKS]

3A. In the color science lab, Batch A and Batch B worked with two different ENGINES when it came to color management. Batch A used Microsoft engine while Batch B used Adobe engine. For the printer profiling experiment, they had to print a unique color with L*a*b* value of 55,75,45, unfortunately an out of gamut color for both batches.

As batch A used adobe color engine, they had the following options available with L*a*b* values for perceptual being 54,70,41, for saturation its 53,74,42, for relative colorimetric its 57,77,48, and for absolute colorimetric its 57,79,44.

Batch B used Microsoft color engine, to get L*a*b* values for perceptual as 53,73,46 for saturation as 54,74,47, for relative colorimetric as 58,76,48, and for absolute colorimetric as 59,78,49.

[show all calculations on paper]

- (a) which is the best rendering intent option for batch A?
- (b) which is the best rendering intent option for batch B?
- (c) which is the overall best ENGINE for this special color?
- (d) which is the overall best rendering option for this unique color?

[04 MARKS]

3B. Give reasons for the following:

- (a) The color of the white point is more important than its density.
- (b) Input devices don't have a color gamut
- (c) profile is only as accurate as the measurements on which it's based

[03 MARKS]

3C. If the offset printing is done using 1350 dpi and the image resolution is 150 lpi, calculate the required halftone cell matrix to illustrate the following halftones: 35%, 45%, 55%, 65% and 75%, Also, represent them with the dot gains of 15% in highlight, midtones and shadow areas. Assume halftone shape is square.

[03 MARKS]

4A. Explain the **THREE** optical properties of the printed ink films which influence the ink sequence. Explain the **FIVE** Production Problem Factors which influence the ink sequence.

[04 MARKS]

4B. Explain the concept behind selecting the screen angles for the process colors.

[03 MARKS]

4C. The organizers of the print award show had given a scenic picture to all participants to be printed. The scenic picture had 6,58,392 color details. To print this picture provided by the organizers, Sneha was using four color Heidelberg Offset Printing Machine which had a gamut volume of 4,66,527 and Shreya was using four color Komori Offset Printing Machine with a gamut volume of 6,47,598.

The gamut for Sneha's Heidelberg Machine (blue) and Shreya's Komori machine (green) is as shown below. The dominant color of the image is plotted in the gamut. [Observe carefully]

Considering the dominant color, Sneha and Shreya decided to keep a healthy competition and match colors to each other. This friendly gesture was also approved by the organizers in view of better international quality.

(a) Name which rendering intent is to be used considering just the overall gamut volume of the machines for both Sneha and Shreya.

(b) Name which rendering intent is to be used considering just the dominant color in the image for both Sneha and Shreya.

(c) Name the rendering intent that's needed for both, considering this friendly gesture.



[03 MARKS]

5A. Explain the relationship between Tack, Absorption, and Time. What is the significance of these factors individually?

[04 MARKS]

- 5B. Identify the type of standard and explain the concepts beneath the statement
- (a) Printing to a prescribed set of density and dot gain conditions
- (b) Setting the press up to the best printing conditions

[03 MARKS]

5C. Bring out the relationship between "EQUAL REFLECTANCE INCREMENTS" and "EQUAL DENSITY INCREMENTS". Also shed some light on Beer's Law and Dichroism.

[03 MARKS]