

28. a. Demonstrate the following morphological operation with example.

- (i) Dilation
- (ii) Erosion
- (iii) Opening and closing

4 3 3
2
2
6

(OR)

b. Explain the various types of region based segmentation method.

10 4 3 3

29. a. Implement the Huffman coding for the word WELCOME and also find average length, entropy and efficiency.

10 3 4 5

(OR)

b. Describe the following image compression algorithm

10 2 4 5

- (i) Rigid registration algorithm
- (ii) Dimensionality transformation

30. a. Explain the digital implementation of filter back projection algorithm in detail.

10 4 5 1

(OR)

b. Demonstrate digital water marking algorithm with example.

10 4 5 1

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Reg. No.

B.Tech. DEGREE EXAMINATION, NOVEMBER 2022

Sixth and Seventh Semester

18ECE363J – MEDICAL IMAGE PROCESSING

(For the candidates admitted from the academic year 2018-2019 to 2019-2020)

Note:

- (i) Part - A should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.
- (ii) Part - B should be answered in answer booklet.

Time: 2½ Hours

Max. Marks: 75

PART – A (25 × 1 = 25 Marks)

Answer ALL Questions

- | | Marks | BL | CO | PO |
|--|-------|----|----|----|
| 1. Identify the range of light intensity level to which the human eye can adapt
(A) 10^{-6} to 10^{-4} (B) 10^4 to 10^6
(C) 10^{-6} to 10^4 (D) 10^{-5} to 10^5 | 1 | 1 | 1 | 1 |
| 2. Choose the number of bits required for displaying coloring image
(A) 4 bits/pixels (B) 6 bits/pixels
(C) 8 bits/pixels (D) 12 bits/pixels | 1 | 3 | 1 | 1 |
| 3. Calculate the number of bit required for storage of 128×128 image with 64 gray levels
(A) 4096 (B) 8192
(C) 12288 (D) 98304 | 1 | 3 | 1 | 1 |
| 4. Compute the Euclidean distance (D_1), city-block distance (D_2) and chessboard distance (D_3) for point P and Q, where P and Q be (3,0) and (2,3) respectively.
(A) $(\sqrt{10}, 3, 4)$ (B) $(\sqrt{10}, 4, 3)$
(C) $(\sqrt{8}, 4, 3)$ (D) $(\sqrt{8}, 2, 3)$ | 1 | 3 | 1 | 1 |
| 5. Relate image transform used for fast computation
(A) Convolution and correlation (B) Multiplication
(C) Correlation (D) Compression | 1 | 2 | 1 | 1 |
| 6. What is the name of process used to correct the power-law response phenomena?
(A) Beta correction (B) Alpha correction
(C) Gamma correction (D) Pie correction | 1 | 1 | 2 | 1 |
| 7. Which of the following is a second-order derivative operator?
(A) Histogram (B) Laplacian
(C) Gaussian (D) Poisson | 1 | 1 | 2 | 1 |

8. Predict the alternate approach to median filtering
(A) Use a mask (B) Gaussian filter
(C) Sharpening (D) Laplacian filter
9. Identify which of the following fails to work on dark intensity distribution
(A) Laplacian transform (B) Gaussian transform
(C) Histogram transform (D) Power law transform
10. Predict the type of slicing technique used to highlight a specific range of gray level
(A) Gray-level slicing (B) Bit-plane slicing
(C) Contrast stretching (D) Byte-level slicing
11. Relate the image segmentation approach used for region growing
(A) Level set method (B) Graph partitioning method
(C) Watershed transformation (D) Clustering method
12. Match the type of segmentation method used for two types of light object on a dark background
(A) Local thresholding (B) Global thresholding
(C) Adaptive thresholding (D) Multiple thresholding
13. Identify the mask used for line detection
(A) Gaussian (B) Laplacian
(C) Ideal (D) Butterworth
14. Choose which of the following uses crossing operator?
(A) First derivative (B) Second derivative
(C) Sobel operator (D) Gaussian operator
15. Interpret the advantages of canny operator
(A) Simplicity of the method (B) Performance is good
(C) Complex (D) Low performance
16. Recall redundancy of the data used by formula
(A) $\frac{1}{C}$ (B) $1 - \left(\frac{-1}{C}\right)$
(C) $1 + \left(\frac{1}{C}\right)$ (D) $1 - \frac{1}{C}$
17. Match sequence of code assigned said to be
(A) Code word (B) Word
(C) Byte (D) Nibble
18. Select which one is not a type of data redundancy
(A) Coding (B) Spatial
(C) Temporal (D) Facsimile

19. Predict every run length will introduce
(A) New pixels (B) New matrix
(C) New frames (D) New intensity
20. Identify the reason for doing compression
(A) Storage (B) Reduce bandwidth
(C) Money (D) Both A and B
21. Relate the advantage of iterative reconstruction techniques vers filter back projection
(A) Better dediction of bone detail (B) Does not require specification of reconstruction kerner of filter
(C) Better handling of noisy images (D) Faster reconstruction
22. Which of the following represent the accumulation of the Ray sum of all rays that pass through the point (X,Y)?
(A) Fourier reconstruction (B) Filter back projection
(C) Back projection (D) Radon transform
23. Identify the mathematical technique that involves the estimation of an unknown value from known value
(A) Filtering (B) Interpolation
(C) Convolution (D) Summation
24. Recall the type of transform used as line integral along the path of rays
(A) Radon (B) DCT
(C) DFT (D) DST
25. Match the type of transform used as an input data for fourier reconstruction of MRI
(A) Cosine (B) Sine
(C) Radon (D) Inverse radon

PART – B (5 × 10 = 50 Marks)

Answer ALL Questions

26. a. Describe in detail about elements of visual perception with neat diagram.
(OR)
b. Compute the Haar basis for N=4.
27. a. Explain the following gray level transformation techniques
(i) Image negative
(ii) Intensity level slicing
(OR)
b. Illustrate in detail about image smoothening in spatial domain.