

# Digital Image Processing

## Multiple Choice Question and Answer:-

1) Of the following, \_\_\_\_\_ has the maximum frequency.

- a) UV Rays
- b) Gamma Rays
- c) Microwaves
- d) Radio Waves

Answer: b

Explanation: Gamma Rays come first in the electromagnetic spectrum sorted in the decreasing order of frequency.

2) In the Visible spectrum the \_\_\_\_\_ colour has the maximum wavelength.

- a) Violet
- b) Blue
- c) Red
- d) Yellow

Answer: c

Explanation: Red is towards the right in the electromagnetic spectrum sorted in the increasing order of wavelength.

3) Wavelength and frequency are related as : (c = speed of light)

- a)  $c = \text{wavelength} / \text{frequency}$
- b)  $\text{frequency} = \text{wavelength} / c$
- c)  $\text{wavelength} = c * \text{frequency}$

d)  $c = \text{wavelength} * \text{frequency}$

Answer: d

Explanation: It is usually written as  $\text{wavelength} = c / \text{frequency}$ .

4) Electromagnetic waves can be visualised as a

- a) sine wave
- b) cosine wave
- c) tangential wave
- d) None of the above

Answer: a

Explanation: Electromagnetic waves are visualised as sinusoidal wave.

5) How is radiance measured?

- a) lumens
- b) watts
- c) armstrong
- d) hertz

Answer: b

Explanation: Radiance is the total amount of energy that flows from the light source and is measured in Watts.

6) Which of the following is used for chest and dental scans?

- a) Hard X-Rays
- b) Soft X-Rays

- c) Radio waves
- d) Infrared Rays

Answer: b

Explanation: Soft X-Rays (low energy) are used for dental and chest scans.

7) Which of the following is impractical to measure?

- a) Frequency
- b) Radiance
- c) Luminance
- d) Brightness

Answer: d

Explanation: Brightness is subjective descriptor of light perception that is impossible to measure.

8) Massless particle containing a certain amount of energy is called

- a) Photon
- b) Shell
- c) Electron
- d) None of these

Answer: a

Explanation: Each bundle of massless energy is called a Photon.

9) What do you mean by achromatic light?

- a) Chromatic light
- b) Monochromatic light

- c) Infrared light
- d) Invisible light

Answer: b

Explanation: Achromatic light is also called monochromatic light. (Light void of color)

10) Which of the following embodies the achromatic notion of intensity?

- a) Luminance
- b) Brightness
- c) Frequency
- d) Radiance

Answer: b

Explanation: Brightness embodies the achromatic notion of intensity and is a key factor in describing color sensation.

11) Which of the following is a receptor in the retina of human eye?

- a) Rods
- b) Cones
- c) Rods and Cones
- d) Neither Rods nor Cones

Answer: c

Explanation: Rods are long slender receptors while cones are shorter and thicker receptors.

12) How is image formation in the eye different from that in a photographic camera

- a) No difference

- b) Variable focal length
- c) Varying distance between lens and imaging plane
- d) Fixed focal length

Answer: b

Explanation: Fibers in ciliary body vary shape of the lens thereby varying its focal length.

13) Range of light intensity levels to which the human eye can adapt (in Log of Intensity-ml)

- a)  $10^{-6}$  to  $10^{-4}$
- b)  $10^4$  to  $10^6$
- c)  $10^{-6}$  to  $10^4$
- d)  $10^{-5}$  to  $10^5$

Answer: c

Explanation: Range of light intensity to which human eye can adapt is enormous and about the order  $10^{10}$  from  $10^{-6}$  to  $10^4$ .

14) What is subjective brightness?

- a) Related to intensity
- b) Related to brightness
- c) Related to image perception
- d) Related to image formation

Answer: a

Explanation: It is the intensity as perceived by the human eye.

15) What is brightness adaptation?

- a) Changing the eye's overall sensitivity
- b) Changing the eye's imaging ability
- c) Adjusting the focal length
- d) Transition from scotopic to photopic vision

Answer: a

Explanation: The human eye has a wide dynamic range by changing the eye's overall sensitivity and this is called brightness adaptation.

16) The innermost membrane of the human eye is

- a) Blind Spot
- b) Sclera
- c) Choroid
- d) Retina

Answer: d

Explanation: Retina is the innermost membrane of the human eye.

17) What is the function of Iris?

