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**BTECH**  
**(SEM VI) THEORY EXAMINATION 2024-25**  
**IMAGE PROCESSING**

TIME: 3 HRS

M.MARKS: 100

**Note:** Attempt all Sections. In case of any missing data; choose suitably.

**SECTION A**

**1. Attempt all questions in brief.**

**2 x 10 = 20**

Q No.	Question	CO	Level
a.	List and briefly describe any two steps in digital image processing.	1	K2
b.	What is the difference between image sampling and quantization in digital image processing?		
c.	Compare Ideal and Gaussian filters used in the frequency domain.		
d.	What is meant by spatial filtering in image enhancement?		
e.	What are the key assumptions in the degradation model for image restoration?		
f.	Differentiate between mean filters and order-statistics filters.		
g.	State any two applications of region-based segmentation.		
h.	Explain the basic concept of the watershed segmentation algorithm.		
i.	What is the role of Huffman coding in image compression?		
j.	Mention two key differences between JPEG and MPEG compression standards.		

**SECTION B**

**2. Attempt any three of the following:**

**10 x 3 = 30**

Q No.	Question	CO	Level
a.	Explain the basic steps involved in a typical digital image processing system with a neat diagram.	1	K2
b.	Explain gray level transformations with examples. How are they useful in image enhancement?		
c.	Explain the image degradation model and discuss different types of noise that affect images.		
d.	Discuss edge detection techniques. Compare any two methods in detail.		
e.	Explain the need for image compression. Discuss any three lossless compression techniques.		

**SECTION C**

**3. Attempt any one part of the following:**

**10 x 1 = 10**

Q No.	Question	CO	Level
a.	Describe image sensing and acquisition techniques. How are they implemented in real-world systems?	1	K2
b.	Describe the 2D DFT and DCT transforms. Highlight their significance in image processing.		

**4. Attempt any one part of the following:**

**10 x 1 = 10**

Q No.	Question	CO	Level
a.	Describe histogram processing techniques and their impact on image contrast.	1	K2
b.	Explain the concept and implementation of homomorphic filtering in image enhancement.		



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**5. Attempt any one part of the following:**

**10 x 1 = 10**

Q No.	Question	CO	Level
a.	Describe mean and adaptive filters used for image restoration. Provide suitable examples.	1	K2
b.	Compare and contrast inverse filtering and Wiener filtering in terms of their applicability and performance.		

**6. Attempt any one part of the following:**

**10 x 1 = 10**

Q No.	Question	CO	Level
a.	Discuss region growing and region splitting and merging techniques in image segmentation. Include examples.	1	K2
b.	Explain morphological processing operations with diagrams. How do they aid segmentation?		

**7. Attempt any one part of the following:**

**10 x 1 = 10**

Q No.	Question	CO	Level
a.	Define texture in images. Describe any two regional descriptors used for texture classification.	1	K2
b.	Explain the boundary representation and Fourier descriptor used in shape analysis.		

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