JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2025

B.Tech-6th Semester (ECE)

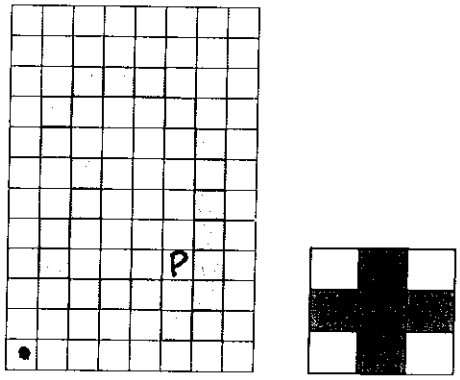
COURSE CODE (CREDITS): 18B1WEC847 (3) MAX. MARKS: 25

COURSE NAME: Medical Image Processing

COURSE INSTRUCTORS:Lt. Praggya Gupta MAX. TIME: 1 Hour 30 Min

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	(a) Describe the use of region filling and boundary extraction in segmenting a tumor region in a PET image. (b) Consider an image point set A which has only the boundary of the object region; within this boundary, there is a hollow region. Fill this hollow region by the given structuring element B. **Note:** Represent the output of each iteration using a number—for example, label the output of the first iteration as 1, the second as 2, and so on.  A B	3	2+6
Q2	Explain the role of a CAD system in assisting radiologists. Mention at least two use cases where CAD systems have improved diagnosis.	4	5
Q3	Compare and contrast the imaging principles of CT and MRI. Highlight the advantages and limitations of each in clinical diagnosis.	1	5
Q4	(a) From the given histogram of a 6x6 grayscale image find the optimal threshold value for separating the foreground from the background using Otsu's between the class variance method.	2	[5+2]

Pixel Value	0	30	80	130
Frequency	4	3	4	5

(b) A given image histogram has two distinct peaks. Conceptually explain how Otsu's method aids in tumor segmentation.