- a) Source of nutrition
- b) Detect color
- c) Varies focal length
- d) Control amount of light

Answer: d

Explanation: Iris is responsible for controlling the amount of light that enters the human eye.

18) \_\_\_\_\_ serve to a general, overall picture of the field of view.

- a) Cones
- b) Rods
- c) Retina
- d) All of the Mentioned

Answer: b

Explanation: Rods produce an overall picture of the field of view.

19) Ratio of number of rods to the number of cones is \_\_\_\_\_

- a) 1:20
- b) 1:2
- c) 1:1
- d) 1:5

Answer: a

Explanation: No of rods: 6 to 7 million, No of rods: 75 to 150.

20) The absence of receptors is in the retinal area called \_\_\_\_\_

- a) Lens
- b) Ciliary body
- c) Blind spot
- d) Fovea

Answer: c

Explanation: Except the blind spot, receptors are radially distributed.

21) The most familiar single sensor used for Image Acquisition is

- a) Microdensitometer
- b) Photodiode
- c) CMOS
- d) None of the Mentioned

Answer: b

Explanation: Photodiode is the most commonly used single sensor made up of silicon materials.

22) A geometry consisting of in-line arrangement of sensors for image acquisition

- a) A photodiode
- b) Sensor strips
- c) Sensor arrays
- d) CMOS

Answer: b

Explanation: Sensor strips are very common next to single sensor and use in-line arrangement.

23) CAT in imaging stands for

- a) Computer Aided Telegraphy
- b) Computer Aided Tomography
- c) Computerised Axial Telegraphy
- d) Computerised Axial Tomography

Answer: d

Explanation: Industrial Computerised Axial Tomography is based on image acquisition using sensor strips.

24) 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

Answer: a

Explanation: The section of the real plane spanned by the coordinates of an image is called the Spacial Domain, with the x and y coordinates referred to as Spacial coordinates.

25) The difference is intensity between the highest and the lowest intensity levels in an image is \_\_\_\_\_

- a) Noise
- b) Saturation
- c) Contrast
- d) Brightness

Answer: c

Explanation: Contrast is the measure of the difference is intensity between the highest and the lowest intensity levels in an image.

26) \_\_\_\_\_ 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

Answer: c

Explanation: It is called so because the ridges resemble the contours of a map.

27) 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

Answer: b

Explanation: Interpolation is the process used to estimate unknown locations. It is applied in all image resampling methods.

28) Which of the following is NOT an application of Image Multiplication?

- a) Shading Correction
- b) Masking
- c) Pixelation
- d) Region of Interest operations

Answer: c

Explanation: Because Pixelation deals with enlargement of pixels.

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

- a) Neighbourhood Operations
- b) Image Registration
- c) Geometric Spatial Transformation
- d) Single Pixel Operation

Answer: d

Explanation: It is expressed as a transformation function  $T$ , of the form  $s=T(z)$ , where  $z$  is the intensity.

30) In Geometric Spatial Transformation, points whose locations are known precisely in input and reference images.

- a) Tie points
- b) Réseau points
- c) Known points
- d) Key-points

Answer: a

Explanation: Tie points, also called Control points are points whose locations are known precisely in input and reference images.

31) A continuous image is digitised at \_\_\_\_\_ points.

- a) random
- b) vertex
- c) contour
- d) sampling

Answer: d

Explanation: The sampling points are ordered in the plane and their relation is called a Grid.

32) 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

Answer: a

Explanation: The transition between continuous values of the image function and its digital equivalent is called Quantisation.

33) Images quantised with insufficient brightness levels will lead to the occurrence of \_\_\_\_\_

- a) Pixillation
- b) Blurring
- c) False Contours
- d) None of the Mentioned

Answer: c

Explanation: This effect arises when the number brightness levels is lower that which the human eye can distinguish.

34) The smallest discernible change in intensity level is called \_\_\_\_\_

- a) Intensity Resolution
- b) Contour
- c) Saturation
- d) Contrast

Answer: a

Explanation: Number of bits used to quantise intensity of an image is called intensity resolution.

35) What is the tool used in tasks such as zooming, shrinking, rotating, etc.?

- a) Sampling
- b) Interpolation

- c) Filters
- d) None of the Mentioned

Answer: b

Explanation: Interpolation is the basic tool used for zooming, shrinking, rotating, etc.

36) 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

Answer: d

Explanation: Its called as Nearest Neighbour Interpolation since for each new location the intensity of the next neighbouring pixel is assigned.

