Ref. No.: Ex/PG/PT/T/124A/2024

M.TECH. PRINTING ENGINEERING AND GRAPHIC COMMUNICATION
FIRST YEAR SECOND SEMESTER EXAM 2024
Paper X
CROSS MEDIA COLOR REPRODUCTION

Time : 3 Hours **FULL MARKS 100**

Answer any *five* questions.

1.a)How the Full frame CCD can be differentiated from Interline CCD? b) Give a brief description of Rendered camera Processing with a flow chart? c) Give an example of an edge-sensing de-mosaicing algorithm for calculating the missing green values. d) If the pixel pitch is X_s, what will be the sampling frequency and Nyquist frequency? e)Why Nyquist frequency is adapted for Bayer pattern. 5+5+4+2+4 =20

2. a) What is the function of integrating cavity in CCD scanners? b) What are the two primary types of sensing technology for scanners? c) How gray balance calibration of scanner is done? d) Describe the working principles of Shepherd's interpolation. e) What is the limitation of Shepherd's interpolation. f) For CMY to Lab transformation, which interpolation do you think is the best and why? Briefly describe it. g) What is the advantage of splines over straight polynomial approximation? 2+2+4+5+1+5+1= 20

3. a) What are the major parameters of CRT calibration? b) Find out the luminance value of red channel for a CRT monitor for input value of red gun 140, K_R=1, D_{offset} = 20, f = 0.16. Assume all other data. c) How the matrix based CRT characterization is done? d)What is the major difference in CRT and LCD calibration? e) What are the parameters of color target design? f)Write down the basic equations for Gray component replacement. 2+ 4+4+4+2+ 4=20

4. a) What are the basic two types of model based printer calibration? b) Describe any one of them. c) What is reflectance of 40% dot area of magenta ink as per Murray Davis equation where magenta ink reflectance is 0.25 and paper reflectance is 0.75? d) What will be the reflectance value of the same 40% magenta ink on the same paper as mentioned in question 4 c) using Yule Nielsen correction factor? e) What is the physical parameter responsible for this correction factor? f) Deduce Kubelka Munk equation for predicting reflectance of colorant. g) Why Neugebauer model is better than Murray Davis equation? 2+5+2+2+2+ 5+2=20

5. Briefly describe one simultaneous gamut mapping algorithm. b) Briefly describe one sequential gamut mapping algorithm. 10+10=20

6. Differentiate between: 4*5=20
a) Visual approach and instrumental approach of color measurement techniques b) Linear least square regression and weighted least square regression c)CCD sensors and CMOS sensors d) Absolute and relative colorimetry e) Empirical characterization and model based characterization

7. Write short notes on 5*4=20

a) Hybrid approach for printer characterization b) High fidelity color Printing c) Multispectral imaging d) Capture Colorimetry model