Academy of Technology

Department of CSE and IT(6th SEM)

DIGITAL IMAGE PROCESSING (PEC-IT601D)

1 mark question

1. To convert a continuous sensed data into Digital form, which of the following is required?
   a) Sampling
   b) Quantization
   c) Both Sampling and Quantization
   d) Neither Sampling nor Quantization

2. To convert a continuous image f(x, y) to digital form, we have to sample the function in
   _____
   a) Coordinates
   b) Amplitude`
   c) All of the mentioned
   d) None of the mentioned

3. For a continuous image f(x, y), how could be Sampling defined?
   a) Digitizing the coordinate values
   b) Digitizing the amplitude values
   c) All of the mentioned
   d) None of the mentioned

4. For a continuous image f(x, y), Quantization is defined as
   a) Digitizing the coordinate values
   b) Digitizing the amplitude values
   c) All of the mentioned
   d) None of the mentioned

5. Validate the statement:
   "For a given image in one-dimension given by function f(x, y), to sample the function we take equally spaced samples, superimposed on the function, along a horizontal line. However, the sample values still span (vertically) a continuous range of gray-level values. So, to convert the given function into a digital function, the gray-level values must be divided into various discrete levels."
   a) True
   b) False

6. How is sampling been done when an image is generated by a single sensing element combined with mechanical motion?
   a) The number of sensors in the strip defines the sampling limitations in one direction and Mechanical motion in the other direction.
   b) The number of sensors in the sensing array establishes the limits of sampling in both directions.
   c) The number of mechanical increments when the sensor is activated to collect data.
   d) None of the mentioned.

7. How does sampling gets accomplished with a sensing strip being used for image acquisition?
   a) The number of sensors in the strip establishes the sampling limitations in one image direction and Mechanical motion in the other direction
   b) The number of sensors in the sensing array establishes the limits of sampling in both directions

c) The number of mechanical increments when the sensor is activated to collect data

d) None of the mentioned

8. How is sampling accomplished when a sensing array is used for image acquisition?

a) The number of sensors in the strip establishes the sampling limitations in one image direction and Mechanical motion in the other direction

b) The number of sensors in the sensing array defines the limits of sampling in both directions

c) The number of mechanical increments at which we activate the sensor to collect data

d) None of the mentioned

9. The quality of a digital image is well determined by _____

a) The number of samples

b) The discrete gray levels

c) All of the mentioned

d) None of the mentioned

10. What is the first and foremost step in Image Processing?

a) Image restoration

b) Image enhancement

c) Image acquisition

d) Segmentation

11. In which step of processing, the images are subdivided successively into smaller regions?

a) Image enhancement

b) Image acquisition

c) Segmentation

d) Wavelets

12. What is the next step in image processing after compression?

a) Wavelets

b) Segmentation

c) Representation and description

d) Morphological processing

13. What is the step that is performed before color image processing in image processing?

a) Wavelets and multi resolution processing

b) Image enhancement

c) Image restoration

d) Image acquisition

14. How many number of steps are involved in image processing?

a) 10

b) 9

c) 11

d) 12

15. What is the expanded form of JPEG?

a) Joint Photographic Expansion Group

b) Joint Photographic Experts Group

c) Joint Photographs Expansion Group

d) Joint Photographic Expanded Group

16. Which of the following step deals with tools for extracting image components those are useful in the representation and description of shape?

a) Segmentation

b) Representation & description

c) Compression

d) Morphological processing

17. In which step of the processing, assigning a label (e.g., "vehicle") to an object based on its descriptors is done?

a) Object recognition
b) Morphological processing
c) Segmentation
d) Representation & description

18. What role does the segmentation play in image processing?
a) Deals with extracting attributes that result in some quantitative information of interest
b) Deals with techniques for reducing the storage required saving an image, or the bandwidth required transmitting it
c) Deals with partitioning an image into its constituent parts or objects
d) Deals with property in which images are subdivided successively into smaller regions

19. The spatial coordinates of a digital image (x,y) are proportional to:
a) Position
b) Brightness
c) Contrast
d) Noise

20. Among the following image processing techniques which is fast, precise and flexible.
a) Optical
b) Digital
c) Electronic
d) Photographic

21. An image is considered to be a function of a(x,y), where a represents:
a) Height of image
b) Width of image
c) Amplitude of image
d) Resolution of image

22. What is pixel?
a) Pixel is the elements of a digital image
b) Pixel is the elements of an analog image
c) Pixel is the cluster of a digital image
d) Pixel is the cluster of an analog image

23. The range of values spanned by the gray scale is called:
a) Dynamic range
b) Band range
c) Peak range
d) Resolution range