37) 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

Answer: b

Explanation: Bilinear interpolation is where the FOUR neighbouring pixels is used to estimate intensity for a new location.

38) Dynamic range of imaging system is a ratio where the upper limit is determined by

- a) Saturation
- b) Noise
- c) Brightness
- d) Contrast

Answer: a

Explanation: Saturation is taken as the Numerator.

39) For Dynamic range ratio the lower limit is determined by

- a) Saturation
- b) Brightness
- c) Noise
- d) Contrast

Answer: c

Explanation: Noise is taken as the Denominator.

40) Quantitatively, spatial resolution cannot be represented in which of the following ways

- a) line pairs
- b) pixels
- c) dots
- d) None of the Mentioned

Answer: d

Explanation: All the options can be used to represent spatial resolution.

41) In 4-neighbours of a pixel p, how far are each of the neighbours located from p?

- a) one pixel apart
- b) four pixels apart
- c) alternating pixels
- d) None of the Mentioned

Answer: a

Explanation: Each pixel is a unit distance apart from the pixel p.

42) If S is a subset of pixels, pixels p and q are said to be \_\_\_\_\_ if there exists a path between them consisting of pixels entirely in S.

- a) continuous
- b) ambiguous
- c) connected
- d) None of the Mentioned

Answer: c

Explanation: pixels p and q are said to be connected if there exists a path between them consisting of pixels entirely in S.

43) If R is a subset of pixels, we call R a \_\_\_\_\_ of the image if R is a connected set.

- a) Disjoint
- b) Region
- c) Closed
- d) Adjacent

Answer: b

Explanation: R is called a Region of the image.

44) Two regions are said to be \_\_\_\_\_ if their union forms a connected set.

- a) Adjacent
- b) Disjoint
- c) Closed
- d) None of the Mentioned

Answer: a

Explanation: The regions are said to be Adjacent to each other.

45) If an image contains K disjoint regions, what does the union of all the regions represent?

- a) Background
- b) Foreground
- c) Outer Border
- d) Inner Border

Answer: b

Explanation: The union of all regions is called Foreground and its complement is called the Background.

46) For a region R, the set of points that are adjacent to the complement of R is called as \_\_\_\_\_

- a) Boundary
- b) Border
- c) Contour
- d) All of the Mentioned

Answer: d

Explanation: The words boundary, border and contour mean the same set.

47) The distance between pixels p and q, the pixels have a distance less than or equal to some value of

radius  $r$  centred at  $(x,y)$  is called :

- a) Euclidean distance
- b) City-Block distance
- c) Chessboard distance
- d) None of the Mentioned

Answer: a

Explanation: Euclidean distance is measured using a radius from a defined centre.

48) The distance between pixels  $p$  and  $q$ , the pixels have a distance less than or equal to some value of radius  $r$ , form a diamond centred at  $(x,y)$  is called :

- a) Euclidean distance
- b) Chessboard distance
- c) City-Block distance
- d) None of the Mentioned

Answer: c

Explanation: Formation of a diamond is measured as City-Block distance.

49) The distance between pixels  $p$  and  $q$ , the pixels have a distance less than or equal to some value of radius  $r$ , form a square centred at  $(x,y)$  is called :

- a) Euclidean distance
- b) Chessboard distance
- c) City-Block distance
- d) None of the Mentioned

Answer: b

Explanation: Distance measured by forming a square around the centre is called Chessboard distance.

50) Which of the following is NOT is not a type of Adjacency?

- a) 4-Adjacency
- b) 8-Adjacency
- c) m-Adjacency
- d) None of the Mentioned

Answer: d

Explanation: All the mentioned adjacency types are valid.

51) How is negative of an image obtained with intensity levels  $[0, L-1]$  with "r" and "s" being pixel values?

- a)  $s = L - 1 + r$
- b)  $s = L - 1 - r$
- c)  $s = L + 1 + r$
- d)  $s = L + 1 - r$

Answer: b

Explanation: The negative is obtained using  $s = L - 1 - r$ .

52) The general form of log transformations is \_\_\_\_\_.

- a)  $s = c \cdot \log(1 + r)$
- b)  $s = c + \log(1 + r)$
- c)  $s = c \cdot \log(1 - r)$
- d)  $s = c - \log(1 - r)$

Answer: a

Explanation:  $s = c \cdot \log(1 + r)$  is the log transformation.

53) Power-law transformations has the basic form of \_\_\_\_\_, where c and ? are constants.

