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

Elective-III : Digital Image Processing

P. Pages : 2 **AHK/KW/19/2467**

Time : Three Hours * 1305 * Max. Marks : 80

Notes :
1. All questions carry marks as indicated.
2. Solve Question 1 OR Questions No. 2.
3. Solve Question 3 OR Questions No. 4.
4. Solve Question 5 OR Questions No. 6.
5. Solve Question 7 OR Questions No. 8.
6. Solve Question 9 OR Questions No. 10.
7. Solve Question 11 OR Questions No. 12.
8. Due credit will be given to neatness and adequate dimensions.
9. Assume suitable data whenever necessary.
10. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Draw the block diagram & explain various components of an Image processing system. **9**

b) Define : **5**
i) Image sampling ii) Quantization

OR

2. a) What are the different transforms used in DIP ? Explain the most advantages one. **7**

b) Define 4-adjancy, 8-adjancy & m-adjancy with one example. **7**

3. a) Discuss about RGB color model in detail. **4**

b) Write short note on color image enhancement with diagram. **6**

c) Specify the expression of following filters : **3**
i) harmonic mean filter ii) Geometric mean filter
iii) Contra harmonic mean filter.

OR

4. a) Write short note on : **8**
i) Harmonic filters
ii) Median filters
iii) Histogram matching.

b) How RGB model is represented using HSI format ? Describe the transformation. **5**

5. a) Differentiate between constraint restoration & unconstraint restoration. **6**

b) How Wiener filtering is useful to reduce the mean square error ? **7**

OR

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

b) Explain removal of blur caused by uniform linear motion. **6**

7. a) Describe a point detection method for detection point in an image. 5

b) Discuss how region splitting & merging approach is used in image segmentation. 6

c) State the line masks for detecting lines in - 3
i) Horizontal direction ii) Vertical direction
iii) -45 direction

OR

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

b) Explain in detail with diagram Dam construction. 6

9. a) Explain JPEG standard for image compression with help of diagram. 7

b) Write short note on : 6
Run length encoding. Also encode the following data -
13 8 24 00027 4 0000 539

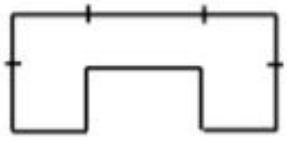
OR

10. a) A source emits letters from an alphabet $A = \{a_1, a_2, a_3, a_4, a_5\}$ with probabilities 8
$P(a_1) = 0.2$, $P(a_2) = 0.4$, $P(a_3) = 0.2$, $P(a_4) = 0.1$, $P(a_5) = 0.1$
i) Find the Huffman code for this source.
ii) Find the average length of this code and its redundancy.

b) Briefly explain transform coding with neat sketch. 5

11. a) Describe following attributes : 6
i) Topological attributes. ii) Geometric attributes

b) What is order of the shape number for figure shown below ? Also obtain the shape number 7



OR

12. Write short notes on : 13
i) Graph matching
ii) Tree search
iii) Object Recognition.
iv) Clustering

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