**Sample Questions**

Department of Information Technology (**R-2019 Scheme)**

**Subject Name:** Image Processing **Semester: VI**

Multiple Choice Question Bank

| **Q1.** | **Choose the correct option for following questions. All the Questions are compulsory and carry equal marks** |
| --- | --- |
| 1. | Which is the foremost step in Image Processing? |
| Option A: | Morphological Processing |
| Option B: | Image acquisition |
| Option C: | Segmentation |
| Option D: | Compression |
|  |  |
| 2. | Digitizing the coordinate values of a continuous image is called |
| Option A: | Compression |
| Option B: | Sampling |
| Option C: | Quantization |
| Option D: | Segmentation |
|  |  |
| 3. | For coordinates p(3,4)the 4 neighbors of pixel p are |
| Option A: | (3,3)(2,3)(1,3)(1,3) |
| Option B: | (4,4)(3,5)(2,4)(3,3) |
| Option C: | (3,3)(2,3)(4,4)(2,2) |
| Option D: | (3,3)(2,4)(3,5)(2,1) |
|  |  |
| 4. | The sum of all components of a normalized histogram will be |
| Option A: | 1 |
| Option B: | 2 |
| Option C: | 0 |
| Option D: | -1 |
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| 5. | Which of the following is not an order static filter used for smoothing in spatial domain. |
| Option A: | Median filter |
| Option B: | Averaging filter |
| Option C: | Max / Maximum filter |
| Option D: | Min / Minimum filter |
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| 6. | Which transformation can be used for enhancing an image with white and gray detail embedded in dark regions of the image, especially when there is more black area in the image. |
| Option A: | Log transformations |
| Option B: | Power-law transformations |
| Option C: | Negative transformations |
| Option D: | Contour |
|  |  |
| 7. | Which is a simple image enhancement technique that attempts to improve the contrast in an image by `stretching' the range of intensity values it contains to span a desired range of values. |
| Option A: | Contouring stretching |
| Option B: | Contrast stretching |
| Option C: | Mask processing |
| Option D: | Point stretching |
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| 8. | Which is a two-dimensional coordinate system in which each point on a plane is determined by a distance from a reference point and an angle from a reference direction. |
| Option A: | Cartesian coordinate system |
| Option B: | Rectangular coordinate system |
| Option C: | Polar coordinate system |
| Option D: | Value coordinate system |
|  |  |
| 9. | Digitizing the coordinate values of a continuous image is called |
| Option A: | Compression |
| Option B: | Sampling |
| Option C: | Quantization |
| Option D: | Segmentation |
|  |  |
| 10. | The operations on single pixels of a digital image is called |
| Option A: | Point Operation |
| Option B: | Diagonal Pixel Operation |
| Option C: | Value Transformation |
| Option D: | Neighbours pixel Operation |
|  |  |
| 11. | What is the full form of CDF? |
| Option A: | Cumulative density function |
| Option B: | Contour derived function |
| Option C: | Cumulative distribution function |
| Option D: | Contour distribution function |
|  |  |
| 12. | State the type of transformation that expands the value of dark pixels while compressing the higher-level values. |
| Option A: | Log transformations |
| Option B: | Inverse-log transformations |
| Option C: | Negative transformations |
| Option D: | Point transformations |
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| 13. | State an image Enhancement techniques that uses a function of values of f(input image) in a predefined neighborhood of (x, y) to determine the value of g(output image) at (x, y). |
| Option A: | Contouring |
| Option B: | Contrast stretching |
| Option C: | Mask processing |
| Option D: | Point processing |
|  |  |
| 14. | Which is a simple image enhancement technique that attempts to improve the contrast in an image by `stretching' the range of intensity values it contains to span a desired range of values. |
| Option A: | Contouring stretching |
| Option B: | Contrast stretching |
| Option C: | Mask processing |
| Option D: | Point stretching |
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| 15. | Which of the following is not the property of 2D Discret Fourier Transform |
| Option A: | Separability |
| Option B: | Periodicity |
| Option C: | Operability |
| Option D: | Conjugate |
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| 16. | Choose the correct statement considering the feature of reciprocal relationship of filter in spatial domain and corresponding filter in frequency domain along with convolution |
| Option A: | The narrower the frequency domain filter more severe is the ringing |
| Option B: | The wider the frequency domain filter more severe is the ringing |
| Option C: | The narrower the frequency domain filter less severe is the ringing |
| Option D: | The wider the frequency domain filter less severe is the ringing |
|  |  |
| 17. | Choose the correct statement regarding the number of computations required for computing an N-point DFT? |
| Option A: | N2 complex subtraction and N(N-1) complex multiplications |
| Option B: | N2 complex multiplications and N(N-1) complex additions |
| Option C: | N2 complex multiplications and N(N-1) complex division |
| Option D: | N2 complex additions and N(N+1) complex multiplications |
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| 18. | Which of the following is not edge detection operator |
| Option A: | Prewitt operator |
| Option B: | Robert operator |
| Option C: | Sobel operator |
| Option D: | Boundary operator |
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| 19. | Which of the following is not a discontinuity based on image segmentation |
| Option A: | Points |
| Option B: | Lines |
| Option C: | Circles |
| Option D: | Edges |
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| 20. | Categorising a pixel as per the range of values in which a pixel lies is called |
| Option A: | Region based segmentation |
| Option B: | Thresholding based segmentation |
| Option C: | Line based segmentation |
| Option D: | Edge based segmentation |
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| 21. | The 2D Fourier transform and it's inverse are |
| Option A: | infinitely nonlinear |
| Option B: | infinitely aperiodic |
| Option C: | infinitely linear |
| Option D: | infinitely periodic |
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| 22. | Fourier series is |
| Option A: | The sum of cosines and sines coefficient multiplied |
| Option B: | The sum of cosines and tan coefficient multiplied |
| Option C: | The difference of tan and sines coefficient multiplied |
| Option D: | The sum of cosines and sines coefficient division |
|  |  |
| 23. | Choose the correct statement regarding the number of computations required for computing an N-point DFT? |
| Option A: | N2 complex subtraction and N(N-1) complex multiplications |
| Option B: | N2 complex multiplications and N(N-1) complex additions |
| Option C: | N2 complex multiplications and N(N-1) complex division |
| Option D: | N2 complex additions and N(N+1) complex multiplications |
|  |  |
| 24. | With which of the following, the gradient is combined for edge detection |
| Option A: | area |
| Option B: | set theory |
| Option C: | line |
| Option D: | thresholding |
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| 25. | Which of the following is not region based segmentation technique |
| Option A: | Region Growing |
| Option B: | Split and merge |
| Option C: | Region Splitting |
| Option D: | Region mask |
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| 26. | Which is a powerful technique for finding straight lines, and other parametrized shapes, in images. |
| Option A: | Hough Transform |
| Option B: | Histogram equalization |
| Option C: | Shape identification |
| Option D: | Line identification |
|  |  |
| 27. | Choose the correct statement regarding the number of computations required for computing an N-point DFT? |
| Option A: | N2 complex subtraction and N(N-1) complex multiplications |
| Option B: | N2 complex multiplications and N(N-1) complex additions |
| Option C: | N2 complex multiplications and N(N-1) complex division |
| Option D: | N2 complex additions and N(N+1) complex multiplications |
|  |  |
| 28. | The starting pixel of region growing process is called |
| Option A: | base pixel |
| Option B: | seed pixel |
| Option C: | original pixel |
| Option D: | image |
|  |  |
| 29. | Mask for horizontal line detection is |
| Option A: | [-1 -1 -1; 2 2 2; -1 -1 -1] |
| Option B: | [2 -1 -1; -1 2 -1; -1 -1 2] |
| Option C: | [ 1 2 -1; -1 2 -1; 1 2 -1] |
| Option D: | [-1 -1 2; -1 2 -1; 2 -1 -1] |
|  |  |
| 30. | Which of these is second order derivative operator for edge detection. |
| Option A: | Sobel operator |
| Option B: | Prewitt operator |
| Option C: | Robert operator |
| Option D: | Laplacian Operator |
|  |  |

