

# ACADEMY OF TECHNOLOGY

## DEPARTMENT OF CSE AND IT -6<sup>TH</sup> SEM (2021)

DIGITAL IMAGE PROCESSING (PEC-IT601D)

MCQ QUESTION BANK

2<sup>ND</sup> INTERNAL EXAMINATION

Group - A

1. What is the basis for numerous spatial domain processing techniques?

a) Transformations

b) Scaling

**c) Histogram**

d) None of the Mentioned

2. 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

3. What is Histogram Equalisation also called as?

a) Histogram Matching

b) Image Enhancement

**c) Histogram linearisation**

d) None of the Mentioned

4. What is Histogram Matching also called as?

a) Histogram Equalisation

**b) Histogram Specification**

c) Histogram linearization

d) None of the Mentioned

5. Histogram Equalisation is mainly used for \_\_\_\_\_

**a) Image enhancement**

b) Blurring

c) Contrast adjustment

d) None of the Mentioned

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

a) Dimming

b) Blurred

**c) Blocky**

d) None of the Mentioned

7. Which filter(s) used to find the brightest point in the image?

a) Median filter

**b) Max filter**

c) Mean filter

d) All of the mentioned

8. 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

9. Which type of Histogram Processing is suited for minute detailed enhancements?

a) Intensive

**b) Local**

c) Global

d) Random

10. In uniform PDF, the expansion of PDF is \_\_\_\_\_

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

11. 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

12. Averaging filters is also known as \_\_\_\_\_ filter.

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

13. What is the undesirable side effects of Averaging filters?

- a) No side effects
- b) Blurred image

**c) Blurred edges**

d) Loss of sharp transitions

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

a) Square filter

b) Neighbourhood

**c) Box filter**

d) Zero filter

15. 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

16. 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**

17. 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

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

- a) Impulse filter
- b) Averaging filter
- c) Median filter**
- d) None of the Mentioned

19. 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

20. 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**

21. Smoothing filter is used for which of the following work(s)?

a) Blurring

b) Noise reduction

**c) All of the mentioned**

d) None of the mentioned

22. The response of the smoothing linear spatial filter is/are \_\_\_\_\_

a) Sum of image pixel in the neighborhood filter mask

b) Difference of image in the neighborhood filter mask

c) Product of pixel in the neighborhood filter mask

**d) Average of pixels in the neighborhood of filter mask**

23. Which of the following filter(s) results in a value as average of pixels in the neighborhood of filter mask.

a) Smoothing linear spatial filter

b) Averaging filter

c) Lowpass filter

**d) All of the mentioned**

24. What is/are the resultant image of a smoothing filter?

- a) Image with high sharp transitions in gray levels
- b) Image with reduced sharp transitions in gray levels
- c) All of the mentioned
- d) None of the mentioned

25. At which of the following scenarios averaging filters is/are used?

- a) In the reduction of irrelevant details in an image
- b) For smoothing of false contours**
- c) For noise reductions
- d) All of the mentioned

26. A spatial averaging filter having all the coefficients equal is termed \_\_\_\_\_

- a) A box filter
- b) A weighted average filter
- c) A standard average filter
- d) A median filter**

27. What does using a mask having central coefficient maximum and then the coefficients reducing as a function of increasing distance from origin results?

- a) It results in increasing blurring in smoothing process**



- b) It results to reduce blurring in smoothing process
- c) Nothing with blurring occurs as mask coefficient relation has no effect on smoothing process
- d) None of the mentioned

28. What is the relation between blurring effect with change in filter size?

- a) Blurring increases with decrease of the size of filter size
- b) Blurring decrease with decrease of the size of filter size
- c) Blurring decrease with increase of the size of filter size
- d) Blurring increases with increase of the size of filter size**

29. Which of the following filter represents a 0th percentile set of numbers?

- a) Max filter
- b) Mean filter
- c) Median filter
- d) Min filter**

30. The median filter also represents which of the following ranked set of numbers?

- a) 100th percentile
- b) 0th percentile
- c) 50th percentile**
- d) None of the mentioned

