**University of Mumbai**

**Examinations Summer 2022**

Program: Electronic & Telecommunication Engineering

SEM-VI (C Scheme) (R2019)

Subject: IPMV Course Code: ECC603

Time: 2hour 30 minutes Max. Marks: 80

=====================================================================

|  |  |
| --- | --- |
| **Q1.** | **Choose the correct option for following questions. All the Questions are compulsory and carry equal marks** |
| 1. | Which is not a color model |
| Option A: | HIS |
| Option B: | RGB |
| Option C: | RCB |
| Option D: | CMYK |
|  |  |
| 2. | Haar Transformation is defined by |
| Option A: | T=HFT |
| Option B: | T=HFH |
| Option C: | T=HFHT |
| Option D: | T=HT |
|  |  |
| 3. | Image can be sharpened using |
| Option A: | contouring |
| Option B: | High Pass Filter |
| Option C: | Erosion |
| Option D: | Low pass filter |
|  |  |
| 4. | Noise reduction can be obtained by blurring the image using smoothing filter |
| Option A: | False |
| Option B: | True |
| Option C: | Maybe |
| Option D: | Can’t say |
|  |  |
| 5. | Hit and miss transformation is used for shape |
| Option A: | compression |
| Option B: | decompression |
| Option C: | detection |
| Option D: | removal |
|  |  |
| 6. | Opening and closing are each other |
| Option A: | Duals |
| Option B: | Centers |
| Option C: | Corners |
| Option D: | Neighbors |
|  |  |
| 7. | Dilation Process makes images |
| Option A: | thinner |
| Option B: | Thickened |
| Option C: | sharpened |
| Option D: | shrinked |
|  |  |
| 8. | \_\_\_\_\_\_\_\_is process of partition the digital image in to multiple regions |
| Option A: | transform |
| Option B: | splitting |
| Option C: | filling |
| Option D: | merging |
|  |  |
| 9. | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_is the position of sign change of the first derivative among neighboring points |
| Option A: | point |
| Option B: | line |
| Option C: | edge |
| Option D: | zero-crossing |
|  |  |
| 10. | Canny edge detection algorithm is based on |
| Option A: | Step edge |
| Option B: | Real model |
| Option C: | smoothing model |
| Option D: | ideal model |
|  |  |
| 11. | \_\_\_\_\_\_\_\_\_\_\_\_is the starting pixel of region growing process. |
| Option A: | image |
| Option B: | base pixel |
| Option C: | original pixel |
| Option D: | seed pixel |
|  |  |
| 12. | Which of the following of a boundary is defined as the line perpendicular to the major axis? |
| Option A: | Minor axis |
| Option B: | Equidistant axis |
| Option C: | Equilateral axis |
| Option D: | Median axis |
|  |  |
| 13. | The effectiveness of an SVM depends upon: |
| Option A: | Selection of Kernel |
| Option B: | Kernel Parameters |
| Option C: | Soft Margin Parameter C |
| Option D: | Selection of Kernel, Kernel Parameters and Soft Margin Parameter C |
|  |  |
| 14. | Which of the following is the useful descriptor of a boundary, whose value is given by the ratio of length of the major axis to the minor axis? |
| Option A: | Eccentricity |
| Option B: | Perimeter |
| Option C: | Area |
| Option D: | Radius |
|  |  |
| 15. | The order of shape number for a closed boundary is: |
| Option A: | Even |
| Option B: | Odd |
| Option C: | 1 |
| Option D: | Any positive value |
|  |  |
| 16. | The term, Curvature is defined as: |
| Option A: | Rate of change of area |
| Option B: | Rate of change of diameter |
| Option C: | Slope |
| Option D: | Rate of change of slope |
|  |  |
| 17. | In 4-neighbours of a pixel p, how far are each of the neighbours located from p? |
| Option A: | one pixel apart |
| Option B: | Two pixels apart |
| Option C: | Four pixels apart |
| Option D: | Alternate pixels apart |
|  |  |
| 18. | Discrete cosine transform (DCT) applied to predict error on |
| Option A: | 2x2 pixels |
| Option B: | 4x4 pixels |
| Option C: | 8x8 pixels |
| Option D: | 3x3 pixels |
|  |  |
| 19. | DTFT is the representation of |
| Option A: | Periodic continuous signals |
| Option B: | Aperiodic continuous signals |
| Option C: | Aperiodic Discrete time signals |
| Option D: | Periodic Discrete time signals |
