ADAMAS UNIVERSITY

ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING AND TECHNOLOGY
END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester I Term: Aug 2019– Dec 2019)

Name of the Program: Master of Computer Applications — Semester: I
Stream: CSE (MCA)
PAPER TITLE: Statistical and Numerical Methods — PAPER CODE: SMA51141
Maximum Marks: 40 — Time duration: 3 hours
Total No of questions: 9 — Totai No of Pages: 2

Answer all the Groups

Group A

*(Answer **all** the questions)* — $5 \times 1 = 5$

1. **a)** Define class limit.
   b) Find the less than type cumulative frequency from the following data

Class Limits	15-19	20-24	25-29	30-34	35-44	45-59
Frequency	37	81	43	24	9	6

   c) What are the different measures of Central Tendency?
   d) Find mean deviation about the arithmetic mean of the following data: 31, 35, 29, 63, 55, 72, 37.
   e) Calculate the relative error if $\frac{5}{3}$ is approximated by 1.6667.

Group B

*(Answer **any three** questions)* — $5 \times 3 = 15$

2. Find the value of $\sqrt{2}$ correct upto 4 significant figures from the following table:

x	1.9	2.1	2.3	2.5	2.7
$\sqrt{x}$	1.3784	1.4491	1.5166	1.5811	1.6432

3. Find variance (x) from the following data:

x	1.0	1.5	2.0	2.5	3.0	3.5	4.0
y	5.3	5.7	6.3	7.2	8.2	8.7	8.4

4. Derive the formula for Newton Raphson method for finding a real root of the equation $f(x) = 0$. Hence find the value of $\frac{1}{13}$ correct to three decimal places.

5. The regression equations concerning two variables x and y are given by $8x - 10y + 66 = 0$ and $40x - 18y = 214$. Find $\bar{x}$ and $\bar{y}$ and correlation coefficient between x and y.

6. Solve the following Ordinary Differential Equation by an appropriate numerical technique-

$\frac{dy}{dx} = 3x + y^2, y(0) = 1 \text{ at } x = 0.1, 0.2$

Group C

(Answer any two questions) $2 \times 10 = 20$

7. (i) Compute $\int_{0.2}^{1.0} x^2(1-x)dx$ by taking step length 0.1 by Simpson's $\frac{1}{3}$ rule . Obtain your result correct to 3 decimal places.

(ii) Find the coefficient of correlation from the following data:

X	65	63	67	64	68	62	70	66
Y	68	66	68	65	69	66	68	65

(5+5) Marks

8.(i) Solve the following system of equations by Gauss Seidel method

$$-2x + 3y + 10z = 22$$
$$10x + 2y + z = 9$$
$$2x + 20y - 2z = -44$$

(ii) Find the equation of the line of regression of y on x for the following data:

x	41	45	50	68	47	77	90	100	80	100	40	43
y	60	63	60	48	85	56	53	91	74	98	65	43

9. (i) Define Median of a frequency distribution.

(ii) Find the median of the following data: 7, 4, 3, 5, 6, 3, 3, 2, 4, 3, 4, 3, 3, 4, 4, 3, 2, 2, 4, 3, 5, 4, 3, 4, 3, 4, 3, 1, 2, 3.

(iii) Define harmonic mean of n nos. $x_1, x_2 \ldots\ldots x_n$. Hence find the harmonic mean of 3 nos. 10,25,40.

(iv) The geometric mean, harmonic mean and arithmetic mean of three observations are 3.63, 3.27 and 4 respectively. Find the observations. **(1+2+3+4)**

ADAMAS UNIVERSITY

ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING AND TECHNOLOGY
END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: MCA Semester: I
Stream: COMPUTER SCIENCE AND ENGINEERING
PAPER TITLE: COMPUTER ORGANISATION AND ARCHITECTURE PAPER CODE: ECS51103
Maximum Marks: 40 Time duration: 3 hours
Total No of questions: 9 Total No of Pages: 2

(Instruction for students: Cleanliness carries bonus marks)

Answer all the Groups

Group A

(Answer all the questions)

$5 \times 1 = 5$

1.

a. Add #45 – what is the meaning of this instruction.
b. What do you understand by instruction decode?
c. What is a pipeline Hazard ?
d. What do you understand by word?
e. What is Effective Address?

