

**MCA (1STSEM) EXAMINATION 2021**

**INFORMATION TECHNOLOGY  
PAPER CODE: MCA101**

**TIME: 3 HOURS**

**MAX MARKS: 70**

**SECTION A**

**6X5=30**

**(Each question carries 5 marks)**

**Answer any 6 of the following questions**

1. Define loader and its different functions.
2. Discuss various machine dependent loaders.
3. Write an algorithm for absolute loader.
4. Explain program relocation and linking algorithm with example.
5. What is the need of syntax analysis?
6. Show the examples of some software tools that manipulate source program?
7. What are the various issues one should consider while choosing File organization and Indexing techniques?
8. Why the sequential scan in primary index is efficient?
9. Define heap file organization, sequential file organization, and hash file organization.

**SECTION B**

**5X8=40**

**(Each question carries 15 marks)**

**Answer any 5 of the following questions**

1. a) Differentiate Primary and Secondary index.  
b) Why hashing is required in direct file organisation?  
c) Tell the various phases of the compiler and examine with programs segment. Discuss in detail about symbol table. (3+2+3)
2. a) List the various phases of a compiler.  
b) Depict diagrammatically how a language is processed.  
c) Explain different Assemblers.  
d) Explain Linker for MS Dos. (4\*2)
3. a) What do you mean by two pass assembler?

- b) What are the jobs of macro processor?
- c) List out the disadvantages of absolute loader.
- d) What is the difference between working a d general registrar? (4\*2)

4. a) Explain different data structures used in case of designing direct linking loader.

b) Discuss the differences between the following file organizations: Sequential, Index sequential & Hash files.

c) Explain the generations of computers in brief. (3+3+2)

5. a) Can one pass macro processor successfully handle a macro containing conditional macro pseudo-op? If no, what modifications are necessary to enable it to handle such situation? If yes, how does it handle it?

b) Write in brief the functions of lexical Analyzer. (5+3)

6. a) What are the main components and operations of an Assembler?

b) Draw a flowchart and explain One pass and two pass assembler in brief. (3+5)

7. a) What is a utility software? Give examples (2+1)

b) What is system software? What are its types? Give examples (2+2+1)

8. a) What is a language processor? What are the types of computer languages? What are the types of language interpreters? (1+2+2)

b) Show stepwise how a source code is transformed to executable code. (3)

**MCA) 1STSEM) EXAMINATION20 21**

**Mathematical Foundation of Computer Science  
PAPER CODE: MCA-102**

**TIME: 3 HOURS**

**MAX MARKS: 70**

Attempt any *five*

**5X5=25**

1. Find the power set of  $\{\{1,2\},3\}$  [5]
2. If  $A=\{1,2,3\}$ ,  $B=\{3,4,5,6\}$ , then find  $A \times B$  and  $B \times A$ . [5]
3. If  $f=\{(1,2), (2,3), (3,1)\}$  and  $g=\{(1,1), (2,3), (3,2)\}$ , then show that  $f \circ g \neq g \circ f$  [5]
4. The order of every subgroup of a finite group  $G$  is a divisor of the order of  $G$ . [5]
5. Draw all trees with six vertices. [5]
6. Find the adjacency matrix  $A = [a_{ij}]$  of each graph  $G$  in figure-P06

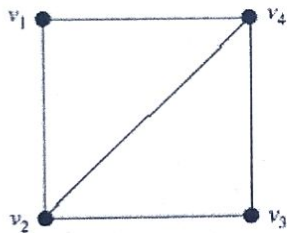


Figure-P06

[5]

7. Write down the table representation of figure-P07:

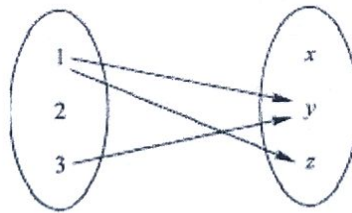


Figure-P07

[5]

Attempt any *three*

**15X3=45**

8. Given  $A=\{1,2,3,4,6,8,9,12,18,24\}$  be ordered by the relation "x divides y". Draw the corresponding Hasse diagram. [15]
9. Given  $S=\{a, b, c, d, e, f, g\}$ . The elements are ordered as shown in the figure-P09 below and let  $X=\{c, d, e\}$ .
  - (a) Find the upper and lower bounds of  $X$
  - (b) Identify  $\sup(X)$ , the supremum of  $X$ , and  $\inf(X)$  infimum of  $X$ .

