**POORNIMA UNIVERSITY, JAIPUR**

**END SEMESTER EXAMINATION, November 2022**

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|  | **3BC5118** | Roll No. | Total Printed Pages: 2 |
| **3BC5118** |  |
| BCA III Year V-Semester (Main/Back) End Semester Examination, November 2022  **(AI&PA)** | |
| **BAP05103: Digital Image Processing** | | | |

# Time: **3** Hours. Total Marks: **60**

Min. Passing Marks: **21**

Attempt **five** questions selecting one question from each Unit. There is internal choice from Unit I to Unit V. Marks of each question or its parts are indicated against each question / parts. Draw neat sketches wherever necessary to illustrate the answer. Assume missing data suitably (if any) and clearly indicate the same in the answer.

Use of following supporting material is permitted during examination for this subject.

# **1.--------------------------Nil--------------------** **2. ------------------Nil-----------------------**

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|  |  | **UNIT-I (CO1)** | **Marks** | **Bloom Level** |
| **Q.1** | **(a)** | Explain Image sensing and acquisition? | **(6)** | **Remember** |
|  |  |  |  |  |
|  | **(b)** | Explain the basic concepts of sampling and quantization in digital image processing. | **(6)** | **Analyze** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.2** | **(a)** | Mention the basic component of an image processing system? Explain all the component with block diagram. | **(6)** | **Analyze** |
|  |  |  |  |  |
|  | **(b)** | Briefly discuss the following:  (i) Spatial resolution of an image. (ii) Optical resolution of an image.  (iii) Image zooming. | **(6)** | **Remember** |
|  |  |  |  |  |
|  |  | **UNIT-II (CO2)** |  |  |
|  |  |  |  |  |
| **Q.3** | **(a)** | What is the aim of image processing or enhancement? Also define the What are the methods of enhancement or image processing. | **(6)** | **Understand** |
|  |  |  |  |  |
|  | **(b)** | Apply low and high pass spatial masks on the following image matrix. Prove that High Pass=Original- Low Pass. Assume virtual Rows and Columns. F(x,y)   |  |  |  | | --- | --- | --- | | 30 | 31 | 32 | | 33 | 120 | 30 | | 32 | 32 | 31 | | **(6)** | **Evaluate** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.4** | **(a)** | What do you understand by Histogram Equalization? Mention the different methods of Histogram Equalization. | **(6)** | **Understand** |
|  |  |  |  |  |
|  | **(b)** | What are morphological operations erosion and dilation? Define their application in Image processing. | **(6)** | **Remember** |
|  |  |  |  |  |
|  |  | **UNIT-III (CO3)** |  |  |
|  |  |  |  |  |
| **Q.5** | **(a)** | Differentiate between Smoothing and Sharpening of an image. | **(6)** | **Analyze** |
|  |  |  |  |  |
|  | **(b)** | How Image can be formed from Hue, Saturation and Intensity. | **(6)** | **Evaluate** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.6** | **(a)** | Differentiate in between RGB and CMY Model. | **(6)** | **Understand** |
|  |  |  |  |  |
|  | **(b)** | Convert a Pixel (35, 120,196) in CMY model from RGB Model. | **(6)** | **Create** |
|  |  |  |  |  |
|  |  | **UNIT-IV (CO4)** |  |  |
|  |  |  |  |  |
| **Q.7** | **(a)** | “Redundant data is repetitive and does not convey much information.” Explain the given statement and discuss types of redundancy | **(6)** | **Apply** |
|  |  |  |  |  |
|  | **(b)** | Explain block truncation coding & it’s applications. | **(6)** | **Remember** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.8** | **(a)** | Differentiate between scalar quantization and vector quantization schemes. | **(6)** | **Understand** |
|  |  |  |  |  |
|  | **(b)** | A source emits three symbols A, B, C with a probability {0.5, 0.25, 0.25} respectively. Construct an arithmetic code to encode the word ‘C A B’ | **(6)** | **Create** |
|  |  |  |  |  |
|  |  | **UNIT-V (CO5)** |  |  |
|  |  |  |  |  |
| **Q.9** | **(a)** | Explain Laplacian edge detector. Explain why LOG mark is preferred over Laplacian for edge detection | **(6)** | **Apply** |
|  |  |  |  |  |
|  | **(b)** | Consider a one-dimensional image f(x)= [10 10 10 10 40 40 40 40 20 20].  What are the first and second derivatives? Locate the position of edge | **(6)** | **Create** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.10** | **(a)** | With the help of suitable mask explain the following: -   1. Point Detection 2. Line Detection 3. Edge Detection | **(6)** | **Evaluate** |
|  |  |  |  |  |
|  | **(b)** | Explain Region-based segmentation with suitable example. | **(6)** | **Remember** |