- a)  $s = c + r$ ?
- b)  $s = c - r$ ?
- c)  $s = c * r$ ?
- d)  $s = c / r$ ?

Answer: c

Explanation:  $s = c * r$  is called the Power-law transformation.

54) For what value of the output must the Power-law transformation account for offset?

- a) No offset needed
- b) All values
- c) One
- d) Zero

Answer: d

Explanation: When the output is Zero, an offset is necessary.

55) What is Gamma Correction?

- a) A Power-law response phenomenon
- b) Inverted Intensity curve
- c) Light brightness variation
- d) None of the Mentioned

Answer: a

Explanation: The exponent in Power-law is called gamma and the process used to correct the response

of Power-law transformation is called Gamma Correction.

56) Which process expands the range of intensity levels in an image so that it spans the full intensity range of the display?

- a) Shading correction
- b) Contrast sketching
- c) Gamma correction
- d) None of the Mentioned

Answer: b

Explanation: Contrast sketching is the process used to expand intensity levels in an image.

57) Highlighting a specific range of intensities of an image is called \_\_\_\_\_.

- a) Intensity Matching
- b) Intensity Highlighting
- c) Intensity Slicing
- d) None of the Mentioned

Answer: c

Explanation: Highlighting a specific range of intensities of an image is called Intensity Slicing.

58) Highlighting the contribution made to total image by specific bits instead of highlighting intensity-level changes is called \_\_\_\_\_.

- a) Intensity Highlighting
- b) Byte-Slicing
- c) Bit-plane slicing
- d) None of the Mentioned

Answer: c

Explanation: It is called Bit-plane slicing.

59) Which of the following involves reversing the intensity levels of an image?

- a) Log Transformations
- b) Piecewise Linear Transformations
- c) Image Negatives
- d) None of the Mentioned.

Answer: c

Explanation: Image negatives use reversing intensity levels.

60) Piecewise Linear Transformation function involves which of the following?

- a) Bit-plane slicing
- b) Intensity level slicing
- c) Contrast stretching
- d) All of the Mentioned

Answer: d

Explanation: Piecewise Linear Transformation function involves all the mentioned functions

61) What is the basis for numerous spatial domain processing techniques?

- a) Transformations
- b) Scaling
- c) Histogram
- d) None of the Mentioned

Answer: c

Explanation: Histogram is the basis for numerous spatial domain processing techniques.

62) In \_\_\_\_\_ image we notice that the components of histogram are concentrated on the low side on intensity scale.

- a) bright
- b) dark
- c) colourful
- d) All of the Mentioned

Answer: b

Explanation: Only in dark images, we notice that the components of histogram are concentrated on the low side on intensity scale.

63) What is Histogram Equalisation also called as?

- a) Histogram Matching
- b) Image Enhancement
- c) Histogram linearisation
- d) None of the Mentioned

Answer: c

Explanation: Histogram Linearisation is also known as Histogram Equalisation.

64) What is Histogram Matching also called as?

- a) Histogram Equalisation
- b) Histogram Specification
- c) Histogram linearisation
- d) None of the Mentioned

Answer: b

Explanation: Histogram Specification is also known as Histogram Matching.

65) Histogram Equalisation is mainly used for \_\_\_\_\_.

- a) Image enhancement
- b) Blurring
- c) Contrast adjustment
- d) None of the Mentioned

Answer: a

Explanation: It is mainly used for Enhancement of usually dark images.

66) To reduce computation if one utilises non-overlapping regions, it usually produces \_\_\_\_\_ effect.

- a) Dimming
- b) Blurred
- c) Blocky
- d) None of the Mentioned

Answer: c

Explanation: Utilising non-overlapping regions usually produces "Blocky" effect.

67) What does SEM stands for?

- a) Scanning Electronic Machine
- b) Self Electronic Machine
- c) Scanning Electron Microscope
- d) Scanning Electric Machine

Answer: c

Explanation: SEM stands for Scanning Electron Microscope.

68) The type of Histogram Processing in which pixels are modified based on the intensity distribution of the image is called \_\_\_\_\_.

- a) Intensive
- b) Local
- c) Global
- d) Random

Answer: c

Explanation: It is called Global Histogram Processing.

69) Which type of Histogram Processing is suited for minute detailed enhancements?

- a) Intensive
- b) Local
- c) Global
- d) Random

Answer: b

Explanation: Local Histogram Processing is used.

