



**COMSATS University Islamabad, Lahore Campus**  
**Department of Electrical and Computer Engineering**

**LAB Mid Term Examination – Spring 2023**

Course Title:	Digital Image Processing				Course Code:	CPE 415	Credit Hours:	4(3,1)
Instructor	Dr. Ikramullah Khosa				Program Name:	BE Computer Engineering		
Semester:	8 <sup>th</sup>	Batch:	FA19-BCE	Section:	A/B	Date:	13-04-2023	
Time Allowed:	60 Minutes				Maximum Marks:		25	
Student's Name:					Reg. No.	CIIT/ /LHR		
<b><u>Important Instructions / Guidelines:</u></b>								
<ul style="list-style-type: none"><li>This is a closed-book, closed-notes examination.</li></ul>								

**Question 1 (CLO-3, PLO-5, P3)**

**(25 Marks)**

**Write a MATLAB code to perform the following tasks:**

- A. Read two images as image1 and image2. Convert them into gray scale if they are color images. (4 Mark)
- B. Produce a watermark image using image1 and image2 with 70:30 content ratio. Show image1, image2 and the watermarked image with appropriate titles. (5 Mark)
- C. Rotate image1 45 degrees, and horizontally flip the image2 using affine transformation. Show original and processed images (total 4) in a single figure with appropriate titles. (6 Mark)
- D. Perform histogram equalization on image1. Write custom code to compute PDF, CDF and to perform histogram equalization. Show original and equalized images along with their corresponding histograms in a single figure. (10 Mark)