Manipal Institute of Technology, Manipal
(A Constituent Institute of Manipal University)

**II SEMESTER M.TECH (PRINTING AND MEDIA TECHNOLOGY)
END SEMESTER EXAMINATIONS, MAY 2016**

SUBJECT: COLOR MANAGEMENT SYSTEMS [PME 504]
REVISED CREDIT SYSTEM

Time: 3 Hours   MAX. MARKS: 50

Instructions to Candidates:
- ❖ Answer **ANY FIVE FULL** questions.
- ❖ Missing data may be suitable assumed.

1A. Explain Planck's radiation law. Give the simplified versions of the Planck's law when the temperature is very low and very high. **[3]**

1B. Explain the transformation of 1931 CIE Chromaticity diagram to 1976 $u^l v^l$ diagram. **[3]**

1C. Define and explain the principle of Metamerism and color constancy. **[4]**

2A. Explain with a neat diagram how our visual perceptions are initiated and strongly influenced by the anatomical structure of the eye. **[3]**

2B. Explain the experiment conducted to arrive at the Tristimulus values. **[3]**

2C. Explain the following elaborately: **[4]**
   (a) The color and brightness of white point and black point.
   (b) The tone reproduction characteristics of the colorants.

3A. List four different ways of adaptation and explain the operating point of the visual system. **[3]**

3B. Explain the geometry of the Munsell System with a neat schematic representation. **[3]**

3C. Define the two problems caused by the Device Dependent Color Models. How did color management system solve this problem? Explain the genesis of color management systems. **[4]**

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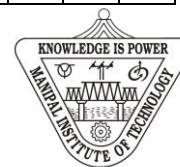
4A.	Explain Monochromats, Dichromats, and Trichromats.	**[3]**
4B.	Two pre-press managers, Mr. Charles and Mr. John are great patrons of Adobe and Microsoft respectively. They had to reproduce a logo in RED color with L*a*b* values 50,80,60 which was unfortunately an out-of-gamut color. Mr. Charles uses only the Adobe CMM engine and the L*a*b* values for the rendering intents are 51,71,46 for perceptual rendering, 51,72,47 for saturation rendering, 51,70,46 for relative colorimetric rendering and 54,74,42 for absolute colorimetric rendering. Mr. John uses only the Microsoft CMM engine and the L*a*b* values for the rendering intents are 50,72,46 for perceptual rendering, 50,70,47 for saturation rendering, 50,71,45 for relative colorimetric rendering and 50,68,52 for absolute colorimetric rendering. Suggest overall which CMM engine is better in this case and then suggest which of the rendering intent is to be selected. (Show all the calculations)	**[3]**
4C.	Define Color Management Module (CMM). When do you care about the CMM? Why do we need CMMs at all?	**[4]**
5A.	"In principle all colors can be matched by a mixture of these primary colored lights in additive principle." But this statement is not entirely true. Why, give reasons?	**[3]**
5B.	Explain three key points which helps in clarifying what illuminance actually measures.	**[3]**
5C.	Explain the concepts of W. D. Wright to mathematically eliminate individual differences or "errors" from the color matching experiments. Also explain the four requirements of the modern perspective towards a color model.	**[4]**
6A.	Explain Wave Theory and the color's spectral signature - wavelength.	**[3]**
6B.	Explain the Swedish Natural Color System.	**[3]**
6C.	Explain the laws of basic colorimetry formulated by G. Wyszecki and W.S. Stiles. Also explain the three ignored considerations towards trichromatic generalization of color matching.	**[4]**