Group B

(Answer any three questions)

$3 \times 5 = 15$

2. What is Programmed I/O and Memory Mapped I/O? What is Instruction Cycle. [2+2+1]

3. Write the 2-Address,1-Address &0-Address m/c instruction sequences for the following expression:

$$X = \frac{(A+B)(4+7)}{\frac{C+D}{5}}$$ [5]

4. State five differences between computer organization and computer architecture

5. Explain the necessity and functionalities of I/O Module. Explain the working principle of peripheral device with diagram.

6.A 8KB direct-mapped write back cache organized as multiple block, each of size 32 bytes, The processor generates 32 bit address. The cache controller maintains the tag information for each cache block comprising 2 extra bits(1 valid bit & 1 modified bit). As many bits as the minimum needed to identify the memory block mapped in the cache. What is the total size of the memory at the cache controller to store the meta data for the cache?

Explain the behavior of a static CMOS ram cell. [3+2]

Group C

(Answer any two questions)

$2 \times 10 = 20$

7. What is an Interrupt. Explain briefly along with flowchart how interrupt is processed. What do you mean by subroutine? State the working principle of DMA. [2+5+1+2]

8. State the differences between Static and Dynamic RAM cell. Write Booth's Algorithm for 2's complement multiplication along with the flowchart. Represent each and every step for multiplying 6 and (-6). [3+3+4=10]

9. Explain the role of cache memory. Explain different types addressing modes with example [3+7]

ADAMAS UNIVERSITY

ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING AND TECHNOLOGY
END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: MCA ,MSc(Tech) in Statistics and Data Science Semester: I
Stream: CSE, Mathematics
PAPER TITLE: Computer Programming PAPER CODE: ECS51101
Maximum Marks: 40 Time duration: 3 hours
Total No of questions:09 Total No of Pages:01

(Any other information required for the student may be mentioned here)

Answer all the Groups

Group A

(Answer all the questions)

$5 \times 1 = 5$

1. **a)** What is Actual Argument?
   b) What is delay loop?
   c) Guess the output

```
main()
{
int x = 7; y = 7,z;
z=(x==y);
printf("%d",z);
}
```

   d) Guess the output

```
main ( )
{
printf(%d%d%d",sizeof(3.14f),sizeof(3.14),sizeof(314));
}
```

   e) What is Macro and why to use it?

Group B

(Answer any three questions)

$3 \times 5 = 15$

2. Difference between call by reference and call by value with examples. 5

3. Write a C function to swap two variables? Write down the difference between compiler and interpreter ? 3+2=5

4. Write Programs in C to print the following patterns 2.5+2.5 = 5

a)
```
0
0 1
0 1 0
```

b)
```
1
2 4
3 5 9
```

5. What is the difference between Structure and Array? What is Array of pointers- explain with example. 3+2=5

6. Describe all types of user defined functions based on their argument passing and value returning capabilities? 5

Group C

(Answer any two questions)

$2 \times 10 = 20$

7. What do you mean by realloc ( ) and free ( )? Explain their difference? Explain the functionality of the following functions with proper syntax and example: getc(), putc(), getchar(), putchar(), scanf() ? What are Automatic and Static Variables ? Explain with examples. 2+1+5+2=10

8. Write a C program to transpose user given matrix? What is the use of fscanf()? Explain with example? What is a word boundary? 7+2+1=10

9. Write a C program to calculate Fibonacci series up to "n" using a recursive function? Write Short notes on Multidimensional Array and Nested For loop. 4+3+3=10

ADAMAS UNIVERSITY

ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING AND TECHNOLOGY
END-SEMESTER EXAMINATION: DECEMBER 2019
(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: MCA
Stream: CSE
PAPER TITLE: Fundamentals of Computer Algorithms
Maximum Marks: 40
Total No of questions: 9

Semester: I
PAPER CODE: ECS51105
Time duration: 3 hours
Total No of Pages: 2

Answer all the Groups

Group A

(Answer all the questions)

$5 \times 1 = 5$

1. a) What is the worst case Time complexity of quick sort?
   b) What is the Time complexity to perform a delete operation in the middle of a singly linked list? (only address of the node to be deleted is given).
   c) When does insertion sort exhibit its best case performance?
   d) What is the time complexity of merge sort?
   e) Define a strictly binary tree.