24. Which is a colour attribute that describes a pure colour?
a) Saturation
b) Hue
c) Brightness
d) Intensity

25. Which gives a measure of the degree to which a pure colour is diluted by white light?
a) Saturation
b) Hue
c) Intensity
d) Brightness

26. Which means the assigning meaning to a recognized object.
a) Interpretation
b) Recognition
c) Acquisition
d) Segmentation

27. A typical size comparable in quality to monochromatic TV image is of size.
    a) 256 X 256
    b) 512 X 512
    c) 1920 X 1080
    d) 1080 X 1080
28. The number of grey values are integer powers of:
    a) 4
    b) 2
    c) 8
    d) 1
29. A continuous image is digitised at _____ points.
    a) random
    b) vertex
    c) contour
    d) sampling
30. The transition between continuous values of the image function and its digital equivalent is called _____
    a) Quantisation
    b) Sampling
    c) Rasterisation
    d) None of the Mentioned
31. Images quantised with insufficient brightness levels will lead to the occurrence of
    _____
    a) Pixillation
    b) Blurring
    c) False Contours
    d) None of the Mentioned
32. The smallest discernible change in intensity level is called _____
    a) Intensity Resolution
    b) Contour
    c) Saturation
    d) Contrast
33. What is the tool used in tasks such as zooming, shrinking, rotating, etc.?
    a) Sampling
    b) Interpolation
    c) Filters
    d) None of the Mentioned
34. The type of Interpolation where for each new location the intensity of the immediate pixel is assigned is _____
    a) bicubic interpolation
    b) cubic interpolation
    c) bilinear interpolation
    d) nearest neighbour interpolation
35. The type of Interpolation where the intensity of the FOUR neighbouring pixels is used to obtain intensity a new location is called _____
    a) cubic interpolation
    b) nearest neighbour interpolation
    c) bilinear interpolation
    d) bicubic interpolation
36. Dynamic range of imaging system is a ratio where the upper limit is determined by
    a) Saturation

b) Noise

c) Brightness

d) Contrast

37. For Dynamic range ratio the lower limit is determined by

a) Saturation

b) Brightness

c) Noise

d) Contrast

38. Quantitatively, spatial resolution cannot be represented in which of the following ways

a) line pairs

b) pixels

c) dots

d) none of the Mentioned

39. At what points, a continuous image is digitized?

a)Sampling

b) Vertex

c) Contour

d) Random

40. _____ represents the transition between image function's continuous values and its digital equivalent.

a) Rasterization

b) Quantization

c) Sampling

d) None of the above

41. The dynamic range of the imaging system is a quantitative relation where the upper limit can be determined by

a)Brightness

b)Contrast

c)Saturation

d) Noise

42. The lower limit of the dynamic range ratio can be determined by

a.   Brightness

b. Contrast

c. Saturation

d. Noise

43. What is meant by the section of the real plane that the image coordinates have spanned?

a.   Coordinate Axis

b. Plane of Symmetry

c. Spatial Domain

d. None of the above

44. At what points, a continuous image is digitized?

a.   Sampling

b. Vertex

c. Contour

d. Random

45. _____ represents the transition between image function's continuous values and its digital equivalent.

a.   Rasterization

b. Quantization

c. Sampling

d. None of the above

46. The dynamic range of the imaging system is a quantitative relation where the upper limit can be determined by

a.   Brightness

b. Contrast

c. Saturation

d. Noise

47. The lower limit of the dynamic range ratio can be determined by

a.   Brightness

b. Contrast

c. Saturation

d. Noise

48. The most familiar single sensor used for Image Acquisition is

a) Microdensitometer

b) Photodiode

c) CMOS

d) None of the Mentioned

49. A geometry consisting of in-line arrangement of sensors for image acquisition

a) A photodiode

b) Sensor strips

c) Sensor arrays

d) CMOS

50. The section of the real plane spanned by the coordinates of an image is called the _____

a) Spacial Domain

b) Coordinate Axes

c) Plane of Symmetry

d) None of the Mentioned

51. The difference is intensity between the highest and the lowest intensity levels in an image is _____

a) Noise

b) Saturation

c) Contrast

d) Brightness

52. _____ is the effect caused by the use of an insufficient number of intensity levels in smooth areas of a digital image.

