Model Questions

SKR/KW/24/2181

Faculty of Science & Technology

Eighth Semester B.E. (Information Technology) (C.B.S.) Examination

DIGITAL IMAGE PROCESSING

Elective–III

Time : Three Hours] [Maximum Marks : 80

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.

(2) Solve Question **1 OR** Question No. **2**.

(3) Solve Question **3 OR** Question No. **4**.

(4) Solve Question **5 OR** Question No. **6**.

(5) Solve Question **7 OR** Question No. **8**.

(6) Solve Question **9 OR** Question No. **10**.

(7) Solve Question **11 OR** Question No. **12**.

(8) Due credit will be given to neatness and adequate dimensions.

(9) Assume suitable data wherever necessary.

(10) Illustrate your answers wherever necessary with the help of neat sketches.

1. (a) What is digital image processing ? Describe the elements of digital image processing system. 9

(b) Define : 5

(i) Hue

(ii) Contrast

(iii) Saturation

(iv) Brightness

(v) Mach band effect.

OR

2. (a) Explain with the help of example, image sampling and quantization. 5

(b) Explain the discrete cosine transform. 4

(c) Explain about vidicon in brief. 5

Model Questions

3. (a) Elaborate histogram processing. Gray level histogram of an image is given below : 10

Gray level	1	2	3	4	5	6	7
Frequency	700	1350	2500	3000	1500	550	0

Compute the Gray level histogram of output image obtaining by enhancing the input by histogram equalization technique.

(b) Discuss RGB color model in detail. 3

OR

4. (a) Explain concept of special filtering. 7

(b) Write short notes on any **two** : 6

(i) Median filter

(ii) Histogram matching

(iii) Harmonic filters.

5. (a) How wiener filtering is useful to reduce the mean square error ? 6

(b) What do you mean by degradation ? Give degradation process model for a continuous function giving relevant mathematical support. 7

OR

6. (a) What do you mean by unconstrained restoration ? 3

(b) Write short note on Gray scale level interpolation. 4

(c) Explain removal of blur caused by uniform linear motion. 6

7. (a) Elaborate the process of Dam construction and watershed in segmentation. 7

(b) Write short note on Region growing by pixel segmentation. 7

OR

8. (a) Explain the global process via the Hough transform. 7

(b) Discuss how region splitting and merging approach is used in image segmentation. 7

9. (a) How image are compressed using JPEG image compression standard ? 5

(b) Enlist objectives of image compression. 5

(c) Write short note on MPEG. 3

OR

Model Questions

10. (a) Design a binary Huffman code for a discrete source three independent symbols α, β, γ with probability 0.9, 0.08 and 0.02 respectively. 8

Determine :

(i) Entropy of source

(ii) Average length of Code

(iii) Coding efficiency.

(b) Briefly explain transform coding with neat sketch. 5

11. (a) Explain feature extraction in topological and geometric attributes. 6

(b) Discuss about Region based description in detail. 7

OR

12. Write short notes on : 13

(i) Statistical Classification

(ii) Syntactic Recognition

(iii) Clustering

(iv) Graph matching.

PRS/KS/24/2508

Faculty of Science and Technology

B.E. (Information Technology) Semester—VIII (C.B.S.) Examination

DIGITAL IMAGE PROCESSING

Elective – III

Time : Three Hours] [Maximum Marks : 80

INSTRUCTIONS TO CANDIDATES

(1) All questions carry marks as indicated.
(2) Solve Question **1 OR** Question No. **2**.
(3) Solve Question **3 OR** Question No. **4**.
(4) Solve Question **5 OR** Question No. **6**.
(5) Solve Question **7 OR** Question No. **8**.
(6) Solve Question **9 OR** Question No. **10**.
(7) Solve Question **11 OR** Question No. **12**.
(8) Assume suitable data wherever necessary.
(9) Diagrams should be given wherever necessary.
(10) Illustrate your answers wherever necessary with the help of neat sketches.
(11) Use of non programmable calculator is permitted.

1. (a) Explain about vidicon in detail with its operations. 7
   (b) What are the elements of an image processing system ? 7

OR

2. (a) Explain the sampling and quantization process used for creating digital image. 5
   (b) What is connectivity between pixels ? Explain 4 and 8 connectivity. 5
   (c) Explain the discrete cosine transform. Obtain the 4 length DCT for the following sequence : {1, 3, 2, –4} 4
3. (a) Explain histogram equalization and its advantages. 5
   (b) Explain median filtering alongwith properties of median filter. 4
   (c) Explain RGB colour model in detail. 4

OR

4. (a) Explain the colour image enhancement with diagram. 6
   (b) Describe the following with respect to spatial filtering :
      (i) Filter
      (ii) Mask
      (iii) Kernel
      (iv) Window
      (v) Template. 7

Model Questions

5.	(a)	Explain the image restoration process w.r. to degradation.	7
	(b)	How individual elements are divided in inverse filtering ? Explain in detail.	6
		OR	
6.	(a)	Differentiate between constrained restoration and unconstrained restoration.	6
	(b)	How Wiener filtering is useful to reduce the mean square error ?	7
7.	(a)	Explain the region growing by pixel segmentation.	5
	(b)	Explain the global process via Hough transform.	8
		OR	
8.	(a)	Explain the region based segmentation of digital images, in detail.	4
	(b)	Explain watershed segmentation algorithm in detail.	6
	(c)	Explain how the process of region splitting and merging takes place.	3
9.	(a)	Explain the objective of image compression.	5
	(b)	A binary Huffman code for a discrete source with three independent symbols X,Y and Z is to be designed with probability 0.8, 0.18 and 0.02 respectively. Determine : (i) Entropy of a source (ii) Average length of code (iii) Coding efficiency and redundancy.	8
		OR	
10.	(a)	Explain the Run-length encoding in detail. Also encode the following data : 13 8 24 00027 4 0000 539	7
	(b)	Explain the JPEG standard for image compression with the help of diagram.	6
11.		Explain the following terms in brief : (i) Statistical classification (ii) Syntactic recognition (iii) Clustering (iv) Graph Matching	14
		OR	
12.	(a)	Explain the feature extraction in topological and geometric attributes.	7
	(b)	Explain the boundary based description and region based description.	7