

M.TECH. PRINTING ENGINEERING AND GRAPHIC COMMUNICATION

FIRST YEAR FIRST SEMESTER – 2025

COLOR ANALYSIS AND TONE REPRODUCTION

FULL MARKS 100

ANSWER ANY FIVE QUESTIONS:

1. What are the parameters on which image quality depends on? How lens flare can be reduced? Why correlated color temperature is better measure than color temperature? Draw the flow chart of Color Rendering Index calculation. How special rendering index differ from general Color Rendering index? Compare Munsell Color system with Natural Color System.

6+2+2+ 4+1+5=20

2. Differentiate between

4*5=20

- a) Fechner's law and Steven's law b) Simultaneous contrast and crispening c) Full frame CCD and Interline CCD d) Hunt effect and Stevens effect e) Consumer camera and Professional camera

3. A) Draw the gonireflectometer diagram and briefly describe it. B) How is it different from spectrophotometer with integrating sphere. C) Draw the schematic diagram of spectrofluorimeter and describe it briefly. D) What is fluorescence quantum yield?

10+1 +7+2=20

4. Draw the color encoding flowchart. What are the parameters of optoelectronic conversion function. How Chromatic aberration is measured? What are the factors on which image noise depend on?

5+5+5+5=20

5. a) What will be the resulting luminance for a CRT monitor from R Channel for input digital R value 60 and luminance of red channel at full intensity is 96. Flare may be considered to be negligible. Nonlinear power law factor 1.8. Assume other data as required. b) Between LCD and CRT, which monitor has higher dynamic range and why? c) What are the two common approaches of printer calibration? d) Briefly describe method of constant stimuli threshold technique of psychophysical method. e) How partition scaling is applied in visual psychophysical technique?

4+2+ 4 +5+5=20

[Turn over

6. a) If X, Y, Z value of a color is 79, 56 and 24 respectively, find out $X_{\text{adapted}}, Y_{\text{adapted}}, Z_{\text{adapted}}$ values applying Von Cies Chromatic Adaptation model.

Hunt–Pointer–Estevez transformation matrix (normalized to illuminant D65) are as follows:

0.4002	0.7076	-0.0808
-0.2263	1.1653	0.0457
0.0	0.0	0.9182

Assume other data with proper justification.

- b) Why Fairchild model is better than Von Cies Model? Briefly describe it. 10+10=20
7. A) What are the limitations of CIE Lab as color appearance model? b) What are the major attributes of CIECAM 02 model- briefly describe it. 4+16=20