| O.P.Code:23EC0433 | R23 | H.T.No. | | | | | | | | | |
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**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**
(AUTONOMOUS)
**B.Tech. III Year II Semester Regular Examinations April-2026**
**DIGITAL IMAGE PROCESSING**
(Electronics & Communications Engineering)

**Time: 3 Hours** **Max. Marks: 70**

**PART-A**

(Answer all the Questions **10 x 2 = 20** Marks)

| | | | | | |
|---|---|---|---|---|---|
| 1 | a | Define Pixel and Digital image. | CO1 | L1 | 2M |
| | b | What are the classification of digital images and image types? | CO1 | L1 | 2M |
| | c | List the advantages of spatial domain filtering. | CO2 | L2 | 2M |
| | d | Differentiate between smoothing and sharpening filters. | CO2 | L2 | 2M |
| | e | Draw the probability density function for Gaussian Noise. | CO3 | L2 | 2M |
| | f | Define Image restoration. | CO3 | L1 | 2M |
| | g | Write short note on compression standards? | CO4 | L1 | 2M |
| | h | What is the difference between 1D and 2D wavelet transforms? | CO4 | L1 | 2M |
| | i | Define morphological erosion. | CO5 | L2 | 2M |
| | j | Why is color information useful in segmentation? | CO5 | L1 | 2M |

**PART-B**

(Answer all Five Units **5 x 10 = 50** Marks)

**UNIT-I**

| | | | | | |
|---|---|---|---|---|---|
| 2 | | Discuss the three principal sensor arrangements used to transform illumination energy into digital images. | CO1 | L2 | 10M |

**OR**

| | | | | | |
|---|---|---|---|---|---|
| 3 | a | Discuss the method of image sensing and acquisition along with suitable diagrams. | CO1 | L2 | 5M |
| | b | Explain about the components of an image processing system with neat diagram. | CO1 | L2 | 5M |

**UNIT-II**

| | | | | | |
|---|---|---|---|---|---|
| 4 | | Illustrate the smoothing spatial filters along with required expressions. | CO2 | L2 | 10M |

**OR**

| | | | | | |
|---|---|---|---|---|---|
| 5 | a | Explain the concepts of image negative and log transformation with suitable expressions. | CO2 | L2 | 5M |
| | b | Define histogram and draw the histogram for four basic image types? | CO2 | L2 | 5M |

**UNIT-III**

| | | | | | |
|---|---|---|---|---|---|
| 6 | | Explain the different Noise models with clear expressions. | CO3 | L2 | 10M |



**OR**

| | | | | | |
|---|---|---|---|---|---|
| 7 | | What is periodic noise in images? Explain the method of periodic noise reduction using frequency domain filtering. | CO3 | L2 | 10M |

**UNIT-IV**

| | | | | | |
|---|---|---|---|---|---|
| 8 | a | Explain the Coding Redundancy with suitable example. | CO4 | L3 | 5M |
| | b | Explain the functional block diagram of a general image compression system. | CO4 | L2 | 5M |

**OR**

| | | | | | |
|---|---|---|---|---|---|
| 9 | a | Differentiate lossy compression process and lossless compression process. | CO4 | L2 | 5M |
| | b | Explain token-based coding technique. Discuss its advantages in image compression. | CO4 | L2 | 5M |

**UNIT-V**

| | | | | | |
|---|---|---|---|---|---|
| 10 | a | Discuss the fundamentals of image segmentation and explain the classification of segmentation techniques with examples? | CO5 | L3 | 5M |
| | b | Explain point detection techniques in image segmentation. | CO5 | L2 | 5M |

**OR**

| | | | | | |
|---|---|---|---|---|---|
| 11 | a | Explain morphological image processing operations and algorithms in detail. | CO5 | L3 | 5M |
| | b | Explain erosion and dilation with mathematical expressions and examples. | CO5 | L2 | 5M |

*** END ***