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B.Tech. DEGREE EXAMINATION, JUNE 2023

Fifth Semester

18AIE332T - IMAGE AND VIDEO PROCESSING

(For the candidates admitted during the academic year 2018-2019 to 2021-2022)

Note:

i. **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40 minutes.
ii. **Part - B** and **Part - C** should be answered in answer booklet.

Time: 3 Hours **Max. Marks: 100**

Part - A (20 × 1 Marks = 20 Marks)
Answer **All** Questions

		Marks	BL	CO
1.	_____ of the following is the next step in image processing after compression. (A) Representation and description (B) Morphological processing (C) Segmentation (D) Wavelets	1	2	1
2.	_____ determines the quality of a digital image. (A) The discrete gray levels (B) The number of samples (C) The discrete gray levels & number of samples (D) The number of bits	1	1	1
3.	The effect caused by the use of an insufficient number of intensity levels in smooth areas of a digital image is _____ (A) False Contouring (B) Interpolation (C) Gaussian smooth (D) Contouring	1	1	1
4.	Approaches to image processing that work directly on the pixels of incoming image work in _____ (A) Spatial domain (B) Inverse transform (C) Transform domain (D) Contouring	1	2	1
5.	_____ of the following expression is used to denote spatial domain. (A) f(x+y)=T[g(x+y)] (B) g(x,y)=T[f(x,y)] (C) g(xy)=T[f(x,y)] (D) g(x-y)=T[f(x-y)]	1	2	2
6.	Infer the general form of representation of power transformation. (A) s=rcγ (B) c=srγ (C) s=rc (D) s=crγ	1	3	2
7.	Identify the disadvantage of using smoothing filter. (A) Blur edges (B) Blur inner pixels (C) Remove sharp transitions (D) Sharp edges	1	2	2
8.	_____ is the output of a smoothening Linear spatial Filter (A) Median of Pixel (B) Maximum of Pixels (C) Minimum of Pixels (D) Average of Pixels	1	1	2
9.	The total number of pixels in the region defines _____. (A) Perimeter (B) Area (C) Intensity (D) Brightness	1	1	3
10.	Find the technique which is based on the Fourier transform. (A) Structural (B) Topological (C) Statistical (D) Spectral	1	3	3

11.	The expanded form of JPEG is _____. (A) Joint Photographic Expansion Group (B) Joint Photographic Experts Group (C) Joint Photographs Expansion Group (D) Joint Photographic Expanded Group	1	1	3
12.	_____ is one of the most important approaches to image segmentation and can be treated as the class boundary. (A) Region-Based Segmentation (B) Thresholding (C) Region Growing (D) Region Segmentation	1	1	3
13.	Digital video is sequence of _____. (A) Pixels (B) Matrix (C) Frames (D) Coordinates	1	2	4
14.	Standard rate of showing frames in a video per second is _____. (A) 10 (B) 20 (C) 25 (D) 30	1	2	4
15.	The matrix representation for translation in homogeneous coordinates is _____. (A) P'=T+P (B) P'=S*P (C) P'=R*P (D) P'=T*P	1	3	4
16.	This consider combining the multiplicative and translational terms for 2D into a single matrix representation is possible by expanding _____. (A) 2 by 2 Matrix into 4*4 Matrix (B) 2 by 2 Matrix into 3*3 Matrix (C) 3 by 3 Matrix into 2 by 2 (D) 3 by 3 Matrix into 4*4 Matrix	1	3	4
17.	Rate of convergence of the N Newton-Raphson method is generally____ (A) Linear (B) Quadratic (C) Super-linear (D) Cubic	1	1	5
18.	The Newton Raphson method fails if ___ (A) f'(Xo)=0 (B) f''(Xo)=0 (C) f(Xo)=0 (D) f'''(Xo)=0	1	3	5
19.	Radiant descent optimization algorithm is used for (A) Certain changes in algorithm (B) Minimizing the cost function in various machine learning algorithms (C) Maximizing the cost function in various machine learning algorithms (D) Remaining same the cost function in various machine learning algorithms	1	2	5
20.	Consider the cost function is convex. Then it converges to a_____ (A) global maximum (B) global minimum (C) local minimum (D) local maximum	1	1	5

Part - B (5 × 4 Marks = 20 Marks)
Answer **any 5** Questions

		Marks	BL	CO
21.	Illustrate the image formation in the eye.	4	3	1
22.	Discuss the basic relationship between pixels	4	2	1
23.	Explain the effects of decreasing gamma	4	2	2
24.	Brief about gaussian filtering	4	2	2
25.	Write the concept of edge detection	4	2	3
26.	Summarize the concept of analog video signal	4	3	4

27.	Explain the hierarchical motion estimation	4	1	5

Part - C (5 × 12 Marks = 60 Marks)
Answer **All** Questions

		Marks	BL	CO
28.	a. Describe the components of digital image processing system. **(OR)** b. Summarize the three basic quantities which are used to describe the quality of chromatic light source : radiance, luminance and brightness.	12	2	1
29.	a. Explain in detail about the Histogram Equalization process in Image enhancement. **(OR)** b. Discuss about gray level slicing and Bit plane slicing.	12	2	2
30.	a. Explain the process of JPEG data compression in detail. **(OR)** b. Describe in detail about region splitting and merging in Image Segmentation and compression.	12	2	3
31.	a. Elaborate the concept of analog video signals and standards. **(OR)** b. Describe the motion detection based filtering.	12	3	4
32.	a. Explain in detail about median and weighted median filtering with examples, **(OR)** b. Illustrate the concept of deformable block motion in detail.	12	2	5

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