a) Gaussian smooth

b) Contouring

c) False Contouring

d) Interpolation

53. The process of using known data to estimate values at unknown locations is called

a) Acquisition

b) Interpolation

c) Pixelation

d) None of the Mentioned

54. Which of the following is NOT an application of Image Multiplication?

a) Shading Correction

b) Masking

c) Pixelation

d) Region of Interest operations

55. The procedure done on a digital image to alter the values of its individual pixels is

a) Neighbourhood Operations

b) Image Registration

c) Geometric Spacial Transformation

d) Single Pixel Operation

56. The histogram of a digital image with gray levels in the range [0, L-1] is represented by a discrete function:

a) $h(r_k)=n_k$

b) $h(r_k)=n/n_k$

c) $p(r_k)=n_k$

d) $h(r_k)=n_k/n$

57. How is the expression represented for the normalized histogram?

a) $p(r_{\_k})=n_{\_k}$

b) $p(r_{\_k})=n_{\_k}/n$

c) $p(r_{\_k})=nn_{\_k}$

d) $p(r_{\_k})=n/n_{\_k}$

58. The inverse transformation from s back to r is denoted as:

a) $s=T^{-1}(r)$ for $0\leq s\leq 1$

b) $r=T^{-1}(s)$ for $0\leq r\leq 1$

c) $r=T^{-1}(s)$ for $0\leq s\leq 1$

d) $r=T^{-1}(s)$ for $0\geq s\geq 1$

59. The probability density function $p_s(s)$ of the transformed variable s can be obtained by using which of the following formula?

a) $p_{\_s}(s)=p_{\_r}(r)|dr/ds|$

b) $p_s(s) = p_r(r)|ds/dr|$

c) $p_r(r) = p_s(s)|dr/ds|$

d) $p_s(s) = p_r(r)|dr/dr|$

60. A transformation function of particular importance in image processing is represented in which of the following form?

a) $s = T(r) = \int_0^{(2r)} p_r(\omega)d\omega$

b) $s = T(r) = \int_0^{(r-1)} p_r(\omega)d\omega$

c) $s = T(r) = \int_0^{(r/2)} p_r(\omega)d\omega$

d) $s = T(r) = \int_0 p_r(\omega)d\omega$

MCQ(2 marks question)

1. Histogram equalization or Histogram linearization is represented by of the following equation:

   a) $s_k = \sum_{j=1}^{k} n_j/n$ k=0,1,2,......,L-1

   b) $s_k = \sum_{j=0}^{k} n_j/n$ k=0,1,2,......,L-1

   c) $s_k = \sum_{j=0}^{k} n/n_j$ k=0,1,2,......,L-1

   d) $s_k = \sum_{j=n}^{k} n_j/n$ k=0,1,2,......,L-1

2. What is the method that is used to generate a processed image that have a specified histogram?

   a) Histogram linearization

   b) Histogram equalization

   c) Histogram matching

   d) Histogram processing

3. In a dark image, the components of histogram are concentrated on which side of the grey scale?

   a) High

   b) Medium

   c) Low

   d) Evenly distributed

4. In uniform PDF, the expansion of PDF is _____

   a) Portable Document Format

   b) Post Derivation Function

   c) Previously Derived Function

   d) Probability Density Function

5. Which expression is obtained by performing the negative transformation on the negative of an image with gray levels in the range[0,L-1] ?

   a) s=L+1-r

   b) s=L+1+r

   c) s=L-1-r

   d) s=L-1+r

6. What is the general form of representation of log transformation?

   a) s=clog$_{10}$(1/r)

   b) s=clog$_{10}$(1+r)

   c) s=clog$_{10}$(1*r)

   d) s=clog$_{10}$(1-r)

7. What is the general form of representation of power transformation?

   a) s=cr$^{\gamma}$

   b) c=sr$^{\gamma}$

   c) s=rc

   d) s=rc$^{\gamma}$

8. 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

9. Which of the following transformation function requires much information to be specified at the time of input?

   a) Log transformation

   b) Power transformation

   c) Piece-wise transformation

   d) Linear transformation

10. In contrast stretching, if r$_1$=s$_1$ and r$_2$=s$_2$ then which of the following is true?

    a) The transformation is not a linear function that produces no changes in gray levels

    b) The transformation is a linear function that produces no changes in gray levels

    c) The transformation is a linear function that produces changes in gray levels

    d) The transformation is not a linear function that produces changes in gray levels

11. In contrast stretching, if r$_1$=r$_2$, s$_1$=0 and s$_2$=L-1 then which of the following is true?

    a) The transformation becomes a thresholding function that creates an octal image

    b) The transformation becomes a override function that creates an octal image

    c) The transformation becomes a thresholding function that creates a binary image

d) The transformation becomes a thresholding function that do not create an octal image

12. In which type of slicing, highlighting a specific range of gray levels in an image often is desired?

a) Gray-level slicing

b) Bit-plane slicing

c) Contrast stretching

d) Byte-level slicing

13. Which of the following depicts the main functionality of the Bit-plane slicing?

a) Highlighting a specific range of gray levels in an image

b) Highlighting the contribution made to total image appearance by specific bits

c) Highlighting the contribution made to total image appearance by specific byte

d) Highlighting the contribution made to total image appearance by specific pixels