**Descriptive Question Bank**

| **Q No** | **10 marks each** |
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| 1 | Perform Histogram Equalization for the following. Obtain a plot of original as well as equalized histogram. |
| 2 | Define the following with example:  (i) Euclidean Distance  (ii) City Block Distance  (iii) Chess Board Distance  (iv) m connectivity |
| 3 | What are the elements of digital image processing systems? Explain with a diagram. |
| 4 | Explain the different steps in digital image processing. |
| 5 | Explain Mask Processing Techniques with example. |
| 6 | Explain Point Processing Techniques with example. |
| 7 | Explain Region based segmentation |
| 8 | Explain DCT and its properties? Find the DCT for the following image: |
| 9 | Explain with suitable example the LZW coding and decoding technique for image compression. |
| 10 | Illustrate Arithmetic Coding and Decoding. |
| 11 | Apply horizontal and vertical line detection mask on the following image F. Use appropriate threshold value. Assume virtual rows and column by repeating border pixel values. |
| 12 | Write short notes on  A) Fourier Descriptor  B) Moments  C) Shape Numbers  D) Hit-or-Miss Transformation. |
| 13 | Explain the following operations:  (i) Erosion (ii) Dilation (iii) Opening (iv) Closing |
| 14 | Explain with example the following:  (i) Thining  (i) Thickening |
| 15 | Give the following mask of size 3x3 and explain their usefulness in image processing. (i) Sobel Operator (ii) Prewitt Operator (iii) High Pass Filter |

| **Q No** | **5 marks each** |
| --- | --- |
| 1 | Explain the High Boost Filter. |
| 2 | Justify/Contradict the statements.  (A) Enhancement process does not change the information content of image. |
| 3 | Justify/Contradict following statements.  (A) For digital image having salt pepper noise, median filter is the best filter. |
| 4 | Justify/ Contrast the statement: The 0th (LSB) plane of the bit plane slicing contains hight frequency information of the image. |
| 5 | Justify/ Contrast the statement: Image subtraction is used for scene matching and detection. |
| 6 | Explain the High Boost Filter. |
| 7 | Define and Distinguish the Sampling and Quantization. |
| 8 | Write short notes on  A) Image Resolution B) Spatial Resolution |
| 9 | Differentiate between Spatial Resolution and Tonal Resolution. |
| 10 | What do you mean by Sampling? What are the different types of Sampling? |
| 11 | Justify/ Contrast the statement: Convolution in spatial domain is multiplication in Fourier domain. |
| 12 | Explain Periodicity and Symmetric property of DFT. |
| 13 | Distinguish between lossless and lossy compression technique. |
| 14 | Explain in brief Hough Tranform. |
| 15 | Obtain the four directional Chain Code and Shape number representation of the following image: |
| 16 | Justify/ Contrast the statement: Shape number uniquely describes an object. |

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