8.   Differentiate between :   4×5=20

   a)   UCR & GCR.

   b)   Optical metamerism and Geometric metamerism.

   c)   Masstone and Printone.

   d)   Direct Color Separation and Indirect Color Separation.

   e)   Gamut compression and clipping.

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B. PRINT ENGG. PART–I   EXAMINATION, 2007

(2nd Semester)

COLOR THEORIES AND ANALYSIS

Time : Three hours   Full Marks : 100

*Answer any **five** questions.*

1. a)   What are the purpose of using mark ?

   b)   Draw the block diagram of direct color separation and describe how the color correction and contrast correction is done by using two marks in the process ?   5+15=20

2. a)   Deduce Modified Yule-Nielson equation.

   b)   Using the above-mentioned equation, find out the reflection density of a cyan print having 55% dot area. The transmittance of ink is 19%, paper reflectance 92%, internal reflectance 20% and first surface reflection is 4%. 15+5=20

3.   The densities of a set of solid color patches are given in Table 1.

Table 1

	D_r	D_g	D_b
Patch no. 1	0.10	1.26	0.45
Patch no. 2	1.15	0.52	0.25
Patch no. 3	0.07	0.09	1.04

[Turn Over]

a) Identify the cyan, magenta and yellow patch from patch 1, 2, and 3.

b) Deduce marking equation.

c) Find out the amount of cyan, magenta and yellow ink (in term of density) for a particular patch where the original densities are $D_r = 0.96$, $D_g = 1.21$ and $D_b = 0.42$. Use the data of solid patches from Table 1.

d) What is the color of the patch.   2+10+6+2=20

4. a) What are the different color spaces commonly used ?

b) Why L, a, b color spaces are preferred in comparison to other when color management is applied ?

c) How dominant wavelength and excitation purity is found from the spectrophotometric curve of a colorant ?

d) What is the limitation of CIE system ?

e) If the Munsell notation of two colors are $5G\frac{2}{7}$ and $2G\frac{7}{5}$, find out the color difference between this two. Explain the difference of two colors in terms of hue, value and chroma.   2+2+10+2+4=20

5. a) What is the additivity rule and the proportionality rule ?

b) How the halftone structure affects proportionality failure ?

c) What are the factors affecting additivity failure — describe the factors ?

d) How the additivity failure can be minimised ?
     4+4+10+2=20

6. a) What is the utility of color management system ?

b) What are the major components of color management system ?

c) How are the profiles created for scanner and monitor ?

d) What are the two ways of color processing ?

e) What are the different types of rendering intents ?
     4+4+4+4+4=20

7. The curves of absorption and scattering for carbon black, titanium dioxide and two yellow pigments are given in Figure 1 and Figure 2.

a) Define Kubelka-Munk theory of color mixing.

b) Explain why Carbon Black appears yellowish in masstone.

c) Explain why Titanium dioxide appears yellowish in masstone.

d) Why the mixture of Carbon Black and Titanium dioxide appear Bluish ?

e) Why chrome yellow is brighter than Flavanthrone Yellow?

f) If 20% Carbon Black is mixed with 80% Flavanthrone Yellow, what will be the resultant color ?
     4+2+2+2+4+6=20

[Turn Over]