31. In neighbourhood operations working is being done with the value of image pixel in the neighbourhood and the corresponding value of a subimage that has same dimension as neighbourhood. The subimage is referred as \_\_\_\_\_

- a) Filter
- b) Mask

c) Template

**d) All of the mentioned**

32. 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

33. In linear spatial filtering, what is the pixel of the image under mask corresponding to the mask coefficient  $w(1, -1)$ , assuming a  $3 \times 3$  mask?

a)  $f(x, -y)$

b)  $f(x + 1, y)$

c)  $f(x, y - 1)$

**d)  $f(x + 1, y - 1)$**

34. Which of the following is/are a nonlinear operation?

a) Computation of variance

b) Computation of median

**c) All of the mentioned**

d) None of the mentioned

35. Which of the following is/are used as basic function in nonlinear filter for noise reduction?

a) Computation of variance

**b) Computation of median**

c) All of the mentioned

d) None of the mentioned

36. In neighborhood operation for spatial filtering if a square mask of size  $n \times n$  is used it is restricted that the center of mask must be at a distance  $\geq (n - 1)/2$  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

37. 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

38. In neighbourhood operation for spatial filtering using square mask of  $n \times n$ , 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  $\geq (n - 1)/2$  pixels from border of image**
- d) None of the mentioned

39. Which of the following filtering is done in frequency domain in correspondence to lowpass filtering in spatial domain?

- a) **Gaussian filtering**
- b) Unsharp mask filtering
- c) High-boost filtering
- d) None of the mentioned

40. Using the feature of reciprocal relationship of filter in spatial domain and corresponding filter in frequency domain, which of the following fact is true?

- a) **The narrower the frequency domain filter results in increased blurring**
- b) The wider the frequency domain filter results in increased blurring
- c) The narrower the frequency domain filter results in decreased blurring
- d) None of the mentioned

41. 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

42. 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

43. What is the name of the filter that multiplies two functions  $F(u, v)$  and  $H(u, v)$ , where  $F$  has complex components too since is Fourier transformed function of  $f(x, y)$ , in an order that each component of  $H$  multiplies both real and complex part of corresponding component in  $F$ ?

- a) Unsharp mask filter
- b) High-boost filter
- c) Zero-phase-shift-filter**
- d) None of the mentioned

44. 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

45. What is the name of the filter that is used to turn the average value of a processed image zero?

- a) Unsharp mask filter
- b) Notch filter**
- c) Zero-phase-shift-filter

d) None of the mentioned

46. 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

47. Which of the following filter(s) attenuates low frequency while passing high frequencies of an image?

a) Unsharp mask filter

**b) Highpass filter**

c) Zero-phase-shift filter

d) All of the mentioned

48. 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

49. 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**

50. 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

51. 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

Group – B

1. Digital function's derivatives are defined as \_\_\_\_\_ and Gradient computation equation is defined as \_\_\_\_\_

- a. differences ;  $|G_x| + |G_y|$**
- b. multiplication ;  $|G_x| - |G_y|$
- c. addition ;  $|G_x| + |G_y|$
- d. division ;  $|G_x| / |G_y|$

2. For line detection we use \_\_\_\_\_ mask and

- a. Gaussian
- b. laplacian ;**
- c. ideal
- d. butterworth

3. The transfer function of a \_\_\_\_\_ of order  $n$ , and with cutoff frequency at a distance  $D_0$  from the origin, is defined as  $1/[1 + (D(u,v) / D_0)^{2n}]$

**a) Butterworth lowpass filter (BLPF)**

b) Ideal lowpass filter

c) Gaussian lowpass filters (GLPFs)

d) none of these

4. The transfer function of a \_\_\_\_\_ with cutoff frequency at a distance  $D_0$  from the origin, is defined as  $\exp(-D^2(u,v) / 2a^2)$ ; where  $a$  is a measure of spread about the center.

