JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2026

B.Tech-V Semester (Science Elective)

COURSE CODE (CREDITS): 25B1WPH534 MAX. MARKS: 15

COURSE NAME: Physics of Medical Imaging Techniques

COURSE INSTRUCTOR: Ragini Raj Singh MAX. TIME: 1 Hour

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

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

(c) Use of calculator is allowed

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Q.No	Question	CO	Marks
Q1	With respect to interaction of energy and tissue compare all the five interaction processes in medical imaging.	1	2
Q2	**(a)** What is ROC curve? What are different types of ROC curves and what are the pros and cons to use these types. **(b)** How to find AUC on the basis of CI. Compare Mann-Whitney rank sum method and Delong's method to find AUC.	1	**2.5** **2.5**
Q3	Discuss cost approach in detail to find optimal cutoff value.	1	2
Q4	Write short notes on: **(i)** Spatial resolution **(ii)** Signal to noise ratio **(iii)** Contrast to noise ratio	2	3
Q5	Consider the following 3 x 6 grayscale image 3 $I = \begin{bmatrix} 2 & 4 & 5 & 4 & 3 & 2 \\ 3 & 5 & \mathbf{25} & 6 & 4 & 3 \\ 2 & 4 & 5 & 4 & 3 & 2 \end{bmatrix}$ Apply 3 x 3 averaging filter $H = \frac{1}{9}\begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$ Find the filtered values at all positions where the complete 3×3 neighborhood is available. Write the new 3 x 6 filtered matrix as an answer.	2	3

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