14. The two-dimensional translation equation in the matrix form is

a) P'=P+T

b) P'=P-T

c) P'=P*T

d) P'=p

15. _____ is a rigid body transformation that moves objects without deformation.

a) Rotation

b) Scaling

c) Translation

d) All of the mentioned

16. To change the position of a circle or ellipse we translate

a) Center coordinates

b) Center coordinates and redraw the figure in new location

c) Outline coordinates

d) All of the mentioned

17. Positive values for the rotation angle Θ defines

a) Counterclockwise rotations about the end points

b) Counterclockwise translation about the pivot point

c) Counterclockwise rotations about the pivot point

d) Negative direction

18. The original coordinates of the point in polor coordinates are

a) X'=r cos (Φ +Θ) and Y'=r cos (Φ +Θ)

b) X'=r cos (Φ +Θ) and Y'=r sin (Φ +Θ)

c) X'=r cos (Φ -Θ) and Y'=r cos (Φ -Θ)

d) X'=r cos (Φ +Θ) and Y'=r sin (Φ -Θ)

19. _____ is the rigid body transformation that moves object without deformation.

a) Translation

b) Scaling

c) Rotation

d) Shearing

20. If the scaling factors values sx and sy are assigned to the same value then

a) Uniform rotation is produced

b) Uniform scaling is produced

c) Scaling cannot be done

d) Scaling can be done or cannot be done

21. Find the Fourier transform of 1a+jt.

a) $2\pi e^{a\omega}$ u(ω)

b) $2\pi e^{a\omega}$ u(-ω)

c) $2\pi e^{-a\omega}$ u(ω)

d) $2\pi e^{-a\omega}$ u(-ω)

22. Find the inverse Fourier transform of e^{j2t}.

a) 2πδ(ω-2)

b) πδ(ω-2)

c) πδ(ω+2)

d) 2πδ(ω+2)

23. Find the inverse Fourier transform of jω.

a) δ(t)

b) ddt δ(t)

c) 1δ(t)

d) ∫δ(t)

24. Find the convolution of the signals x_1 (t) = e^{-2t} u(t) and x_2 (t) = e^{-3t} u(t).

a) e^{-2t} u(t) – e^{-3t} u(t)

b) e^{-2t} u(t) + e^{-3t} u(t)

c) e^{2t} u(t) – e^{3t} u(t)

d) e^{2t} u(t) – e^{-3t} u(t)

25. Find the inverse Fourier transform of f(t)=1.

a) u(t)

b) δ(t)

c) e^{-t}

d) 1jω

26. Find the inverse Fourier transform of sgn(ω).

a) $1\pi t$

b) $j\pi t$

c) jt

d) 1t

27. Given that S_1 and S_2 are two discrete time systems. Consider the following statements:

i) If S_1 and S_2 are linear, then S is linear

ii) If S_1 and S_2 are non-linear, then S is non-linear

iii) If S_1 and S_2 are causal, then S is causal

iv) If S_1 and S_2 are time invariant, then S is time invariant

The true statements from the above are _____

a) i, ii, iii

b) ii, iii, iv

c) I, iii, iv

d) I, ii, iii, iv

28. For two discrete time systems, consider the following statements:

i) If S_1 and S_2 are linear and time invariant, then interchanging their order does not change the system.

ii) If S_1 and S_2 are linear and time variant, then interchanging their order does not change the system

The correct statement from the above is _____

a) Both i & ii

b) Only i

c) Only ii

d) Neither i, nor ii

29. The following input-output pairs have been observed during the operation of a time invariant system

i) $x_1[n] = \{1, 0, 2\}$ (Laplace transform) $y_1[n] = \{0, 1, 2\}$

ii) $x_2[n] = \{0, 0, 3\}$ (Laplace transform) $y_2[n] = \{0, 1, 0, 2\}$

iii) $x_3[n] = \{0, 0, 0, 1\}$ (Laplace transform) $y_3[n] = \{1, 2, 1\}$

The conclusion regarding the linearity of the system is _____

a) Linear

b) Non-linear

c) One more observation is required

d) Conclusion cannot be drawn from observation

30. S_1 and S_2 are two DT systems which are connected together to form a new system.

Consider the following statements:

i) If S_1 and S_2 are non-causal, then S is non-causal

ii) If S_1 and/or S_2 are unstable, then S is unstable

The correct statement from the above is _____

a) Both i and ii

b) Only i

c) Only ii

d) Neither i nor ii

31. The Z transform of $\delta (n - m)$ is _____

a) z^{-n}

b) z^{-m}

c) $1/z{-}n$

d) $1/z{-}m$