Group B

(Answer any three questions)

$3 \times 5 = 15$

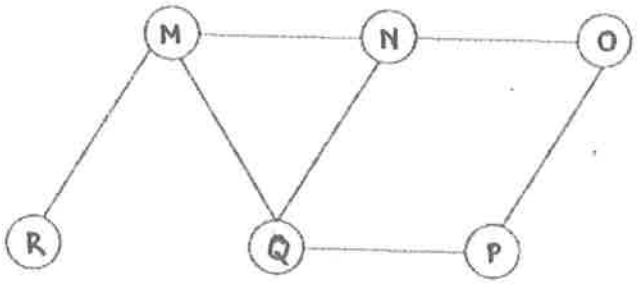
2. What is time complexity of fun()?[c is a global constant]

```
int fun(int n){
 int count = 100;
 for (int i = 1; i <n; i=i*c)
    count=count-1;
 return count;
}
```

3. Write algorithms for Push and Pop operations of a Stack. [2.5+2.5]

4. Write an algorithm to perform Insertion Sort on an array. Analyze the time complexity. [3+2]

5. Perform DFS on the following graph (choose R as source).



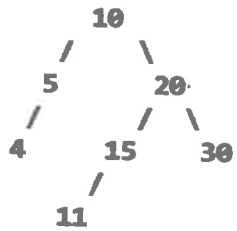
6. What is the worst case time complexity for search, insert and delete operations in a general Binary Search Tree? Explain with example.

Group C

(Answer any two questions)

2×10=20

7. i. Consider the following Binary Search Tree



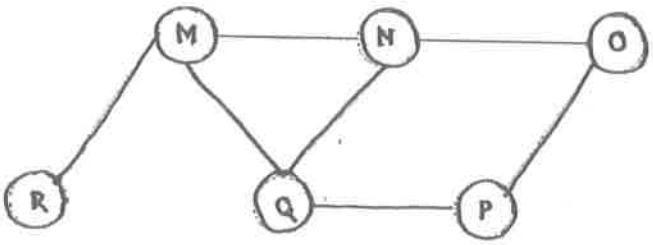
If we randomly search one of the keys present in above BST, what would be the expected number of comparisons?

ii. What is the maximum height of any AVL-tree with 7 nodes? Assume that the height of a tree with a single node is 0. [4+6]

8. Write an algorithm to perform Quick Sort on an array. Analyze the time complexity. [6+4]

9. Write an algorithm to perform delete operation in a sorted array. Analyze the time complexity.

Give adjacency matrix representation of the following graph.



[5+2+3]

ADAMAS UNIVERSITY

ADAMAS UNIVERSITY

SCHOOL OF ENGINEERING AND TECHNOLOGY

END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: MCA

Semester: I

Stream: CSE

PAPER TITLE: Data Structure

PAPER CODE: ECS51107

Maximum Marks: 40

Time duration: 3 hours

Total No of questions: 9

Total No of Pages: 02

Answer all the Groups

Group A

(Answer all the questions)

$5 \times 1 = 5$

1.

a. The given array is arr = {1, 2, 4, 3}. Bubble sort is used to sort the array elements. How much iteration will be done to sort the array?

b. What data structure can be used to check if syntax has balanced parenthesis?

c. Which balance factor is used to check in AVL Tree is

d. Which value is assigned/set at front and rear ends during the initialization of a Queue

e. Which data structures find their applications in BFS and DFS Traversal mechanisms on a Tree respectively?

Group B

(Answer any three questions)

$3 \times 5 = 15$

2. Write the algorithm to create and display single link list using pointer.

3. Translate, by inspection and hand , each infix expression into its equivalent prefix and postfix notation:

a. A * (B+D)/E-F*(G+H/K)

b. A-B/(C ^ D)+(E * F)

4. Write an algorithm and example in the support of Selection sort.

5. Define Complete and weighted Graph? How to represent a graph by Adjacency Matrix, adjacency list.

6. What is Forest in a tree? Explain with an example? Design a Tree for a given preorder and inorder traversal:

Inorder Traversal: {4, 2, 1, 7, 5, 8, 3, 6}

Preorder Traversal: {1, 2, 4, 3, 5, 7, 8, 6}

Group C

(Answer any two questions)

$2 \times 10 = 20$

7.

a. Convert X: A+ (B + C *(D + E)) + F/G into postfix form showing the stack status after every step in tabular form.

b. Write the application of Stack in different field?

c. Write the function to insert and remove elements from the stack.