|  |  |
| Q20. | Which of the following is a second-order derivative operator |
| Option A: | Spatial |
| Option B: | Gaussian |
| Option C: | Histogram |
| Option D: | Laplacian |
|  |  |
| Q21. | Spatial domain refers to |
| Option A: | Manipulations on whole image |
| Option B: | Direct manipulation of image pixel |
| Option C: | Modifications on Fourier transform of an image |
| Option D: | Contrast shrinking |
|  |  |
| Q22. | Gray level enhancement improves |
| Option A: | Contrast stretching |
| Option B: | Bandwidth |
| Option C: | Gamma Factor |
| Option D: | Resolution |
|  |  |
| Q23. | 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? |
| Option A: | Unsharp mask filter |
| Option B: | High-boost filter |
| Option C: | Zero-phase-shift-filter |
| Option D: | High pass filter |
|  |  |
|  |  |
| Q24. | Histogram Equalisation also called as? |
| Option A: | Histogram Matching |
| Option B: | Image Enhancement |
| Option C: | Histogram linearization |
| Option D: | None of the Mentioned |
|  |  |
| Q25. | Purpose of restoration is to gain |
| Option A: | Degraded image |
| Option B: | Original image |
| Option C: | Pixels |
| Option D: | Coordinated |
|  |  |
| 26. | Degraded image is given in a |
| Option A: | Frequency domain |
| Option B: | Time domain |
| Option C: | Spatial domain |
| Option D: | Plane |
|  |  |
| 27. | Degraded image is produced using degradation process and |
| Option A: | Additive noise |
| Option B: | Destruction |
| Option C: | Pixels |
| Option D: | Coordinates |
|  |  |
| 28. | Segmentation is usually not perfect due to number of factors such as |
| Option A: | Noise, Bad illumination |
| Option B: | Object Contain several regions |
| Option C: | Due to boundary-filling |
| Option D: | Due to closed contour |
|  |  |
| 29. | Laplacian is a |
| Option A: | First order derivative filter |
| Option B: | Sobel operator |
| Option C: | Canny operator |
| Option D: | Second order derivative filter |
|  |  |
| 30. | Dilation followed by erosion is called as |
| Option A: | Opening |
| Option B: | Closing |
| Option C: | Burring |
| Option D: | Translation |
|  |  |
| 31. | For point detection we use |
| Option A: | Second derivative |
| Option B: | First Derivative |
| Option C: | Third Derivative |
| Option D: | Fourth Derivative |
|  |  |
|  |  |
| 32. | Thresholding gives the |
| Option A: | Binary Image |
| Option B: | Large Image |
| Option C: | Grayscale Image |
| Option D: | Color Image |
|  |  |
| 33. | If the standard deviation of pixels is positive, then the sub image is labelled as |
| Option A: | Red |
| Option B: | White |
| Option C: | Green |
| Option D: | Black |
|  |  |
| 34. | Which of the following is process of partition the digital image in to multiple regions |
| Option A: | Merging |
| Option B: | Filling |
| Option C: | Transform |
| Option D: | Splitting |
|  |  |
| 35. | Which of the following of a boundary is defined as the line perpendicular to the major axis? |
| Option A: | Equidistant axis |
| Option B: | Equilateral axis |
| Option C: | Median axis |
| Option D: | Minor axis |
|  |  |
| 36. | Erosion also known as |
| Option A: | Shrinking |
| Option B: | Growing |
| Option C: | Convolution |
| Option D: | integration |
|  |  |
| 37. | If the boundary is traversed in the clockwise direction, a vertex point ‘p’ is said to be a part of the convex segment if the rate of change of slope at ‘p’ is: |
| Option A: | Positive |
| Option B: | Negative |
| Option C: | Zero |
| Option D: | Non-negative |
|  |  |
| 38. | Erosion also known as |
| Option A: | Shrinking |
| Option B: | Growing |
| Option C: | Convolution |
| Option D: | integration |
|  |  |
| 39. | What is the order of the shape number of a rectangular boundary with the dimensions of 3×3? |
| Option A: | 2 |
| Option B: | 6 |
| Option C: | 12 |
| Option D: | 9 |
|  |  |
| 40. | In object recognition, the sensed object properties are called as \_\_\_\_\_\_\_ |
| Option A: | Patterns |
| Option B: | Classes |
| Option C: | Labels |
| Option D: | Objects |

