SCHEME OF MARKING

Total No. of Questions – [09] Total No. of Printed Pages: 3

G.R. No.	

P118-141 (ESE)

DECEMBER 2018 / END-SEM

F. Y. M. TECH. (Signal Processing) (SEMESTER - I)

Image and Video Processing (ETPA11181)

(PATTERN 2018)

Time: [3 Hours] [Max. Marks: 50]

(*) Instructions to candidates:

1) **Answer Q.1, Q.2, Q.3, Q.4 OR Q.5, Q.6 OR Q.7, Q.8 OR Q.9**
2) **Figures to the right indicate full marks.**
3) **Use of scientific calculator is allowed**
4) **Use suitable data where ever required**

Q.1) **a)** Explain sampling and quantization in images. What is spatial and gray level resolution? Why pixel magnitude is fixed at 8 bits? **(3)**

Exp: **0.5 M each** + Spatial and Gray **: 0.5 M each** + **1M**

OR

b) What is Weber's ratio? What is the significance of the Weber's experiment in image processing? **(3)**

1M + 2M

Q.2) **a)** An 8 bit input image has to be enhanced by stretching gray level range [96,169] by a factor of 2.The remaining gray levels observe identity transformation. Draw the gray level transformation function. **(3)**

Complete drawing : **3M**

OR

b) Explain image filtering process using window technique. What are smoothing filters. Where they are used? **(3)**

Windowing : **2M** Application : **1M**

Q.3) **a)** Explain the encoding process in JPEG image compression. **(2)**

Block diagram : **2 M**

OR

b) Explain how Hadamard transform is used in image compression? **(2)**
Transform with Kronekar product : **2M**

Q.4) a) Explain Hough Transform? How it is used for edge linking in an image? **(6)**
2M + 4 M

b) Define Segmentation. What is similarity based approach. Explain any one similarity based approach with suitable example. **(8)**
2M + 2M + 4M

OR

Q.5) a) What is the role of illumination in segmentation by thresholding ? Explain Optimal thresholding technique. **(6)**
4 M+ 2M

b) Compare first and second order derivative based techniques used in image segmentation. **(8)**
Any 4 points : **2 M each**

Q.6) a) Explain how the degradation functions in image restoration are computed using 1)Observation and 2) Experimentation. **(6)**
By observation : **3M**
By experimentation : **5M**

b) Explain Block based Motion Estimation and compensation technique. Why macroblock of 16x16 size is preferred? **(8)**

Motion Est: **3M** Motion compensation : **3M** . Macroblock **2M**

OR

Q.7) a) Compare image enhancement and restoration in detail. **(6)**
3 Points of comparison : **2M each**

b) Explain Weiner Filter. Compare performance of Inverse, Weiner and Constrained least square filtering. **(8)**
2 M + 3 points: **2M each**

Q.8) a) Explain with suitable example following operations used in morphological image processing. **(6)**
1) Dilation
2) Erosion
3) Opening
4) Closing
1.5 M each

b) Explain role of structuring element in morphological **(8)**

operations.

Role : **4 M** Any 2 examples : **2 M each**

OR

Q.9) **a)** Why there is necessity of colour space conversion. What is the significance of converting into HSI colour space. List different colour spaces. **(6)**
3 M + 2M +1 M

b) Explain boundary extraction and region filling morphological operations. **(8)**

Boundry extraction **: 4 M**
Region filling :**4M**