70) In uniform PDF, the expansion of PDF is \_\_\_\_\_.

- a) Portable Document Format
- b) Post Derivation Function
- c) Previously Derived Function
- d) Probability Density Function

Answer: d

Explanation: PDF stands for Probability Density Function.

71) What is accepting or rejecting certain frequency components called as?

- a) Filtering
- b) Eliminating
- c) Slicing
- d) None of the Mentioned

Answer: a

Explanation: Filtering is the process of accepting or rejecting certain frequency components.

72) A filter that passes low frequencies is \_\_\_\_\_.

- a) Band pass filter
- b) High pass filter
- c) Low pass filter
- d) None of the Mentioned

Answer: c

Explanation: Low pass filter passes low frequencies.

73) What is the process of moving a filter mask over the image and computing the sum of products at each location called as?

- a) Convolution
- b) Correlation
- c) Linear spatial filtering

d) Non linear spatial filtering

Answer: b

Explanation: The process is called as Correlation.

74) The standard deviation controls “\_\_\_\_\_” of the bell (2-D Gaussian function of bell shape).

a) Size

b) Curve

c) Tightness

d) None of the Mentioned

Answer: c

Explanation: The standard deviation controls “tightness” of the bell.

75) What is required to generate an  $M \times N$  linear spatial filter?

a)  $MN$  mask coefficients

b)  $M+N$  coordinates

c)  $MN$  spatial coefficients

d) None of the Mentioned

Answer: a

Explanation: To generate an  $M \times N$  linear spatial filter  $MN$  mask coefficients must be specified.

76) What is the difference between Convolution and Correlation?

a) Image is pre-rotated by 180 degree for Correlation

b) Image is pre-rotated by 180 degree for Convolution

c) Image is pre-rotated by 90 degree for Correlation

d) Image is pre-rotated by 90 degree for Convolution

Answer: b

Explanation: Convolution is the same as Correlation except that the image must be rotated by 180 degrees initially.

77) Convolution and Correlation are functions of \_\_\_\_\_.

- a) Distance
- b) Time
- c) Intensity
- d) Displacement

Answer: d

Explanation: Convolution and Correlation are functions of displacement.

78) The function that contains a single 1 with the rest being 0s is called \_\_\_\_\_.

- a) Identity function
- b) Inverse function
- c) Discrete unit impulse
- d) None of the Mentioned

Answer: c

Explanation: It is called Discrete unit impulse.

79) Which of the following involves Correlation?

- a) Matching
- b) Key-points

- c) Blobs
- d) None of the Mentioned.

Answer: a

Explanation: Correlation is applied in finding matches.

80) An example of a continuous function of two variables is \_\_\_\_\_

- a) Identity function
- b) Intensity function
- c) Contrast stretching
- d) Gaussian function

Answer: d

Explanation: Gaussian function has two variables and is an exponential continuous function.

81) The output of a smoothing, linear spatial filtering is a \_\_\_\_\_ of the pixels contained in the neighbourhood of the filter mask.

- a) Sum
- b) Product
- c) Average
- d) Dot Product

Answer: c

Explanation: Smoothing is simply the average of the pixels contained in the neighbourhood.

82) Averaging filters is also known as \_\_\_\_\_ filter.

- a) Low pass

- b) High pass
- c) Band pass
- d) None of the Mentioned

Answer: a

Explanation: Averaging filters is also known as Low pass filters.

83) What is the undesirable side effects of Averaging filters?

- a) No side effects
- b) Blurred image
- c) Blurred edges
- d) Loss of sharp transitions

Answer: c

Explanation: Blue edges is the undesirable side effect of Averaging filters.

84) A spatial averaging filter in which all coefficients are equal is called \_\_\_\_\_.

- a) Square filter
- b) Neighbourhood
- c) Box filter
- d) Zero filter

Answer: c

Explanation: It is called a Box filter.

85) Which term is used to indicate that pixels are multiplied by different coefficients?

- a) Weighted average

- b) Squared average
- c) Spatial average
- d) None of the Mentioned

Answer: a

Explanation: It is called weighted average since more importance(weight) is given to some pixels.

86) The non linear spacial filters whose response is based on ordering of the pixels contained is called \_\_\_\_\_.

- a) Box filter
- b) Square filter
- c) Gaussian filter
- d) Order-statistic filter

Answer: d

Explanation: It is called Order-statistic filter.

