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

2. 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

3. 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

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

5. The number of grey values are integer powers of:  
a) 4  
b) 2  
c) 8  
d) 1

6. The most familiar single sensor used for Image Acquisition is  
a) Microdensitometer  
b) Photodiode  
c) CMOS  
d) None of the Mentioned

7. A geometry consisting of in-line arrangement of sensors for image acquisition  
a) A photodiode  
b) Sensor strips  
c) Sensor arrays  
d) CMOS

8.The section of the real plane spanned by the coordinates of an image is called the \_\_\_\_\_\_\_\_\_\_\_\_\_  
a) Spatial Domain  
b) Coordinate Axes  
c) Plane of Symmetry  
d) None of the Mentioned

9.The difference is intensity between the highest and the lowest intensity levels in an image is \_\_\_\_\_\_\_\_\_\_\_  
a) Noise  
b) Saturation  
c) Contrast  
d) Brightness

10.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

11.In Geometric Spatial Transformation, points whose locations are known precisely in input and reference images.  
a) Tie/Control points  
b) Réseau points  
c) Known points  
d) Key-points

12. Wavelength and frequency are related as : (c = speed of light)  
a) c = wavelength / frequency  
b) frequency = wavelength / c  
c) wavelength = c \* frequency  
d) c = wavelength \* frequency

13. How is radiance measured?  
a) lumens  
b) watts  
c) armstrong  
d) hertz

 14. Image processing approaches operating directly on pixels of input image work directly in \_\_\_\_\_\_\_\_\_\_\_\_  
a) Transform domain  
b) Spatial domain  
c) Inverse transformation  
d) None of the Mentioned

15. Which of the following expression is used to denote spatial domain process?  
a) g(x,y)=T[f(x,y)]  
b) f(x+y)=T[g(x+y)]  
c) g(xy)=T[f(xy)]  
d) g(x-y)=T[f(x-y)]

16.The smallest discernible change in intensity level is called \_\_\_\_\_\_\_\_\_\_\_\_  
a) Intensity Resolution  
b) Contour  
c) Saturation  
d) Contrast

17. What is the tool used in tasks such as zooming, shrinking, rotating, etc.?  
a) Sampling  
b) Interpolation  
c) Filters  
d) None of the Mentioned

18. Images quantized with insufficient brightness levels will lead to the occurrence of \_\_\_\_\_\_\_\_\_\_\_\_  
a) Pixillation  
b) Blurring  
c) False Contours  
d) None of the Mentioned

19. 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

20. 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

21.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

22. 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

23. 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

24. 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

25. 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

26. Assume that an image f(x, y) is sampled so that the result has M rows and N columns. If the values of the coordinates at the origin are (x, y) = (0, 0), then the notation (0, 1) is used to signify :  
a) Second sample along first row  
b) First sample along second row  
c) First sample along first row  
d) Second sample along second row

27. The resulting image of sampling and quantization is considered a matrix of real numbers. By what name(s) the element of this matrix array is called \_\_\_\_\_\_\_\_\_\_  
a) Image element or Picture element  
b) Pixel or Pel  
c) All of the mentioned  
d) None of the mentioned

28. An image whose gray-levels span a significant portion of gray scale have \_\_\_\_\_\_\_\_\_\_ dynamic range while an image with dull, washed out gray look have \_\_\_\_\_\_\_\_\_\_ dynamic range.  
a) Low and High respectively  
b) High and Low respectively  
c) Both have High dynamic range, irrespective of gray levels span significance on gray scale  
d) Both have Low dynamic range, irrespective of gray levels span significance on gray scale

29. Validate the statement “When in an Image an appreciable number of pixels exhibit high dynamic range, the image will have high contrast.”  
a) True  
b) False

30. In digital image of M rows and N columns and L discrete gray levels, calculate the bits required to store a digitized image for M=N=32 and L=16.  
a) 16384  
b) 4096  
c) 8192  
d) 512

31. What is the first and foremost step in Image Processing?  
a) Image restoration  
b) Image enhancement  
c) Image acquisition  
d) Segmentation

32. 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

33. 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

34. \_\_\_\_\_ is the total amount of energy that flows from light source.

