JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2025

B.Tech-6th Semester (ECE)

COURSE CODE (CREDITS):18B1WEC847 (3) MAX. MARKS: 35

COURSE NAME:Medical Image Processing

COURSE INSTRUCTORS:Lt. Praggya Gupta MAX. TIME: 2 Hours

Note: *(a) All questions are compulsory.*

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No	Question	CO	Marks
Q1	What is clustering? list out three clustering based segmentation methods.Given the following 2D data points: (2, 3), (3, 3), (6, 8), (7, 9), (8, 8), perform one iteration of the K-means clustering algorithm with K = 2. Use (2, 3) and (6, 8) as the initial centroids. Show the assignment of points to clusters and compute the new centroids after the first iteration.	CO-3	2+5
Q2	Define Image fusion. What are the main objectives of Image Fusion? Explain the following quantitative parameters to analyze the image fusion process: (a). Entropy (b). Universal Image Quality Index (UIQI) (c).Normalize cross corelation (NCC) (d).Peak Signal to Noise Ratio (PSNR)	CO-4	1+2+4
Q3	Calculate the area and centroid of the following image- 0 0 0 1 0 0 0 1 0 0 1 1 0 0 0 0	CO-3	2+5
Q4	Explain the different methods used for texture description in digital images. Discuss the following approaches in detail: a) Histogram Moment-Based Methods: Explain how statistical moments like mean, variance, skewness, and kurtosis are used to characterize texture.	CO-2	3.5+3.5

	b) Co-occurrence Matrix-Based Methods: Describe the Gray-Level Co-occurrence Matrix (GLCM), its construction, and texture features that can be extracted (e.g., contrast, homogeneity, energy, correlation).		
Q5	Binary image X and structuring element B are given as follows-	CO-3	3.5+3.5

0	0	0	0	0	0
0	0	1	1	0	0
0	1	1	1	1	0
0	1	1	1	1	0
0	1	1	1	1	0
0	0	0	0	0	0

X

0	0	0
1	1	1
0	1	0

B

Calculate X erosion B and X dilation B