87) Impulse noise in Order-statistic filter is also called as \_\_\_\_\_.

- a) Median noise
- b) Bilinear noise
- c) Salt and pepper noise
- d) None of the Mentioned

Answer: c

Explanation: It is called salt-and-pepper noise because of its appearance as white and black dots superimposed on an image.

88) Best example for a Order-statistic filter is \_\_\_\_\_.

- a) Impulse filter
- b) Averaging filter

- c) Median filter
- d) None of the Mentioned

Answer: c

Explanation: Median filter is the best known Order-statistic filter.

89) What does “eliminated” refer to in median filter?

- a) Force to average intensity of neighbours
- b) Force to median intensity of neighbours
- c) Eliminate median value of pixels
- d) None of the Mentioned.

Answer: b

Explanation: It refers to forcing to median intensity of neighbours.

90) Which of the following is best suited for salt-and-pepper noise elimination?

- a) Average filter
- b) Box filter
- c) Max filter
- d) Median filter

Answer: d

Explanation: Median filter is better suited than average filter for salt-and-pepper noise elimination.

91) What is the set generated using infinite-value membership functions, called?

- a) Crisp set
- b) Boolean set

- c) Fuzzy set
- d) All of the mentioned

Answer: c

Explanation: It is called fuzzy set.

92) Which is the set, whose membership only can be true or false, in bi-values Boolean logic?

- a) Boolean set
- b) Crisp set
- c) Null set
- d) None of the mentioned

Answer: b

Explanation: The so called Crisp set is the one in which membership only can be true or false, in bi-values Boolean logic.

93) If  $Z$  is a set of elements with a generic element  $z$ , i.e.  $Z = \{z\}$ , then this set is called \_\_\_\_\_

- a) Universe set
- b) Universe of discourse
- c) Derived set
- d) None of the mentioned

Answer: b

Explanation: It is called the universe of discourse.

94) A fuzzy set 'A' in  $Z$  is characterized by a \_\_\_\_\_ that associates with element of  $Z$ , a real number in the interval  $[0, 1]$ .

- a) Grade of membership

- b) Generic element
- c) Membership function
- d) None of the mentioned

Answer: c

Explanation: A fuzzy set is characterized by a membership function.

95) A fuzzy set is \_\_\_\_\_ if and only if membership function is identically zero in Z.

- a) Empty
- b) Subset
- c) Complement
- d) None of the mentioned

Answer: a

Explanation: It is called an Empty set.

96) Which of the following is a type of Membership function?

- a) Triangular
- b) Trapezoidal
- c) Sigma
- d) All of the mentioned

Answer: d

Explanation: All of them are types of Membership functions.

97) Which of the following is not a type of Membership function?

- a) S-shape

- b) Bell shape
- c) Truncated Gaussian
- d) None of the mentioned

Answer: d

Explanation: All of the mentioned above are types of Membership functions.

98) Using IF-THEN rule to create the output of fuzzy system is called \_\_\_\_\_.

- a) Inference
- b) Implication
- c) Both the mentioned
- d) None of the mentioned

Answer: c

Explanation: It is called Inference or Implication.

99) What is the independent variable of fuzzy output?

- a) Maturity
- b) Membership
- c) Generic Element
- d) None of the mentioned

Answer: a

Explanation: Maturity is the independent variable of fuzzy output.

100) Which of the following is not a principle step in fuzzy technique?

- a) Fuzzify input

- b) Apply implication method
- c) Defuzzify final output
- d) None of the mentioned

Answer: d

Explanation: All of the mentioned above are key steps in fuzzy technique.

101) The principle objective of Sharpening, to highlight transitions is \_\_\_\_\_.

- a) Pixel density
- b) Composure
- c) Intensity
- d) Brightness

Answer: c

Explanation: The principle objective of Sharpening, to highlight transitions is Intensity.

102) How can Sharpening be achieved?

- a) Pixel averaging
- b) Slicing
- c) Correlation
- d) None of the mentioned

Answer: d

Explanation: Sharpening is achieved using Spatial Differentiation.

103) What does Image Differentiation enhance?

- a) Edges

- b) Pixel Density
- c) Contours
- d) None of the mentioned

Answer: a

Explanation: Image Differentiation enhances Edges and other discontinuities.

104. What does Image Differentiation de-emphasize?

- a) Pixel Density
- b) Contours
- c) Areas with slowly varying intensities
- d) None of the mentioned

Answer: c

Explanation: Image Differentiation de-emphasizes areas with slowly varying intensities.