(A) Radiance

(B) Darkness

(C) Brightness

(D) Luminance

35. Midlevel processing on image involves

(A) Acquisition

(B) Sampling

(C) Segmentation

(D) Quantization

36. The sharpness and accuracy of an image is basically known as

(A) Illumination

(B) Resolution

(C) Quantization

(D) Scaling

37. An image made up of square array of 256 x 256 pixels requires how much storage area?

(A) 512 KB

(B) 256 KB

(C) 128 KB

(D) 64 KB

38. In human visual system, the area in which the receptors are absent is called

(A) fovea

(B) rods

(C) hot spot

(D) blind spot

Spatial Filtering

39. In neighborhood operations working is being done with the value of image pixel in the neighborhood and the corresponding value of a subimage that has same dimension as neighborhood. The subimage is referred as \_\_\_\_\_\_\_\_\_  
a) Filter  
b) Mask  
c) Template  
d) All of the mentioned

40. The response for linear spatial filtering is given by the relationship \_\_\_\_\_\_\_\_\_\_  
a) Sum of filter coefficient’s product and corresponding image pixel under filter mask  
b) Difference of filter coefficient’s product and corresponding image pixel under filter mask  
c) Product of filter coefficient’s product and corresponding image pixel under filter mask  
d) None of the mentioned

41. In linear spatial filtering, what is the pixel of the image under mask corresponding to the mask coefficient w (1, -1), assuming a 3\*3 mask?  
a) f (x, -y)  
b) f (x + 1, y)  
c) f (x, y – 1)  
d) f (x + 1, y – 1)

42. In neighborhood operation for spatial filtering if a square mask of size n\*n is used it is restricted that the center of mask must be at a distance ≥ (n – 1)/2 pixels from border of image, what happens to the resultant image?  
a) The resultant image will be of same size as original image  
b) The resultant image will be a little larger size than original image  
c) The resultant image will be a little smaller size than original image  
d) None of the mentioned

43. Which of the following method is/are used for padding the image?  
a) Adding rows and column of 0 or other constant gray level  
b) Simply replicating the rows or columns  
c) All of the mentioned  
d) None of the mentioned

44.In neighborhood operation for spatial filtering using square mask of n\*n, which of the following approach is/are used to obtain a perfectly filtered result irrespective of the size?  
a) By padding the image  
b) By filtering all the pixels only with the mask section that is fully contained in the image  
c) By ensuring that center of mask must be at a distance ≥ (n – 1)/2 pixels from border of image  
d) None of the mentioned

45. Which of the following fact(s) is/are true for the relationship between low frequency component of Fourier transform and the rate of change of gray levels?  
a) Moving away from the origin of transform the low frequency corresponds to smooth gray level variation  
b) Moving away from the origin of transform the low frequencies corresponds to abrupt change in gray level  
c) All of the mentioned  
d) None of the mentioned

46. Which of the following fact(s) is/are true for the relationship between high frequency component of Fourier transform and the rate of change of gray levels?  
a) Moving away from the origin of transform the high frequency corresponds to smooth gray level variation  
b) Moving away from the origin of transform the higher frequencies corresponds to abrupt change in gray level  
c) All of the mentioned  
d) None of the mentioned

47. To set the average value of an image zero, which of the following term would be set 0 in the frequency domain and the inverse transformation is done, where F(u, v) is Fourier transformed function of f(x, y)?  
a) F(0, 0)  
b) F(0, 1)  
c) F(1, 0)  
d) None of the mentioned

48. Which of the following filter(s) attenuates high frequency while passing low frequencies of an image?  
a) Unsharp mask filter  
b) Lowpass filter  
c) Zero-phase-shift filter  
d) All of the mentioned

49. Which of the following filter have a less sharp detail than the original image because of attenuation of high frequencies?  
a) Highpass filter  
b) Lowpass filter  
c) Zero-phase-shift filter  
d) None of the mentioned

 50. The feature(s) of a highpass filtered image is/are \_\_\_\_\_\_\_\_\_\_\_  
a) Have less gray-level variation in smooth areas  
b) Emphasized transitional gray-level details  
c) An overall sharper image  
d) All of the mentioned

51. A spatial domain filter of the corresponding filter in frequency domain can be obtained by applying which of the following operation(s) on filter in frequency domain?  
a) Fourier transform  
b) Inverse Fourier transform  
c) None of the mentioned  
d) All of the mentioned

