**POORNIMA UNIVERSITY, JAIPUR**

**END SEMESTER EXAMINATION, APRIL 2023**

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| Roll No. | Total Printed Pages: 2 |
| **3BT6134** |  |
| B. Tech. III Year VI- Semester (Main/Back) End Semester Examination, April 2023  **(AI)** | |
| **BAI06102 / BAi06103: 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)** | Define the following terms:  (i) Image Resolution (iii) Pixel and (iv) Digital Image | **(6)** | **Remember** |
|  |  |  |  |  |
|  | **(b)** | What are the basic concepts of digital image processing? Explain the key features of important image file formats. | **(6)** | **understand** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.2** | **(a)** | Discuss the effect of Non Uniform Sampling and Quantization. | **(6)** | **understand** |
|  |  |  |  |  |
|  | **(b)** | Discuss downsampling (or subsampling) and upsampling of an image with suitable examples. | **(6)** | **remember** |
|  |  |  |  |  |
|  |  | **UNIT-II (CO2)** |  |  |
|  |  |  |  |  |
| **Q.3** | **(a)** | Explain the various enhancement techniques performed in the spatial domain. | **(6)** |  |
|  |  |  |  |  |
|  | **(b)** | Perform the Histogram Stretching on below image with 8 intensity levels   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | Gray Level | 1 | 2 | 3 | 4 | 5 | 6 | 7 | | No. of Pixel | 70 | 0 | 0 | 50 | 20 | 0 | 20 | | **(6)** | **apply** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.4** | **(a)** | What do you mean by image enhancement techniques? Explain Nonlinear point transformation in detail. | **(6)** | **remember** |
|  |  |  |  |  |
|  | **(b)** | Given that Gray level is 0-7 i.e 8. Apply the following  transformation:-Inversion,SquareRoot,SquareFunction,Logarithmic Function C=1  and γ =1.2 ,a=0.5 | **(6)** | **apply** |
|  |  | |  |  |  |  | | --- | --- | --- | --- | | **1** | **3** | **4** | **2** | | **4** | **6** | **4** | **6** | | **5** | **6** | **5** | **7** | | **2** | **3** | **7** | **5** |   **UNIT-III (CO3)** |  |  |
| **Q.5** | **(a)** | Convert H = 30°, S = 0.80, I = 0.70 to (r,g,b) and then to (R,G,B), where each of r, g and b is between 0 and 1. | **(6)** | **analyze** |
|  |  |  |  |  |
|  | **(b)** | What is the Color Space Model in Image Processing? Explain RGB and CMYK color models and their color range values. | **(6)** | **analyze** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.6** | **(a)** | Explain Erosion and dilation with suitable examples. | **(6)** | **remember** |
|  |  |  |  |  |
|  | **(b)** | Explain Hit and Miss transform in detail. | **(6)** | **understand** |
|  |  |  |  |  |
|  |  | **UNIT-IV (CO4)** |  |  |
|  |  |  |  |  |
| **Q.7** | **(a)** | Explain about Huffman coding by taking an example. | **(6)** | **create** |
|  |  |  |  |  |
|  | **(b)** | Explain the need of image compression. How a vector quantization approach is used for compression. | **(6)** | **Understand** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.8** | **(a)** | What is noise PDF? Explain erlang noise and Impulse noise. Differentiate between Gaussian noise and impulse noise? | **(6)** | **apply** |
|  |  |  |  |  |
|  | **(b)** | What is the need of error free image compression? Discuss any two coding techniques to achieve this. | **(6)** | **analyze** |
|  |  |  |  |  |
|  |  | **UNIT V (CO5)** |  |  |
|  |  |  |  |  |
| **Q.9** | **(a)** | Explain about the color segmentation process. | **(6)** |  |
|  |  |  |  | **understand** |
|  | **(b)** | What are the different applications of image segmentation? Explain different image segmentation techniques | **(6)** | **remember** |
|  |  |  |  |  |
|  |  | **OR** |  |  |
|  |  |  |  |  |
| **Q.10** | **(a)** | Write short note on  (i) Edge Linking (ii) Boundary Linking | **(6)** | **understand** |
|  |  |  |  |  |
|  | **(b)** | Explain the concept of Region based segmentation in image processing. | **(6)** | **understand** |