Reg. No. \_\_\_\_\_\_\_\_\_\_\_\_\_



**End Semester Examination – Nov / Dec – 2019**

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| **Code :** | **18EC3013** | **Duration :** | **3hrs** |
| **Sub. Name :** | **ADVANCED DIGITAL IMAGE PROCESSING** | **Max. Marks :** | **100** |

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| **Q. No.** | **Sub Div.** | **Questions** | **Course Outcome** | **Marks** |
| **ANSWER ANY FIVE QUESTIONS (5 x 16 = 80 Marks)** | | | | |
| 1. | a. | Elaborate on the various elements of visual perception. | CO1 | 10 |
| b. | Justify the statement that “The subjective brightness is not a function of intensity alone.” | CO1 | 6 |
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| 2. |  | Calculate the the standard Discrete Hadamard Transform of (𝑥, 𝑦) in the case of 𝑀 = 𝑁 = 2 and (𝑥, 𝑦) = [ 1 2 2 3 ]. | CO1 | 16 |
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| 3. | a. | Briefly explain the concept of edge detection and its model. | CO2 | 10 |
| b. | Calculate Y1= XΘB, where Θ denotes the morphological erosion operator and Y2= X⊕B where ⊕ denotes the morphological dilation operator; where X is the binary image and B is the structuring element. | CO2 | 6 |
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| 4. | a. | Briefly explain the concept of image fusion and its types. | CO3 | 10 |
| b. | Find the shape numbers of the following: | CO2 | 6 |
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| 5. | a. | Describe volumetric display using ray tracing and its advantages. | CO3 | 8 |
| b. | Write short notes on sources and slicing of 3D datasets. | CO3 | 8 |
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| 6. |  | Explain the image sharpening using frequency domain filters. Support your answer with necessary mathematical equations. | CO1 | 16 |
|  |  |  |  |  |
| 7. | a. | Calculate the response (R) for the centre pixel of the image with the given mask using the averaging technique. | CO1 | 6 |
| b. | Sketch perspective plot of 2-D ideal low pass filter transfer function and filter cross section and explain its usefulness in image enhancement. | CO2 | 10 |
|  | | **COMPULSORY QUESTION (1 x 20 = 20 Marks)** |  |  |
| 8. | a. | Explain in detail how image processing is applicable for abnormality detection in medical images. | CO2 | 10 |
| b. | Discuss the application of scene understanding in natural images. | CO2 | 10 |