52. A frequency domain filter of the corresponding filter in spatial domain can be obtained by applying which of the following operation(s) on filter in spatial domain?  
a) Fourier transform  
b) Inverse Fourier transform  
c) None of the mentioned  
d) All of the mentioned

53. Smoothing in frequency domain is achieved by attenuating which of the following component in the transform of a given image?  
a) Attenuating a range of high-frequency components  
b) Attenuating a range of low-frequency components  
c) All of the mentioned  
d) None of the mentioned

54. In Frequency domain filtering, the characteristics of the lowpass filter h(x, y) is/are\_\_\_\_\_\_\_\_\_  
a) Has a dominant component at origin  
b) Has a concentric, circular components about the center component  
c) All of the mentioned  
d) None of the mentioned

55. 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

 56. The general form of log transformations is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
a) s = c.log(1 + r)  
b) s = c+log(1 + r)  
c) s = c.log(1 – r)  
d) s = c-log(1 – r)

57. 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.∆

58. What is Gamma Correction?  
a) A Power-law response phenomenon  
b) Inverted Intensity curve  
c) Light brightness variation  
d) None of the Mentioned

 59. 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

60. 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

61. 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

62. 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

63. 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

64. Which gray-level transformation increase the dynamic range of gray-level in the image?  
a) Power-law transformations  
b) Negative transformations  
c) Contrast stretching  
d) None of the mentioned

65. When is the contrast stretching transformation a linear function, for r and s as gray-value of image before and after processing respectively?  
a) r1 = s1 and r2 = s2  
b) r1 = r2, s1 = 0 and s2 = L – 1, L is the max gray value allowed  
c) r1 = 1 and r2 = 0  
d) None of the mentioned

66. When is the contrast stretching transformation a thresholding function, for r and s as gray-value of image before and after processing respectively?  
a) r1 = s1 and r2 = s2  
b) r1 = r2, s1 = 0 and s2 = L – 1, L is the max gray value allowed  
c) r1 = 1 and r2 = 0  
d) None of the mentioned

67. What condition prevents the intensity artifacts to be created while processing with contrast stretching, if r and s are gray-values of image before and after processing respectively?  
a) r1 = s1 and r2 = s2  
b) r1 = r2, s1 = 0 and s2 = L – 1, L is the max gray value allowed  
c) r1 = 1 and r2 = 0  
d) r1 ≤ r2 and s1 ≤ s2

68. A specific range of gray-levels highlighting is the basic idea of \_\_\_\_\_\_\_\_\_\_  
a) Contrast stretching  
b) Bit –plane slicing  
c) Thresholding  
d) Gray-level slicing

69. In level gray slicing image enhancement technique the following approach/approaches are used:   
a) To give all gray level of a specific range high value and a low value to all other gray levels  
b) To brighten the pixels gray-value of interest and preserve the background  
c) All of the mentioned  
d) None of the mentioned

70. Which of the following transform produces a binary image after processing?  
a) Contrast stretching  
b) Gray-level slicing  
c) All of the mentioned  
d) None of the mentioned

71. The lowpass filtering process can be applied in which of the following area(s)?  
a) The field of machine perception, with application of character recognition  
b) In field of printing and publishing industry  
c) In field of processing satellite and aerial images  
d) All of the mentioned

72. 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

73. 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

74. In histogram equalization which of the following conditions does the T(r) must satisfy?  
a) T(r) is double-valued and monotonically decreasing in the interval 0≤r≤1; and  
0≤T(r)≤1 for 0≤r≤1  
b) T(r) is double-valued and monotonically increasing in the interval 0≤r≤1; and  
0≤T(r)≤1 for 0≤r≤1  
c) T(r) is single-valued and monotonically decreasing in the interval 0≤r≤1; and  
0≤T(r)≤1 for 0≤r≤1  
d) T(r) is single-valued and monotonically increasing in the interval 0≤r≤1; and  
0≤T(r)≤1 for 0≤r≤1

75. The inverse transformation from s back to r is denoted as:  
a) s=T-1(r) for 0≤s≤1  
b) r=T-1(s) for 0≤r≤1  
c) r=T-1(s) for 0≤s≤1  
d) r=T-1(s) for 0≥s≥1