a) Butterworth lowpass filter (BLPF)

b) Ideal lowpass filter

**c) Gaussian lowpass filters (GLPFs)**

d) none of these

5. The transfer function of a \_\_\_\_\_ of order  $n$ , and with cutoff frequency at a distance  $D_0$  from the origin, is defined as  $1/[1 + (D_0 / D(u,v))^{2n}]$

a) Butterworth lowpass filter (BLPF)

b) Ideal lowpass filter

c) Gaussian lowpass filters (GLPFs)

**d) a) Butterworth highpass filter (BHPF)**

6. The transfer function of a \_\_\_\_\_ with cutoff frequency at a distance  $D_0$  from the origin, is defined as  $1 - \exp(-D^2(u,v) / 2a^2)$ ; where  $a$  is a measure of spread about the center.

a) Butterworth highpass filter (BHPF)

b) Ideal highpass filter



**c) Gaussian highpass filters (GHPFs)**

d) Gaussian lowpass filters (GLPFs)

7. What is the name of the filter that multiplies two functions  $F(u, v)$  and  $H(u, v)$ , where  $F$  has complex components too since is Fourier transformed function of  $f(x, y)$ , in an order that each component of  $H$  multiplies both real and complex part of corresponding component in  $F$ ?

a) Unsharp mask filter

b) High-boost filter

**c) Zero-phase-shift-filter**

d) None of the mentioned

8. a geometric mean filter achieves smoothing comparable to the arithmetic mean filter, but it tends to lose less image detail in the process.

**a. true**

b. false

9. i) The harmonic mean filter works well for noise, but fails for salt noise. ii) The harmonic mean filter does well also with other types of noise like Gaussian noise.

a) true; false

**b) false; true;**

c) false; false

d) true; true

**10.** The harmonic mean filter works well for \_\_\_\_ noise, but fails for \_\_\_\_ noise

**a) salt ; pepper**

b) pepper ; salt

c) pepper ; Gaussian

d) Gaussian ; salt

11. i ) The median represents the 50th percentile of a ranked set of numbers.

ii) The 0th percentile filter is the min filter

- a) true; false
- b) false; true;
- c) false; false

**d) true; true**

**12. i )** The median represents the 50th percentile of a ranked set of numbers.

ii) The 0th percentile filter is the max filter

**a) true; false**

b) false; true;

c) false; false

d) true; true

13. i) The 0th percentile filter is the min filter

ii) The 100th percentile filter is the max filter

**a) true; false**

b) false; true;

c) false; false

d) true; true

14. In adaptive, local noise reduction filter, if the variance of the noise corrupting image is zero, the filter should return simply the value of \_\_\_\_ .

**a)  $g(x,y)$  the value of the noisy image at  $(x, y)$**

b) the local mean of the pixels

c) Input image  $f(x,y)$

d) none of these

15. In adaptive, local noise reduction filter, the trivial case- \_\_\_\_ case in which  $g(x,y)$  is equal to \_\_\_\_ .

**a) zero noise ; Input image  $f(x,y)$**

b) high noise ; Input image  $f(x,y)$

- c) zero noise ; noisy image  $g(x,y)$
- d) very high noise ; noisy image  $f(x,y)$

16. In adaptive, local noise reduction filter, if the local variance is high relative to the variance of the noise corrupting image , the filter should return a value close to \_\_\_\_\_

**a)  $g(x,y)$  the value of the noisy image at  $(x, y)$**

b) the local mean of the pixels

c) Input image  $f(x,y)$

d) none of these

17. A high local variance for adaptive, local noise reduction filter is typically associated with edges, and these should be preserved.