\

|  |  |
| --- | --- |
| **Sr. No.** | **Q.1 or Q2 or Q3 5 marks each** |
| 1 | Explain Unsharp Masking and High-boost Filtering, |
| 2 | Explain different color models. |
| 3 | Explain Histogram equalization and Histogram Specification |
| 4 | Explain Sobel, Prewitt and Roberts operators for sharpening image. |
| 5 | Explain 2-D DFT. |
| 6 | Explain 2-D DFT application in frequency domain filtering |
| 7 | Explain Boundary extraction , Hole filling, Thinning and thickening |
| 8 | Explain Model of the Image Degradation/Restoration Process |
| 9 | Explain removal of periodic noise and inverse filtering |
| 10 | Compare Ideal, Butterworth and gaussian filtering |
| 11 | Find chain code and shape number 8-connectivity. Use anticlockwise direction.    Staring point |
| 12 | List different knowledge representation methods.. |
| 13 | Show the segmentation of the image shown in Fig using split-and-merge technique. |
| 14 | Explain Ideal, Butterworth and Gaussian filter. |
| 15 | Explain Wavelet transform. |
| 16 | Explain Model of the Image Restoration Process and Removal of periodic noise |
| 17 | Explain Thinning and thickening and inverse filtering. |
| 18 | Explain edge linking. |
| 19 | Explain thresholding. |
| 20 | Explain principle of machine vision. |

|  |  |
| --- | --- |
| **Sr. No.** | **Q.1 or Q2 or Q3 10 marks each** |
| 1 | Explain different point processing techniques. |
| 2 | Explain average and median/ Order-Statistic Filters with example. |
| 3 | Explain wavelet and Haar transform. |
| 4 | Explain erosion, dilation and Hit and Miss transform, |
| 5 | Determine median value of marked pixels using 3 x 3 mask For pixels 128 24 172 and 26 (in second row)  [18 22 33 25 32 34; 34 128 24 172 26 23; 22 19 32 31 28 26 |
| 6 | Calculate histogram equalization for   |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | Gray level r | **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | | No. of pixels with gray level nr | **200** | **170** | **130** | **50** | **70** | **80** | **140** | **160** | |
| 7 | Explain Canny edge detection. |
| 8 | Explain Laplacian of Gaussian method for edge detection. |
| 9 | Explain region growing and region splitting and merging. |
| 10 | Explain Image Segmentation using the Second Derivative-The Laplacian. |
| 11 | Explain boundary detection using polygonal method. |
| 12 | Explain various boundary descriptors. |
| 13 | Explain Fourier transform of boundaries. |
| 14 | Explain Boundary description using segment sequences |
| 15 | Explain K-means algorithm. |
| 16 | Explain Bayesian Classifiers and its types. |
| 17 | Explain SVM. |
| 18 | Explain Confusion matrix and co-occurrence matrix with example. |
| 19 | Explain classifier settings and learning |
| 20 | Determine opening and closing for |