

20AA741

M.C.A. EXAMINATION, 2021

(First Semester)

(C Scheme) (Main Only)

MASTER OF COMPUTER APPLICATIONS

MCA101C

Computer Organization and Architecture

Time : 2½ Hours]

[Maximum Marks : 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Four* questions in all. All questions carry equal marks.

1. (i) Define a micro instruction.
- (ii) Write the purpose of Accumulator.
- (iii) What is the use of a macro ?
- (iv) Write two advantages of microprogramming.
- (v) Define control memory.
- (vi) Why cache memory is needed ?
- (vii) How hit ratio can be improved ?
- (viii) State the Amdahl's law for parallel computers.
- (ix) What is the use of CRC in data transmission ?
- (x) What is the purpose of priority interrupt ?

2. (i) What do you mean by register transfer language (RTL) ? Write any *four* conventions used in RTL.
(ii) List and briefly explain different types of busses used in a computer system.
3. (i) Draw and explain the instruction cycle of a computer.
(ii) Write and explain the structure of an assembly language program. Explain the purpose of each segment.
4. (i) Which architecture is best for high performance RISC or CISC ? Elaborate your answer.
(ii) List and explain various categories of micro instructions.
5. List and elaborate the functions of the control unit of a computer. With the help of neat diagram explain the operation of micro-program sequencer for control memory.
6. (i) Write the advantages and disadvantages of associative memory.
(ii) What do you mean by address space and memory space ? By taking a suitable example explain the relationship between address and memory space.
7. For providing a memory capacity of 4096 bytes of RAM and 4096 bytes of ROM design a memory system and also show how the connections will be made. Each RAM chip is of 128×8 size and each ROM chip is of size 512×8 .
8. With the help of suitable examples illustrate how instruction level parallelism ILP can be achieved by optimizing the code generation and scheduling process.
9. With the help of suitable diagram explain the sequence of operations involved in an input output operation. Also explain the working of I/O processor.

20AA742

M.C.A. EXAMINATION, 2021

(First Semester)

(C Scheme) (Main Only)

(MCA)

MCA103C

INTRODUCTION TO DBMS

Time : 2½ Hours]

[Maximum Marks : 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Four* questions in all. All questions carry equal marks.

1. (a) What is data abstraction ? How is it helpful in DBMS ? Explain with example.
(b) What is entity set ? What are its types ? Describe.
(c) What is a recursive relationship ? Explain with example.
2. (a) What are various types of data independence supported by DBMS ? Explain.
(b) What are mapping constraints ? What is their role in DBMS ? Explain.
(c) What are various types of DBMS on the basis of models ? Explain.
3. (a) Can a table have more than one foreign key ? Justify your answer with example.
(b) What is an aggregate function ? Explain various aggregate functions in SQL.
(c) How to find a key for a relationship when it is converted to table ? Explain with example.

4. (a) What is cross operator in relational algebra ? What is its utility ? Explain with example.
(b) What is full outer join ? Give example of a query that can be answered with full outer join.
(c) What are the set compatibility conditions relational algebra. On which operations these conditions are applied ?
5. Precisely compare 3NF, BCNF & 4NF. Also give an example of a relation which not in 4NF but it is in BCNF.
6. Explain implementation of set operations, natural join and outer joins in SQL.
7. What is recover ability of transactions ? Explain one method to check database recovery in detail.
8. Write short notes on the following :
 - (a) ARIES
 - (b) Lock based concurrency control.

20AA743

M.C.A. EXAMINATION, 2021

(First Semester)

(C Scheme) (Main Only)

MASTER OF COMPUTER APPLICATIONS

MCA105C

Programming in 'C'

Time : 2½ Hours]

[Maximum Marks : 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Four* questions in all. All questions carry equal marks.

1. (a) Name various data types used in C.
(b) What is a bitwise operator ?
(c) Write advantages of using a function in C.
(d) Explain any *two* operations that can be performed on pointer.
(e) Write uses of library functions.
2. Define a flow chart. Draw a flow chart to find the roots of a quadratic equation.
3. Write the use of the following in C :
 - (i) getchar
 - (ii) putchar
 - (iii) ifdef

- (iv) gets
 - (v) puts
4. Explain the control statements used in C. Differentiate between while and do-while statements.
 5. What is nested if-else statement ? Write an algorithm and a program in C to assign grade to the students as per following conditions :
 - If marks > 90 then grade A
 - If marks > 80 then grade B
 - If marks > 70 then grade C
 - If marks > 60 then grade D
 - If marks > 50 then grade E
 - else grade F.
 6. Define array. How an array is initialized ? Write a program in C to declare an array of 10 number. Enter the values of 10 numbers and sort the array in ascending order.
 7. What are storage classes ? Explain various types of storage classes used in C.
 8. What is a structure ? Explain it by taking a suitable example. How is it different from an array ?
 9. Write a program in C to create a file and write data into it and count numbers of characters entered.

20AA744

M.C.A. EXAMINATION, 2021

(First Semester)

(C-Scheme) (Main Only)

(MCA)

MCA107C

SOFTWARE ENGINEERING

Time : 2½ Hours]

[Maximum Marks : 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Four* questions in all. All questions carry equal marks.

1. (i) Define application software.
- (ii) Write any *two* software metrics.
- (iii) Explain egoless programming.
- (iv) Write two advantages of agile software development strategy.
- (v) Define alpha testing.
- (vi) Why a decision table is used ?
- (vii) How cyclomatic complexity of module can be improved ?
- (viii) Define vertical scaling in cloud.
- (ix) Define a hypervisor.
- (x) Write *two* advantages of virtualization.

