E–789

M. Sc. (Third Semester)
EXAMINATION, Dec.-Jan., 2020-21

COMPUTER SCIENCE

(Elective—I)

(Image Processing)

Time : Three Hours]　　　　　　　[*Maximum Marks : 100*

Note : Attempt all Sections as directed.

Section—A　　　　1 each

(Objective/Multiple Choice Questions)

Note : Attempt all questions.

Choose the correct answer :

1. What does the total number of pixels in the region define ?

    (a) Perimeter

    (b) Area

    (c) Intensity

    (d) Brightness

2. What is the third step in digital image processing ?

    (a) Image Restoration

(b) Segmentation

(c) Image Enhancement

(d) Color image processing

3. The spatial resolution of an image principally determine by :

(a) Contrast

(b) Quantization

(c) Sampling

(d) Dynamic range

4. The basic geometric transformation is ....

(a) Translation

(b) Rotation

(c) Scaling

(d) All of the above

5. 2D Fourier transform and its inverse are infintely :

(a) a periodic

(b) periodic

(c) linear

(d) non-linear

6. The Walsh and Hadamard transforms are .... in nature.

(a) Sinusoidal

(b) Cosine

(c) Non-sinusoidal

(d) Cosine and sine

7. The Slant transform is :

    (a)   real

    (b)   orthogonal

    (c)   fast

    (d)   All of the above

8. Discrete cosine transforms express a function or a signal in terms of :

    (a)   Sum of cosine functions oscillating at different frequencies.

    (b)   Sum of cosine functions oscillating at same frequencies.

    (c)   Sum of cosine functions at different sampling intervals.

    (d)   Sum of cosine functions oscillating at same sampling intervals.

9. Intensity levels of 8-bit images are :

    (a)   128

    (b)   256

    (c)   512

    (d)   1024

10. Black color in image processing is usually represented by :

    (a)   0

    (b)   1

    (c)   128

    (d)   256

11. High pass filters are used for image :

    (a)   Contrast

    (b)   Sharpening

    (c)   Blurring

    (d)   Resizing

12. Blur is characterized by the .... response of the system.

    (a)   filter

    (b)   noise

    (c)   impulse

    (d)   image

13. .... is he process of partition the digital image into multiple regions.

    (a)   Merging

    (b)   Filtering

    (c)   Splitting

    (d)   Transform

14. .... is the position of sign change of the first derivative among neighboring points.

    (a)   Edge

    (b)   Zero-crossing

    (c)   Point

    (d)   Line

15. Digital video is sequence of :

    (a) Pixels

    (b) Matrix

    (c) Frames

    (d) Coordinates

16. Compressed image can be recovered back by :

    (a) Image enhancement

    (b) Image decompression

    (c) Image contrast

    (d) Image equalization

17. Image compression comprised of :

    (a) Encoder

    (b) Decoder

    (c) Frame

    (d) Both (a) and (b)

18. Which of the following is the useful descriptor of boundary, whose value is given by the ratio of length of the major axis to the minor axis ?

    (a) Radius

    (b) Perimeter

    (c) Area

    (d) Eccentricity

19. The order of shape number for a closed boundary is :

    (a) Odd

    (b) Even

    (c) Zero

    (d) Any positive value

20. The convolution of a discrete signal with itself is :

    (a) Squaring the signal

    (b) Doubling the signal

    (c) Adding two signals

    (d) Not possible

Section—B   2 each

(Very Short Answer Type Questions)

Note : Attempt all questions.

1. What do you mean by digital image ?

2. Write any *two* applications of digital image processing.

3. What are the *four* types of image transformation ?

4. What is an FFT algorithm ?

5. Define the term image enhancement.

6. What is an inverse filtering ?

7. Define the term image compression.

8. Regions are important for the interpretation of an image. Why ?

9. What is image representation in image processing ?

10. Define the term projection in image processing.

Section—C   3 each

(Short Answer Type Questions)

Note : Attempt all questions.

1. Write the advantages of digital image processing.

2. Calculate the total number of pixels where number of rows
    and columns are 300 and 200 respectively in an image.

3. What are the properties of Slant transform ?

4. What is Haar transform ? How to define Haar function ?

5. Write the general forms of the image negative transformation
    and log transformation.

6. Write the applications of least mean squares algorithm.

7. Compare lossy and lossless image compressions.

8. What is an image segmentation ? Name any *two* image
    segmentation techniques.

9. Explain boundary descriptors.

10. Write an example of 2D convolution.

Section—D   6 each

(Long Answer Type Questions)

Note : Attempt any *five* questions.

1. Write the differences between image sampling and
    quantization.

2. What do you understand by KL-transform ? Write properties
    of KL-transform.

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3. Discuss degradation model in detail.

4. Describe different image compression standards.

5. Explain edge linking and boundary detection thresholding.

6. What are regional descriptors ? Discuss any *three*.

7. Write a brief note on Radon transforms.

8. Explain the concept of color image processing.