**a) true**

b) false

18. The transfer function of a bandpass filter  $HBP(u, v)$  is obtained from a corresponding bandreject filter with transfer function  $HBR(u, v)$

a)  $HBP(u, v) = 1 + HBR(u, v)$

b)  $HBP(u, v) = 1 / HBR(u, v)$

**c)  $HBP(u, v) = 1 - HBR(u, v)$**

**d)  $HBP(u, v) = HBR(u, v)$**

19. A notch filter rejects (or passes) frequencies in predefined neighborhoods about a center frequency.

**a) true**

b) false

20. The transfer function of a notch pass filter  $HNP(u, v)$  is obtained from a corresponding notch reject filter with transfer function  $HNR(u, v)$

- a)  $HNP(u, v) = 1 + HPR(u, v)$
- b)  $HNP(u, v) = 1 / HNR(u, v)$
- c)  $HNP(u, v) = 1 - HNR(u, v)$**
- d)  $HNP(u, v) = HNR(u, v)$

21. Three principal ways to estimate the degradation function for use in image restoration are-

- a) (1) observation, (2) experimentation, and (3) mathematical modeling**
- b) (1) observation, (2) behavioral modeling , and (3) mathematical modeling
- c) (1) behavioral modeling, (2) experimentation, and (3) mathematical modeling
- d) (1) observation, (2) experimentation, and (3) behavioral modeling

22. \_\_\_\_\_ way is used to restore an old photograph of historical value.

- a) estimation by observation**
- (b) estimation by experimentation
- (c) estimation by mathematical modeling
- (d) none of these

23. \_\_\_\_\_ take into account environmental conditions that cause degradations.

- a) estimation by observation
- (b) estimation by experimentation
- (c) estimation by mathematical modeling**
- (d) none of these

24. i) The transition into higher values of cutoff frequencies is much smoother with the BHPF than IHPF.

ii) Ringing effect of ILPF becomes finer (i.e. decreases) as the cutoff frequency decreases.

- a) true; false**

- b) false; true;
- c) false; false
- d) true; true

25. The effects of ILPF: i. Blurring effect which decreases as the cutoff frequency increases.  
ii. Ringing effect which becomes finer (i.e. decreases) as the cutoff frequency increases.

- a) true; false
- b) false; true;
- c) false; false
- d) true; true**

26. The effects of BLPF compared to ILPF: i) Smooth transition in blurring as a function of increasing cutoff frequency. ii) No ringing is visible because of the smooth transition between low and high frequencies.

- a) true; false
- b) false; true;
- c) false; false
- d) true; true**

27. The effects of BLPF compared to ILPF i) No ringing is visible because of the smooth transition between low and high frequencies. ii) BLPF of order 1 has no ringing. Ringing is imperceptible in BLPF of order 2, but can become significant in BLPF of higher order as shown in the figure below.

- a) true; false
- b) false; true;
- c) false; false
- d) true; true**

27. The effects of GLPF: 1. Smooth transition in blurring as a function of \_\_\_\_\_ cutoff frequency.

2. GLPF did not achieve as much smoothing as BLPF of order 2 for the same cutoff frequency.

a) decreasing ; true

b) increasing ; false

**c) increasing ; true**

d) decreasing ; false

28. The effects of GLPF are- i. GLPF did not achieve as much smoothing as BLPF of order 2 for the same cutoff frequency.

ii. No ringing effect. This is important in situations (e.g. medical imaging) where any type of artifact is not acceptable.

a) Both are false

**b) Both are true**

c) i) false but ii) true

d) i i) false but i) true

29. i) GLPF can be used to bridge small gaps in broken characters by \_\_\_\_\_ it.

ii) GLPF can also be used for cosmetic processing prior to printing and publishing

a) blurring ; false

**b) blurring ; true**

c) contrast stretching ; true

d) contrast stretching ; ; false

30. The effects of BHPF: i) IHPF behaves smoother than BHPF. ii) The boundaries are much less distorted than that of IHPF, even for the smallest value of cutoff frequency.

a) Both are true

b) Both are false

**c) i) false but ii) true**

d) i i) false but i) true

