Total No. of Questions: 6 *Total No. of Printed Pages:3*

Enrollment No.....

Faculty of Engineering

End Sem Examination Dec-2023

RA3CO42 Digital Image Processing

Programme: B.Tech. Branch/Specialisation: RA

Duration: 3 Hrs. **Maximum Marks: 60**

Note: All questions are compulsory. Internal choices, if any, are indicated. Answers of Q.1 (MCQs) should be written in full instead of only a, b, c or d. Assume suitable data if necessary. Notations and symbols have their usual meaning.

Q.1 i. What are the categories of digital image processing? **1**

(a) Image enhancement (b) Image classification and analysis

(c) Image transformation (d) All of these

ii. Which of the following is the first and foremost step in Image Processing? **1**

(a) Image acquisition (b) Segmentation

(c) Image enhancement (d) Image restoration

iii. Which of the following in an image can be removed by using a smoothing filter? **1**

(a) Sharp transitions of brightness levels

(b) Sharp transitions of gray levels

(c) Smooth transitions of gray levels

(d) Smooth transitions of brightness levels

iv. Which of the following filter's responses is based on the pixels ranking? **1**

(a) Sharpening filters (b) Nonlinear smoothing filters

(c) Geometric mean filter (d) Linear smoothing filters

v. Region of Interest (ROI) operations is generally known as _____. **1**

(a) Masking (b) Dilation

(c) Shading correction (d) None of these

vi. Which of the following is the role played by segmentation in image processing? **1**

(a) Deals with property in which images are subdivided successively into smaller regions

(b) Deals with partitioning an image into its constituent parts or objects

(c) Deals with extracting attributes that result in some quantitative information of interest

(d) Deals with techniques for reducing the storage required saving an image, or the bandwidth required transmitting it

vii. If x(n) is a real sequence and X(k) is its N-point DFT, then which of the following is true? **1**

(a) X(N-k)=X(-k) (b) X(N-k)=X*(k)

(c) X(-k)=X*(k) (d) All of these

viii. Wavelet series equation is the sum of- **1**

(a) Scaling coefficient (b) Detail coefficient

(c) Span coefficient (d) Both (a) and (b)

ix. Every run length pair introduce new- **1**

(a) Pixel (b) Matrix

(c) Frames (d) Intensity

x. Image compression comprised of- **1**

(a) Encoder & Decoder (b) Pixel and Frames

(c) Matrix and Frames (d) All of these

Q.2 i. What is Pixel? Also explain the term image resolution. **2**

ii. Define sampling and quantization. Find the number of bits required to store a 256 X 256 image with 32 Gray levels. **3**

iii. What are the steps involved in Digital Image Processing (DIP)? Also explain the elements of DIP system. **5**

OR iv. What do you mean by Colour model? Explain different colour model in detail. **5**

Q.3 i. What is histogram equalization? Why do we need to perform it on an image? **3**

ii. Describe homomorphic filtering. Also write down the steps involved in splitting and merging. **7**

OR iii. Explain Spatial Filtering and its types. Also explain smoothing and sharpening filters. **7**

Q.4 i. What do mean by graph cut segmentation? **3**

ii. Explain Hough and Hadamard transform in detail. **7**

OR iii. Write short notes on image segmentation. **7**

Q.5 i. What is image transform? **3**

ii. Explain discrete cosine transform with suitable equations. **7**

OR iii. Explain Discrete Fourier Transform (DFT) in detail. Also write down the properties of DFT. **7**

Q.6 Attempt any two:

i. Explain image restoration process in detail. **5**

ii. Discuss region-oriented segmentation in detail. **5**

iii. What is image compression? Explain its types and also explain different lossless compression methods. **5**

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