

5/31

2212E1569

Candidate's Seat No: _____

**IMSc (CS) Sem.-9 Examination
Micro Services
December-2025**

Time : 3.00 Hours]

[Max.Marks :70

Instructions:

- Write both the Sections in the separate answer book.
- Both Sections having equal weightage.
- Draw Diagrams wherever necessary.
- Make Assumptions wherever necessary.

SECTION – I

- Q-1 Do as directed (any 5): [15]
- a. What do you understand by coupling? Discuss the types of coupling.
 - b. Discuss the concept of containers and Kubernetes.
 - c. What is CI/CD Pipeline? Discuss in brief.
 - d. What is 'Decomposition by Layer', discuss Code first and Data first in light of it.
 - e. Explain the concept of Domain-Driven design in the light of Microservices.
 - f. What is synchronous blocking and asynchronous blocking? Given examples in each case.
- Q-2 Attempt the following (Any 2): [10]
- a. Write a detailed note on Monolith architecture, discuss its advantages & drawbacks.
 - b. List and explain the enabling technologies for Microservices.
 - c. State the advantages of Microservices.
- Q-3 Attempt the following (Any 2): [10]
- a. Discuss the useful decomposition patterns and concerns related to data decomposition.
 - b. Give an overview of Microservices communication styles with reference to In-Process Vs. Inter-Process communication.
 - c. Explain different 'patterns' of communication in microservices.

P.T.O

SECTION – II

E1569-2

- Q-4 Do as directed (any 5): [15]
- Discuss ACID properties in brief.
 - How is REST different from RPC ? Give example to justify your answer.
 - What is the application of Postman to test APIs ?
 - Discuss the key points to avoid breaking changes while implementing microservices.
 - Explain 2 phase commit protocol
 - Explain the need of security in microservices.
- Q-5 Attempt the following (Any 2): [10]
- Write a short note on SAGA.
 - Discuss any one case study of creating microservices. Suppose you have a monolithic project and want to convert it into microservice based project, give an example of all the microservices that you would like to create.
 - Discuss the following commands of Docker: (i) build (ii) run (iii) ps (iv) images (v) pull
- Q-6 Attempt the following (Any 2): [10]
- Discuss different test scopes to test the microservices.
 - Explain any 5 commands used within Dockerfile in brief
 - Discuss how Docker/ECS can be helpful in cloud environment while dealing with microservices.
-

2212E1569 -3

Candidate's Seat No: _____

IMSc (CS) Sem.-9 Examination
Computer Vision
December-2025

Time : 3.00 Hours]

[Max.Marks :70

Instructions:

- Write both the Sections in the separate answer book.
- Both Sections having equal weightage.
- Draw Diagrams wherever necessary.
- Make Assumptions wherever necessary.

SECTION – I

Q-1 Explain the following terms related to image with an appropriate example: 10

- Image
- Segmentation
- Structural element
- Adaptive thresholding
- Colour channel
- Object detection
- Edge
- Convolution
- 8-Neighbours
- Morphological Operations

Q-2 Attempt the following (Any 3): 15

- Explain Image negation, Gamma Correction and Log transform pointwise operations with their effects and use case.
- What is Histogram equalization? Write its steps how it enhances the image with an example.
- What are the different arithmetic and logical operations that can be applied to an image? Explain the concept of clipping when the resulting pixel value falls outside the valid intensity range of 0-255.
- Explain convolution operation on image? What is kernel/filter and its importance in producing feature maps? Write down the kernel for Gaussian Blur and Mean filter.

Q-3 Attempt the following (Any 2): 10

- Explain edge detection and type of edges. Write effects and

P.T.O

E1569-4

convolution masks for any 4 operators.

- b. What is change in intensity and how it is useful to detect edge? Explain first and second order change in intensity and highlight their findings.
- c. What is Bit slicing and how it works? Explain the process and effect of gray level slicing, Intensity slicing, Bit-plan slicing and Histogram Equalization.

SECTION – II

Q-4 For the given binary image and structuring element, find and write erosion and dilation version of this image 10

0	0	0	0	0	0	1	0	0	0	0	0	0	0
0	0	0	0	0	1	1	1	0	0	1	0	0	0
0	0	0	0	0	1	1	1	0	0	1	0	0	0
0	0	0	1	1	1	1	1	0	0	1	0	0	0
0	0	1	1	1	1	1	1	1	1	1	0	0	0
0	1	1	1	0	1	0	1	1	1	1	0	0	0
1	1	1	1	0	1	0	0	0	0	0	0	0	0
0	1	1	1	0	1	0	0	0	0	0	0	0	0
0	0	1	1	0	0	0	0	0	0	0	0	0	0
0	0	0	1	1	1	1	1	1	0	0	0	0	0
0	0	0	0	0	0	1	1	0	0	0	0	0	0
0	0	0	0	0	0	1	0	0	0	0	0	0	0
0	0	0	0	0	0	1	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0

Structuring element

1	1	1
1	1	1
1	1	1

Q-25 Attempt the following (Any 3):

15

- a. Explain opening and closing of an image with their applications. Explain them using “Hits and Fits”.
- b. Explain Thresholding and its type (simple, adaptive, otsu with their subtypes) in detail with their working.

E-1569-5

- c. Explain Watershed algorithm for image segmentation.
- d. What are local features? Give advantage of local features over global features. List some important local feature extraction algorithm.

Q-3 6 Attempt the following (Any 1):

10

- a. Explain image transformations. How transformation works explain using its mathematical interpretation. Write the transformation matrices and effects of translation, scaling, shearing, rotation, reflection.
- b. Define Segmentation and its methods? Explain Region based with watershed algorithm, Cluster based with K-means and thresholding-based segmentation in detail.

→ X