[5+2+3]

8.

a. What is circular a queue?

b. Explain the limitation of simple queue with an example and how to rectify it.

c. Write the function for insertion and deletion of an element from a circular queue.

[2+3+5]

9.

a. What is AVL Tree?

b. What is the need of AVL Tree?

c. In how many ways AVL Tree can rotate and why the rotation is needed.
Construct an AVL Tree by inserting numbers from 1 to 8.

[1+ 1+2+6]

ADAMAS UNIVERSITY

ADAMAS UNIVERSITY
SCHOOL OF ENGINEERING AND TECHNOLOGY

END-SEMESTER EXAMINATION: DECEMBER 2019

(Academic Session: 2019 – 20, Semester Term: Aug 2019– Dec 2019)

Name of the Program: MCA Semester: I
Stream: CSE
PAPER TITLE: HSS I PAPER CODE: HEN41117
Maximum Marks: 40 Time duration: 3 hours
Total No of questions: 10 Total No of Pages: 02

(Any other information required for the student may be mentioned here)

Answer all the Groups

Group A

(Answer all the questions)

10 *Marks*

1. **Correct the following incorrect sentences:**
   a) The movie begin before I reach the theatre.
   b) Monica cook dinner of her.
   c) She finish her homework before go to bed.
   d) The baby howl continuously.
   e) The childrens is playing on the park.

Group B

(Answer any three questions)

$3x5 = 15$

2. **Write a brief note on the stages of communication.**

3. **Discuss about the different types of communications.**

4. **Fill in the blanks using suitable prepositions. Please copy the sentences given, while answering:**

   i. **The air-plane flew ____ the mountain.**
   ii. **The cat slept ____ the bed.**
   iii. **The ferry takes people _____ the river.**
   iv. **I gave the parcel ____ him.**
   v. **We went to the theater_____ Karan.**
   vi. **This is the file I was looking _____.**
   vii. **Is this the lady you were speaking ____?**
   viii. **The person _____ whom he is talking is my boss.**
   ix. **She arrived ____ 4 o' clock.**
   x. **The children threw stones _____ the pond.**

5. **Fill in the blanks using suitable articles. Please copy the sentences given, while answering:**

i. Who is _____ Class Representative of your class?
ii. ____Children sat quietly.
iii. The justice was delivered ____ the court.
iv. He knows ___ address.
v. I placed my hand on ____ door.
vi. There was _____ elephant nearby.
vii. He is ____ painter.
viii. There was ____ ink pot on the table.
ix. It was ____ prosperous land.
x. ____Cinema ends on a happy note.

6. Fill in the blanks using suitable forms of the verbs given in the bracket. Please copy the sentences given, while answering:

i. We _____ for a meeting. (leaving)
ii. The child _____ out of the window. (looking)
iii. The women _____ water from the well. (draw)
iv. I _____ stories for children. (write)
v. We _____ to Singapore next Sunday. (fly)
vi. Why _____ question? (ask).
vii. I am _____ these days. (writing)
viii. Only one telephone _____. (function)
ix. I ____ my father. (resemble)
x. Do you _____ my story? (believe)

Group C

(Answer any three questions)

$3x5 = 15$

7. Draft a letter as the purchase manager of De and Co. Private Limited, Kolkata, placing an order for paper boxes from Packers Private Limited, Delhi.

8. Write a paragraph within 300 words on the Water crisis in your locality.

9. Draft a letter of complaint as the Purchase Officer of Ghosh and Sons Private Limited, Kolkata to the Utilities Private Limited, Kolkata, complaining against the malfunctioning of fan regulators newly bought for your company.

10. Draft a cover letter to the HRD of an organization, where you want to participate in an exhibition.