2. (a) Explain the term Software crisis ? Discuss various factors leading to software crisis.
(b) Which of the characteristics of software differentiates it from other engineering disciplines.
3. (a) List the main aims of requirement engineering ? Describe its four sub-processes.
(b) Explain the evolutionary software development model for automation of a cafeteria.
4. (a) Exhaustive testing is just not possible. Comment.
(b) Differentiate between black box testing and white box testing.
5. Explain the process of transform mapping. Also describe the steps involved in the transformation of data flow diagrams into an architecture with suitable example.
6. (a) Discuss any *four* measures which can be used for measuring software.
(b) What are the problems encountered when LOC is used as metric ? How these issues are handled ?
7. Compare the ISO and SEI CMM models for quality of a software product.
8. Write any *ten* principles of Agile software development methodology. Also write five disadvantages of Agile Methodology.
9. List any *Seven* parameters which you will consider while choosing a cloud service provider for your organization's computational needs.

20AA745

M.C.A. EXAMINATION, 2021

(First Semester)

(C Scheme) (Main Only)

(MCA)

MCA109C

COMPUTER NETWORKS

Time : 2½ Hours]

[Maximum Marks : 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Four* questions in all. All questions carry equal marks.

1. (a) A host communicates with another host using the TCP/IP protocol suite. What is the unit of data sent or received at each of the following layers :
 - (i) application layer
 - (ii) network layer
 - (iii) data-link layer ?
- (b) A router connects three links (networks). With how many of the following layers can the router be involved with :
 - (i) physical layer, (ii) data-link layer, (iii) network layer ?
- (c) How many point-to-point WANs are needed to connect 'n' LANs, if each LAN is able to directly communicate with any other LAN ?
- (d) In FTP, which entity (client or server) starts (actively opens) the control connection ? Which entity starts (actively opens) the data transfer connection ?

- (e) Which cipher can be broken more easily, monoalphabetic or polyalphabetic ? Explain.
2. (a) List and explain the type of delays in a packet-switch network.
(b) Distinguish between communication at the network layer and communication at the data-link layer.
3. (a) List and explain the major classes of guided media.
(b) List and explain the different types of networking devices.
4. Elaborate the concept of Fast Ethernet and Gigabit Ethernet. Also explain how Gigabit Ethernet is better than the Fast Ethernet.
5. (a) What are proxy servers ? Explain.
(b) List and explain the different classes of services.
6. (a) If a port number is 16-bits (2 bytes), what is the minimum header size at the transport layer of the TCP/IP protocol suite ?
(b) Assume that we add a new protocol to the application layer. What changes do we need to make to other layers ?
(c) What are the types of address (identifiers) used in each of the following layers :
(i) application layer,
(ii) network layer,
(iii) data-link layer ?
(d) What do you think would happen if the control connection were served before the end of an FTP session ? Would it affect the data connection ?
(e) Both HTTP and FTP can retrieve a file from a server. Which protocol should we use to download a file ? Explain.
7. Compare the TCP header and the UDP header. List the fields in the TCP header that are not part of the UDP header. Give reasons for each of the missing fields.

8. (a) Distinguish between a substitution cipher and a transposition cipher.
(b) When we talk about authentication in SSL, do we mean message authentication or entity authentication ? Also distinguish between message authentication and entity authentication.
9. (a) Distinguish between http and https.
(b) Elaborate the working mechanism and significance of Digital signatures.

20AA746

M.C.A. EXAMINATION, 2021

(First Semester)

(C Scheme) (Main Only)

(MCA)

MCA111C

DATA STRUCTURE USING 'C'

Time : 2½ Hours]

[Maximum Marks : 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Four* questions in all. All questions carry equal marks.

1. (a) What do you mean by nonlinear data structures ? What are their types ?
(b) Can Binary Search algorithm be applied to linear linked lists ? Justify your answer.
(c) What is over flow condition in a data structure ? How overflow condition of an array is different from overflow condition of a linked list ?
2. (a) What is big oh notation for asymptotic complexity ? Find big oh notation for $x^2 - 3x + 2$, also mention the values of x for which it is true.
(b) Differentiate top down and bottom up approaches for algorithm design. Also mention example of algorithms for each .
(c) Compare an algorithm with a flow chart. Also write features of a good algorithm.

3. (a) What are differences in row major ordering and column major ordering of a matrix ? Give example in support of your answer.
- (b) Write an algorithm to multiply two matrix and also mention the worst time complexity of this algorithm.
- (c) Evaluate given post fix notation using algorithm, also show intermediate results :

$$10\ 2\ 8\ * + 3\ -$$

4. (a) Write algorithm to represent push and pop operations when stack is represented using an array.
 - (b) Write algorithm to delete an item from circular queue.
 - (c) Add $3x^4 - 5x^2 + 10$ and $5x^3 + 10x^2 + 9x - 20$ with the help of linked lists.
5. Write an algorithm to delete an item from doubly linked list.
6. (a) Apply following operations on initially empty Binary Search tree and draw tree for each operations :
Insert 23, 45, 67, 78, 90, 56, 33, 89 delete 45 delete 56 insert 92.
 - (b) Compare AVL tree with Binary search tree.
7. Write an algorithm for merge sort and explain its working.
8. Write complete algorithm for depth first search also mention its worst time complexity.