

(i) Printed Pages : 3 Roll No. ....

(ii) Questions : 9 Sub. Code : 

1	3	4	4	3
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Exam. Code : 

5	0	4	3
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Bachelor of Computer Application (FYUP) 3<sup>rd</sup> Semester  
(2125)

**COMPUTER ORIENTED NUMERICAL METHODS**

Paper : NBCA303

Time Allowed : Three Hours] [Maximum Marks : 45

- Note :— (i) Question Paper consists of **NINE** questions comprising **TWO** questions in each of Sections A, B, C, D and **ONE** compulsory question of short answer type in Section E.
- (ii) The students are required to attempt any **ONE** question each from Sections A, B, C, D and Section E is compulsory.
- (iii) The student can only use Basic Scientific (Non-programmable and Non-storage) Calculator.
- (iv) Log tables are allowed for computation.

**SECTION—A**

1. Explain how floating point numbers are stored in computers and the various consequences of normalized floating point representation of numbers. 9

2. (a) Differentiate between numerical analysis vs numerical methods. 5

(b) Define error and explain its different types that can occur in numerical computations with example. 4

### SECTION—B

3. Find the value of  $\sqrt{13}$  by using Newton Raphson method. 9

4. Find a real root of equation  $x^3 - 5x - 7$  correct up to three decimal places by Bisection method. 9

### SECTION—C

5. Solve the Gauss elimination method:

$$2x + 5y - z = 8$$

$$x + 3y - z = 3$$

$$3y - 2z = -1$$

6. (a) Differentiate between interpolation vs extrapolation. 3

(b) Estimate from the following table the number of students who obtained marks between 40 and 45 by Newton's forward interpolation formula:

Marks	30-40	40-50	50-60	60-70	70-80
No. of Students	31	42	51	35	31

SECTION—D

7. Evaluate  $\int_0^1 \sqrt{1-x^2} dx$  by

- (a) Simpson 1/3<sup>rd</sup> rule  
(b) Simpson 3/8<sup>th</sup> rule, taking six intervals.

9

8. Given  $\frac{dy}{dx} = 1 + y^2$  and  $y(0) = 0$

Find  $y(0.4)$  using Runge-Kutta fourth order method with step-size of 0.2.

9

SECTION—E

(Compulsory)

9. Elaborate:

- (a) Prepare the divided difference table for the following data:

x	1	3	4	6	10
f(x)	0	18	58	190	920

- (b) Lagrange Inverse interpolation.

- (c) Numerical integration.

3+3+3

(i) Printed Pages : 2 Roll No. ....

(ii) Questions : 9 Sub. Code : 

1	3	4	4	2
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Exam. Code : 

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Bachelor of Computer Application (FYUP) 3<sup>rd</sup> Semester  
(2125)

DATA STRUCTURES

Paper : NBCA302

Time Allowed : Three Hours] [Maximum Marks : 45

Note :— (i) Question Paper consists of **nine** questions comprising **two** questions each in Sections A, B, C, D and **one** compulsory question of short answer type in Section E.

(ii) The students are required to attempt any **one** question each from Sections A, B, C, D and Section E is compulsory.

**SECTION—A**

1. Explain data structure with its classification and operations in detail. 9
2. (a) Define stack and its memory representation in detail. 5  
(b) Explain types of an array in detail. 4

**SECTION—B**

3. What is Linked list? Write an algorithm for search of a node in linked list in detail. 9

4. (a) Explain queue with its types and memory representation in detail. 5  
 (b) Differentiate between stack and queue in detail. 4

**SECTION—C**

5. (a) Describe graph and its memory representation in detail. 5  
 (b) Explain DFS traversing of a graph in detail. 4  
 6. (a) What are trees? Explain its types in detail. 5  
 (b) Explain binary tree In order traversal in detail. 4

**SECTION—D**

7. Explain Linear Search. Write an algorithm for a Linear search. 9  
 8. Explain sorting with its types in detail. Elaborate comparison between different sorting. 9

**SECTION—E  
 (Compulsory)**

9. Elaborate :  
 (a) Algorithm Complexity  
 (b) Recursion  
 (c) Push and Pop  
 (d) Circular linked list  
 (e) Weighted Graph 2+2+2+2+1

(i) Printed Pages : 2 Roll No. ....

