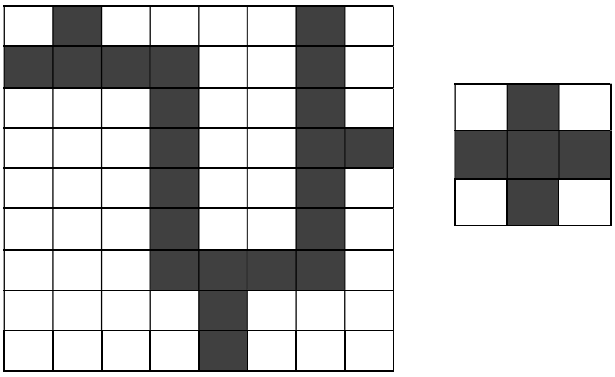
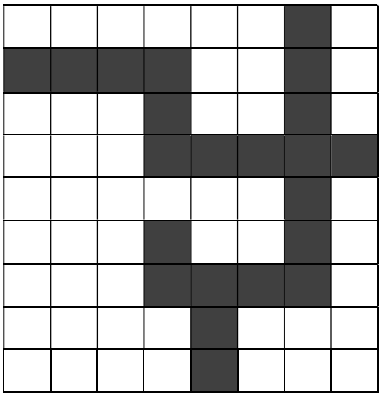
	Harcourt Butler Technical University Kanpur		END SEM EXAM
Branch	**MCA**	Program	**MCA**
Course Name	**Digital Image Processing**	Semester	**IV**
Course Code	**ECA-576**	Year	**(F Year) 2023-24**
Time	**2:30 Hr**	Maximum Marks	**50**

Knowledge Level (KL)	**K1:** Remembering	**K3:** Applying	**K5:** Evaluating
	K2: Understanding	**K4:** Analyzing	**K6:** Creating

Note: Answer All Questions

Q. No	Questions	Marks	CO	KL
1.	***Give short answers for the following:***			
	a) What is the **Shannon Sampling Theorem** and how is it significant in Digital Image Processing?	2	CO1	K1,K2
	b) Give the kernels for **High boost filter.** Explain their use.	2	CO2	K1,K3
	c) What is a **median filter**? Explain it's one use.	2	CO3	K1,K4
	d) How would we apply the **Laplacian filter** using python?	2	CO4	K6
	e) What is **dilation**? Where is it used?	2	CO5	K1,K3
2.	***Answer both parts:***			
	a) Which **filter** would you use for **detecting the two lines in this image** and why? Give the kernels of the filters and apply them on the following image. Give the interpretation of the result you get.	5	CO1	K3,K5
	b) What is **Noise** in image processing? How do we **remove salt and pepper noise** from an image?	5	CO2	K1,K6
3.	***Answer both parts:***			

200	**10**	**10**	**20**	**20**	**20**	**20**	**20**
10	**200**	**10**	**20**	**20**	**20**	**20**	**20**
200	**200**	**200**	**200**	**200**	**200**	**200**	**200**
20	**20**	**20**	**200**	**20**	**20**	**20**	**20**
20	**20**	**20**	**20**	**200**	**0**	**0**	**0**
20	**20**	**20**	**20**	**20**	**200**	**0**	**0**

	a) Perform **region filling** of the given image with the given mask and initial point p showing all intermediate steps: 	5	CO3	K3
	a) How does **Laplacian of Gaussian** work? What advantage does it have over Laplacian filter?	5	CO3	K2,K5
4.	***Answer both parts:***			
	a) What is **Segmentation**? Explain the **Region growing approach** for segmentation.	5	CO4	K1,K3
	b) Find **convex hull** for the image given using SEs given  B^1 B^2 B^3 B^4	5	CO4	K4
5.	***Answer both parts:***			
	a) What do you understand by **SIFT**? Discuss its advantages and disadvantages?	5	CO5	K2,K5
	a) Explain the **Hit or Miss transform** with suitable example.	5	CO5	K4

Course Outcomes		
	CO1	Apply sampling and quantization techniques for conversion of an analog image into digital form.
	CO2	Enhance the image using various types of filtering, segmentation and edge detection techniques
	CO3	Analyze and interpret the effects of high pass and low pass filter in an image.
	CO4	Restore the image in the presence of noise by using modern restoration software
	CO5	Use the techniques of morphological image processing, image registration and image recognition