No. of Printed Pages : 02 **Roll No. .....**

BB63

M.Tech. EXAMINATION, 2020

(Second Semester)

(B. Scheme) (Re-appear)

(ECE)

MTEC506B

DIGITAL IMAGE PROCESSING

Time : 3 *Hours*] [*Maximum Marks :* 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit.

Unit I

1. (a) Explain in detail the processes involved in generating digital images from sensed data. **8**

(b) Explain various spatial operations performed on pixels of an image. **7**

2. (a) Explain Intensity-level slicing and Bit-plane slicing transformation functions. **8**

(b) Discuss the implementation of second-order derivatives and their use in image sharpening. **7**

Unit II

3. (a) How an image can be smoothed by attenuating the high frequency components of its Fourie transform ? **7**

(b) How image sharpening can be achieved in the frequency domain by high pass filtering ? **8**

4. (a) Discuss scaling functions used in multiresolution analysis. **7**

(b) Explain wavelet packet decomposition considering a three-scale FWT filter bank. **8**

Unit III

5. Discuss, how periodic noise can be analyzed and filtered quite effectively using frequency domain techniques ? **15**

6. (a) Explain, how to estimate the degradation function by image observation ? **7**

(b) What are the disadvantages of inverse filtering ? Discuss a filtering approach that incorporate degradation function and statistical characteristics of noise into the restoration process. **8**

Unit IV

7. (a) Discuss an error-free compression approach that also addresses spatial redundancies in an image. **8**

(b) Explain various steps included in DCT-based watermarking approach. **7**

8. (a) Write Otsu's algorithm to estimate optimum global thresholding. **8**

(b) Discuss watershed segmentation algorithm. **7**