76. 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|

 77. A transformation function of particular importance in image processing is represented in which of the following form?  
a) s=T(r)=∫0 (2r)pr (ω)dω  
b) s=T(r)=∫0 (r-1)pr (ω)dω  
c) s=T(r)=∫0 (r/2)pr (ω)dω  
d) s=T(r)=∫0 pr (ω)dω

78. Histogram equalization or Histogram linearization is represented by of the following equation:  
a) sk =∑k j =1 nj/n k=0,1,2,……,L-1  
b) sk =∑k j =0 nj/n k=0,1,2,……,L-1  
c) sk =∑k j =0 n/nj k=0,1,2,……,L-1  
d) sk =∑k j =n nj/n k=0,1,2,……,L-1

79. Histograms are the basis for numerous spatial domain processing techniques.  
a) True  
b) False

80. 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

81. What is the basis for numerous spatial domain processing techniques?  
a) Transformations  
b) Scaling  
c) Histogram  
d) None of the Mentioned

82. 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

83. What is Histogram Equalisation also called as?  
a) Histogram Matching  
b) Image Enhancement  
c) Histogram linearisation  
d) None of the Mentioned

84. Which type of Histogram Processing is suited for minute detailed enhancements?  
a) Intensive  
b) Local  
c) Global  
d) Random

85. 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

86. The edges and other abrupt changes in gray-level of an image are associated with\_\_\_\_\_\_\_\_\_  
a) High frequency components  
b) Low frequency components  
c) Edges with high frequency and other abrupt changes in gray-level with low frequency components  
d) Edges with low frequency and other abrupt changes in gray-level with high frequency components

87.Image sharpening in frequency domain can be achieved by which of the following method(s)?  
a) Attenuating the high frequency components  
b) Attenuating the low-frequency components  
c) All of the mentioned  
d) None of the mentioned

88.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

89. 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

90.  Range of light intensity levels to which the human eye can adapt (in Log of Intensity-mL)  
a) 10-6 to 10-4  
b) 104 to 106  
c) 10-6 to 104  
d) 10-5 to 105

91. The inner most membrane of the human eye is  
a) Blind Spot  
b) Sclera  
c) Choroid  
d) Retina

92. What is the function of Iris in Human Eye?  
a) Source of nutrition  
b) Detect color  
c) Varies focal length  
d) Control amount of light

93. \_\_\_\_\_\_\_\_ serve to a general, overall picture of the field of view.  
a) Cones  
b) Rods  
c) Retina  
d) All of the Mentioned

94. 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

95. 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

 96. 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

97. Two regions are said to be \_\_\_\_\_\_\_\_\_\_\_ if their union forms a connected set.  
a) Adjacent  
b) Disjoint  
c) Closed  
d) None of the Mentioned

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

98. 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

99. 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

100. 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

 101. 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

102. 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

103. What is the quantity that is used to measure the total amount of energy flowing from the light source?  
a) Brightness  
b) Intensity  
c) Luminence  
d) Radiance

104. The texture of the region provides measure of which of the following properties?  
a) Smoothness alone  
b) Coarseness alone  
c) Regularity alone  
d) Smoothness, coarseness and regularity

105. The principal factor to determine the spatial resolution of an image is \_\_\_\_\_\_\_  
a) Quantization  
b) Sampling  
c) Contrast  
d) Dynamic range

106. A pixel p at coordinates (x, y) has neighbors whose coordinates are given by:  
(x+1, y), (x-1, y), (x, y+1), (x, y-1)  
This set of pixels is called \_\_\_\_\_\_\_\_\_\_\_\_  
a) 4-neighbors of p  
b) Diagonal neighbors  
c) 8-neighbors  
d) None of the mentioned

107.A pixel p at coordinates (x, y) has neighbors whose coordinates are given by:  
(x+1, y+1), (x+1, y-1), (x-1, y+1), (x-1, y-1)  
This set of pixels is called \_\_\_\_\_\_\_\_\_\_\_\_  
a) 4-neighbors of p  
b) Diagonal neighbors  
c) 8-neighbors  
d) None of the mentioned