105) The requirements of the First Derivative of a digital function:

- a) Must be zero in areas of constant intensity
- b) Must be non-zero at the onset of an intensity step
- c) Must be non-zero along ramps
- d) All of the Mentioned

Answer: d

Explanation: All the three conditions must be satisfied.

106) What is the Second Derivative of Image Sharpening called?

- a) Gaussian

- b) Laplacian
- c) Canny
- d) None of the mentioned

Answer: b

Explanation: It is also called Laplacian.

107. The ability that rotating the image and applying the filter gives the same result, as applying the filter to the image first, and then rotating it, is called \_\_\_\_\_.

- a) Isotropic filtering
- b) Laplacian
- c) Rotation Invariant
- d) None of the mentioned

Answer: c

Explanation: It is called Rotation Invariant, although the process used is Isotropic filtering.

108) For a function  $f(x,y)$ , the gradient of 'f' at coordinates  $(x,y)$  is defined as a \_\_\_\_\_.

- a) 3-D row vector
- b) 3-D column vector
- c) 2-D row vector
- d) 2-D column vector

Answer: d

Explanation: The gradient is a 2-D column vector.

109) Where do you find frequent use of Gradient?

- a) Industrial inspection
- b) MRI Imaging
- c) PET Scan
- d) None of the mentioned

Answer: a

Explanation: Gradient is used in Industrial inspection, to aid humans, in detection of defects.

110) Which of the following occurs in Unsharp Masking?

- a) Blurring original image
- b) Adding a mask to original image
- c) Subtracting blurred image from original
- d) All of the mentioned

Answer: d

Explanation: In Unsharp Masking, all of the above occurs in the order: Blurring, Subtracting the blurred image and then Adding the mask.

111) Which of the following make an image difficult to enhance?

- a) Narrow range of intensity levels
- b) Dynamic range of intensity levels
- c) High noise
- d) All of the mentioned

Answer: d

Explanation: All the mentioned options make it difficult to enhance an image.

112) Which of the following is a second-order derivative operator?

- a) Histogram
- b) Laplacian
- c) Gaussian
- d) None of the mentioned

Answer: b

Explanation: Laplacian is a second-order derivative operator.

113) Response of the gradient to noise and fine detail is \_\_\_\_\_ the Laplacian's.

- a) equal to
- b) lower than
- c) greater than
- d) has no relation with

Answer: b

Explanation: Response of the gradient to noise and fine detail is lower than the Laplacian's and can further be lowered by smoothing.

114) Dark characteristics in an image are better solved using \_\_\_\_\_.

- a) Laplacian Transform
- b) Gaussian Transform
- c) Histogram Specification
- d) Power-law Transformation

Answer: d

Explanation: It can be solved by Histogram Specification but it is better handled by Power-law Transformation.

115) What is the smallest possible value of a gradient image?

- a) e
- b) 1
- c) 0
- d) -e

Answer: c

Explanation: The smallest possible value of a gradient image is 0.

116) Which of the following fails to work on dark intensity distributions?

- a) Laplacian Transform
- b) Gaussian Transform
- c) Histogram Equalization
- d) Power-law Transformation

Answer: c

Explanation: Histogram Equalization fails to work on dark intensity distributions.

117) \_\_\_\_\_ is used to detect diseases such as bone infection and tumors.

- a) MRI Scan
- b) PET Scan
- c) Nuclear Whole Body Scan
- d) X-Ray

Answer: c

Explanation: Nuclear Whole Body Scan is used to detect diseases such as bone infection and tumors

118) How do you bring out more of the skeletal detail from a Nuclear Whole Body Bone Scan?

- a) Sharpening
- b) Enhancing
- c) Transformation
- d) None of the mentioned

Answer: a

Explanation: Sharpening is used to bring out more of the skeletal detail.

119) Final step of enhancement lies in \_\_\_\_\_ of the sharpened image.

- a) Increase range of contrast
- b) Increase range of brightness
- c) Increase dynamic range
- d) None of the mentioned

Answer: c

Explanation: Increasing the dynamic range of the sharpened image is the final step in enhancement.

120) An alternate approach to median filtering is \_\_\_\_\_

- a) Use a mask
- b) Gaussian filter
- c) Sharpening
- d) Laplacian filter

Answer: a

Explanation: Using a mask, formed from the smoothed version of the gradient image, can be used for median filtering.

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