(ii) Questions : 9 Sub. Code : 

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Exam. Code : 

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Bachelor of Computer Application (FYUP) 3<sup>rd</sup> Semester  
(2125)

**COMPUTER ARCHITECTURE**

**Paper—NBCA301**

**Time Allowed : Three Hours] [Maximum Marks : 90**

Note :— Attempt **five** questions in all, selecting **one** question each from Units-I, II, III, and IV. Unit-V is compulsory.

**UNIT—I**

1. Write short on the following:

(a) Computer Organization

(b) Basic Organization of Digital Computer

(c) Computer Architecture 4+10+4

2. (i) What is a Register? Explain the register transfer concept using register transfer language.

(ii) Discuss Shift Microoperations in detail by giving examples.

9+9

**UNIT—II**

3. Discuss the uses of different registers in the basic computer. How common bus is used to communicate between these registers?

18

4. Explain different types of instruction. Describe the instruction cycle by drawing the neat and clean flowchart in detail. 18

### UNIT—III

5. What do you mean by memory hierarchy? Explain each memory in the hierarchy in detail with the help of neat and clean diagram. 18
6. What is virtual memory? How pages and associative tables are implemented in a virtual memory? 18

### UNIT—IV

7. (i) Explain the working of I/O interface with data bus and memory bus. Also give the example of I/O interface with the help of diagram.
- (ii) Differentiate Isolated vs Memory Mapped I/O. 12+6
8. What do you mean by Asynchronous data transfer? Discuss different methods of Asynchronous data transfer with the help of diagrams. 18

### UNIT—V

9. (a) Difference between Micro operations and Macro operations. 3
- (b) Explain three states of bus buffer. 3
- (c) Difference between direct and indirect address. 3
- (d) Difference between Assembly and Machine languages. 3
- (e) What is DMA? 3
- (f) Why start and stop bits are used in Asynchronous data transfer? 3

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Bachelor of Computer Application (FYUP) 3<sup>rd</sup> Semester  
(2125)

**INTRODUCTION TO MACHINE LEARNING**

Paper : NBCA304

Time Allowed : Three Hours] [Maximum Marks : 90

Note :— Attempt FIVE questions in all, selecting ONE question each from Units-I, II, III and IV. Unit-V is compulsory.

**UNIT-I**

1. Define Machine Learning. How is it different from traditional programming? Explain the different types of learning paradigms. 18
2. What are the challenges in Machine Learning? Explain the process of designing a machine learning system. 18

**UNIT-II**

3. What is the need for data preprocessing in Machine Learning? Explain different methods for handling missing data, noisy data, and inconsistent data. 18
4. Describe the concept of feature selection. How does normalization and feature scaling improve model performance? Explain with suitable examples. 18

### UNIT-III

5. Explain the working of the Decision Tree algorithm. How is a decision tree constructed and pruned? 18
6. What is a Support Vector Machine (SVM)? Explain its basic concept and working principle. Compare SVM with k-nearest neighbor classifier. 18

### UNIT-IV

7. Differentiate between K-means and DBSCAN clustering algorithms. Explain how DBSCAN overcomes the limitations of K-means. 18
8. Define Deep Learning. Explain the architecture and components of a Convolutional Neural Network (CNN). How is it different from a traditional neural network? 18

### UNIT-V

9. Attempt any **SIX** of the following (3 marks each):
  - (a) Define training data and test data.
  - (b) Mention two issues in Machine Learning.
  - (c) What is reinforcement learning?
  - (d) Define normalization.
  - (e) What is the purpose of classification evaluation metrics?
  - (f) State any two limitations of K-Means.
  - (g) What is backpropagation?
  - (h) Define Recurrent Neural Networks (RNNs).  $3 \times 6 = 18$