108. What is the set of pixels of 8-neighbors of pixel p at coordinates (x, y)?  
a) (x+1, y), (x-1, y), (x, y+1), (x, y-1), (x+2, y), (x-2, y), (x, y+2), (x, y-2)  
b) (x+1, y), (x-1, y), (x, y+1), (x, y-1), (x+1, y+1), (x+1, y-1), (x-1, y+1), (x-1, y-1)  
c) (x+1, y+1), (x+1, y-1), (x-1, y+1), (x-1, y-1), (x+2, y+2), (x+2, y-2), (x-2, y+2), (x-2, y-2)  
d) (x+2, y), (x-2, y), (x, y+2), (x, y-2), (x+2, y+2), (x+2, y-2), (x-2, y+2), (x-2, y-2)

109. Two pixels p and q having gray values from V, the set of gray-level values used to define adjacency, are m-adjacent if:  
a) q is in N4(p)  
b) q is in ND(p) and the set N4(p) ∩ N4(q) has no pixels whose values are from V  
c) Any of the mentioned  
d) None of the mentioned

110.Let S, a subset of pixels in an image, is said to be a connected set if:  
a) If for any pixel p in S, the set of pixels that are connected to it in Sis only one  
b) If it only has one connected component  
c) If S is a region  
d) All of the mentioned

111.Let R be a subset of pixels in an image. How can we define the contour of R?  
a) If R is a region, and the set of pixels in R have one or more neighbors that are not in R  
b) If R is an entire image, then the set of pixels in the first and last rows and columns of R  
c) All of the mentioned  
d) None of the mentioned

 112. For pixels p(x, y), q(s, t), and z(v, w), D is a distance function or metric if:  
a) D(p, q) ≥ 0  
b) D(p, q) = D(q, p)  
c) D(p, z) ≤ D(p, q) + D(q, z)  
d) All of the mentioned

113. For pixels p(x, y), q(s, t), the Euclidean distance between p and q is defined as:  
a) D(p, q) = [(x – s)2 + (y – t)2]1/2  
b) D(p, q) = |x – s| + |y – t|  
c) D(p, q) = max (|x – s| + |y – t|)  
d) None of the mentioned

114. For pixels p(x, y), q(s, t), the city-block distance between p and q is defined as:  
a) D(p, q) = [(x – s)2 + (y – t)2]1/2  
b) D(p, q) = |x – s| + |y – t|  
c) D(p, q) = max (|x – s| + |y – t|)  
d) None of the mentioned

115. For pixels p(x, y), q(s, t), the chessboard distance between p and q is defined as:  
a) D(p, q) = [(x – s)2 + (y – t)2]1/2  
b) D(p, q) = |x – s| + |y – t|  
c) D(p, q) = max (|x – s| + |y – t|)  
d) None of the mentioned

116.What is the technique for a gray-level transformation function called, if the transformation would be to produce an image of higher contrast than the original by darkening the levels below some gray-level m and brightening the levels above m in the original image.  
a) Contouring  
b) Contrast stretching  
c) Mask processing  
d) Point processing

117.For Image Enhancement a general-approach is to use 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). The techniques that uses such approaches are called \_\_\_\_\_\_\_\_  
a) Contouring  
b) Contrast stretching  
c) Mask processing  
d) None of the mentioned

118.If h(rk) = nk, rk the kth gray level and nk total pixels with gray level rk, is a histogram in gray level range [0, L – 1]. Then how can we normalize a histogram?  
a) If each value of histogram is added by total number of pixels in image, say n, p(rk)=nk+n  
b) If each value of histogram is subtracted by total number of pixels in image, say n, p(rk)=nk-n  
c) If each value of histogram is multiplied by total number of pixels in image, say n, p(rk)=nk \* n  
d) If each value of histogram is divided by total number of pixels in image, say n, p(rk)=nk / n

119.What is the sum of all components of a normalized histogram?  
a) 1  
b) -1  
c) 0  
d) None of the mentioned

120.A low contrast image will have what kind of histogram when, the histogram, h(rk) = nk, rk the kth gray level and nk total pixels with gray level rk, is plotted nk versus rk?  
a) The histogram that are concentrated on the dark side of gray scale  
b) The histogram whose component are biased toward high side of gray scale  
c) The histogram that is narrow and centered toward the middle of gray scale  
d) The histogram that covers wide range of gray scale and the distribution of pixel is approximately uniform

121. A bright image will have what kind of histogram, when the histogram, h(rk) = nk, rk the kth gray level and nk total pixels with gray level rk, is plotted nk versus rk?  
a) The histogram that are concentrated on the dark side of gray scale  
b) The histogram whose component are biased toward high side of gray scale  
c) The histogram that is narrow and centered toward the middle of gray scale  
d) The histogram that covers wide range of gray scale and the distribution of pixel is approximately uniform

122. A high contrast image and a dark image will have what kind of histogram respectively, when the histogram, h(rk) = nk, rk the kth gray level and nk total pixels with gray level rk, is plotted nk versus rk?  
I.The histogram that are concentrated on the dark side of gray scale.  
II.The histogram whose component are biased toward high side of gray scale.  
III.The histogram that is narrow and centered toward the middle of gray scale.  
IV. The histogram that covers wide range of gray scale and the distribution of pixel is approximately uniform.  
a) I) And II) respectively  
b) III) And II) respectively  
c) II) And IV) respectively  
d) IV) And I) respectively

123. The transformation s = T(r) producing a gray level s for each pixel value r of input image. Then, if the T(r) is single valued in interval 0 ≤ r ≤ 1, what does it signifies?  
a) It guarantees the existence of inverse transformation  
b) It is needed to restrict producing of some inverted gray levels in output  
c) It guarantees that the output gray level and the input gray level will be in same range  
d) All of the mentioned

124. The transformation s = T(r) producing a gray level s for each pixel value r of input image. Then, if the T(r) is monotonically increasing in interval 0 ≤ r ≤ 1, what does it signifies?  
a) It guarantees the existence of inverse transformation  
b) It is needed to restrict producing of some inverted gray levels in output  
c) It guarantees that the output gray level and the input gray level will be in same range  
d) All of the mentioned

125. The transformation s = T(r) producing a gray level s for each pixel value r of input image. Then, if the T(r) is satisfying 0 ≤ T(r) ≤ 1 in interval 0 ≤ r ≤ 1, what does it signifies?  
a) It guarantees the existence of inverse transformation  
b) It is needed to restrict producing of some inverted gray levels in output  
c) It guarantees that the output gray level and the input gray level will be in same range  
d) All of the mentioned

126. The transformation T (rk) = ∑k(j=0) nj /n, k = 0, 1, 2, …, L-1, where L is max gray value possible and r-k is the kth gray level, is called \_\_\_\_\_\_\_  
a) Histogram linearization  
b) Histogram equalization  
c) All of the mentioned  
d) None of the mentioned

127. If the histogram of same images, with different contrast, are different, then what is the relation between the histogram equalized images?  
a) They look visually very different from one another  
b) They look visually very similar to one another  
c) They look visually different from one another just like the input images  
d) None of the mentioned

128. A filter is applied to an image whose response is independent of the direction of discontinuities in the image. The filter is/are \_\_\_\_\_\_\_\_  
a) Isotropic filters  
b) Box filters  
c) Median filter  
d) All of the mentioned

129.  In isotropic filtering, which of the following is/are the simplest isotropic derivative operator?  
a) Laplacian  
b) Gradient  
c) All of the mentioned  
d) None of the mentioned

130. The Laplacian is which of the following operator?  
a) Nonlinear operator  
b) Order-Statistic operator  
c) Linear operator  
d) None of the mentioned

131.A Laplacian for an image f(x, y) is defined as: [digital-image-processing-questions-answers-second-order-derivative-enhancement-q5](https://www.sanfoundry.com/wp-content/uploads/2017/06/digital-image-processing-questions-answers-second-order-derivative-enhancement-q5.png) is given by \_\_\_\_\_\_\_\_  
a) [f(x + 1, y) + f(x – 1, y) – 2f(x, y)] and [f(x, y + 1) + f(x, y – 1) – 2f(x, y)] respectively  
b) [f(x + 1, y + 1) + f(x, y – 1) – 2f(x, y)] and [f(x , y + 1) + f(x – 1, y) – 2f(x, y)] respectively  
c) [f(x, y + 1) + f(x, y – 1) – 2f(x, y)] and [f(x + 1, y) + f(x – 1, y) – 2f(x, y)] respectively  
d) None of the mentioned

132. The Laplacian ∇2 f=[f(x + 1, y) + f(x – 1, y) + f(x, y + 1) + f(x, y – 1) – 4f(x, y)], gives an isotropic result for rotations in increment by what degree?  
a) 90o  
b) 0o  
c) 45o  
d) None of the mentioned

133. A mask of size 3\*3 is formed using Laplacian including diagonal neighbors that has central coefficient as 9. Then, what would be the central coefficient of same mask if it is made without diagonal neighbors?  
a) 5  
b) -5  
c) 8  
d) -8

134. First derivative in image processing is implemented using which of the following given operator(s)?  
a) Magnitude of Gradient vector  
b) The Laplacian  
c) All of the mentioned  
d) None of the mentioned

135. If for an image function f(x, y), the magnitude of gradient vector [digital-image-processing-questions-bank-q4](https://www.sanfoundry.com/wp-content/uploads/2017/06/digital-image-processing-questions-bank-q4.png)is given by: mag(∇f)=[G2x+G2y] (1/2), then which of the following fact is correct?  
a) The component of Gradient vector are linear operator and also the magnitude of the vector  
b) The component of Gradient vector are linear operator, but the magnitude are not  
c) The component of Gradient vector are nonlinear operator and also the magnitude of the vector  
d) The component of Gradient vector are nonlinear operator, but the magnitude are not

136. What is the sum of the coefficient of the mask defined using gradient?  
a) 1  
b) -1  
c) 0  
d) None of the mentioned

137.Gradient is used in which of the following area(s)?  
a) To aid humans in detection of defects  
b) As a preprocessing step for automated inspections  
c) All of the mentioned  
d) None of the mentioned

138. Gradient have some important features. Which of the following is/are some of them?  
a) Enhancing small discontinuities in an otherwise flat gray field  
b) Enhancing prominent edges  
c) All of the mentioned  
d) None of the mentioned

139. An image has significant edge details. Which of the following fact(s) is/are true for the gradient image and the Laplacian image of the same?  
a) The gradient image is brighter than the Laplacian image  
b) The gradient image is brighter than the Laplacian image  
c) Both the gradient image and the Laplacian image has equal values  
d) None of the mentioned

 140. Computing the Fourier transform of the Laplacian result in spatial domain is equivalent to multiplying the F(u, v), Fourier transformed function of f(x, y) an input image, and H(u, v), the filter used for implementing Laplacian in frequency domain. This dual relationship is expressed as \_\_\_\_\_\_\_\_\_  
a) Fourier transform pair notation  
b) Laplacian  
c) Gradient  
d) None of the mentioned

141.Computing the Fourier transform of the Laplacian result in spatial domain is equivalent to multiplying the F(u, v), Fourier transformed function of f(x, y) an input image of size M\*N, and H(u, v), the filter used for implementing Laplacian in frequency domain. This dual relationship is expressed as Fourier transform pair notation given by\_\_\_\_\_\_\_\_\_\_\_\_\_  
a) ∇2 f(x,y)↔[(u –M/2)2+ (v –N/2)2]F(u,v)  
b) ∇2 f(x,y)↔-[(u+M/2)2– (v+N/2)2]F(u,v)  
c) ∇2 f(x,y)↔-[(u –M/2)2+ (v –N/2)2]F(u,v)  
d) ∇2 f(x,y)↔[(u+M/2)2– (v+N/2)2]F(u,v)

142. Transforming the operation f(x, y)(-1)x+y prior to taking the transform of the image. If F and f are of same size M\*N, where does the point (u, v) =(0,0) shifts?  
a) (M -1, N -1)  
b) (M/2, N/2)  
c) (M+1, N+1)  
d) (0, 0)

143. What is the Second Derivative of Image Sharpening called?  
a) Gaussian  
b) Laplacian  
c) Canny  
d) None of the mentioned

144. Which of the following is a second-order derivative operator?  
a) Histogram  
b) Laplacian  
c) Gaussian  
d) None of the mentioned

145. What is accepting or rejecting certain frequency components called as?  
a) Filtering  
b) Eliminating  
c) Slicing  
d) None of the Mentioned

146. 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

147. What is required to generate an M X N linear spatial filter?  
a) MN mask coefficients  
b) M+N coordinates  
c) MN spatial coefficients  
d) None of the Mentioned

148. 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

149. Convolution and Correlation are functions of \_\_\_\_\_\_\_\_\_\_\_\_\_  
a) Distance  
b) Time  
c) Intensity  
d) Displacement