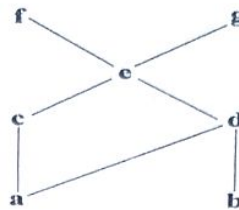


Figure-P09

[8+7]

10. A graph G with vertices A, B,... ,F is stored in memory using a linked representation with a vertex file and an edge file as in figure- P10.  
List the vertices in the order they appear in memory. [15]

		Vertex file							
		1	2	3	4	5	6	7	8
START	VERTEX	B		F	D	A		C	E
	NEXT-V	3		5	1	8		0	7
	PTR	9		4	7	6		5	12

		Edge file													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
ADJ		4	4	1	8	8	1	5	3	5	8	4	7		
NEXT		8	0	10	0	0	2	3	0	11	0	0	1		

Figure-P10

11. Consider the second-order homogeneous recurrence relation  
 $a_n = a_{n-1} + 2a_{n-2}$  with initial conditions  $a_0 = 2, a_1 = 7$

- (a) Find the next three terms of the sequence.  
 (b) Find the general solution.  
 (c) Find the unique solution with the given initial conditions. [15]

12. Let A, B, C, D, E, F, G, H be eight data items with the following assigned weights:

Data item	A	B	C	D	E	F	G	H
Weight	22	5	11	19	2	11	25	5

Construct a 2-tree T with a minimum weighted path length P using the above data as external nodes.  
 [15]

**MCA (1STSEM) EXAMINATION 2021**  
**PROGRAMMING AND PROBLEM SOLVING IN C**

PAPER CODE: MCA102

TIME: 3 HOURS

MAX MARKS: 70

**SECTION A            5X5=25**

(Each question carries 5 marks)

Answer any 5 of the following questions

1. What is static variable? What is use of this variable?
2. What is Null pointer? Write down the use of Null Pointer.
3. Define an array with proper example. Declare an array of structure having 50 elements of student type.
4. Define different types of operators in C
5. How to declare a function? Define a function with proper C code.
6. Distinguish between malloc () and calloc () and give the examples.
7. Distinguish between the following:
  - (i) Syntactic error and semantic error
  - (ii) Run time error and logical error
  - (iii) Compiler and Interpreter
8. What are the features of C preprocessor? Give the differences between macros and function?

**SECTION B        3X15=45**

(Each question carries 15 marks)

Answer any 3 of the following questions

1. Write a complete C program to compute and print the names of those students who have got more than 75 marks. Also print their marks along with their names.  
15
2. Write down the steps of inserting a formula in an EXCEL spread sheet. Which are the mathematical operators, used in Excel's formula?    8+7
3. For the purpose of deleting the file and directory which commands are used in a DOS system? Explain by suitably taking one example. Write a note on capabilities and limitations of a computer .  
8+7
4. Write a C program to print Fibonacci series between 1 to 50. Define While loop in C.  
12+3
5. How is data recorded on a CDROM? How is it read? Define the terms "Seek time" and "Latency time" of a magnetic disk. Write a short note on super computers and their applications.  
6+4+5

**MCA(1STSEM)EXAMINATION 2021**  
**Computer Organization and Assembly Language Programming**  
**PAPER CODE: MCA104**

**TIME: 3 HOURS**

**MAX MARKS: 70**

**SECTION A            5X5=25**

**(Each question carries 5 marks)**

**Answer any 5 of the following questions**

**Q1.** Describe Synchronous and asynchronous transmission. What is the need of DMA in a Computer? How is DMA different than that of Interrupt driven I/O technique?

**Q2.** What is meant by instruction? What is Bus? Draw the single bus structure and explain it.

**Q3.** Define Latency and throughput. Discuss the principle operation of micro programmed control unit. What are the differences between hardwired and micro programmed control units?

**Q5.** What are the types of micro instruction? Why we need an instruction buffer in a pipelined CPU?

**Q6.** Define cache. Define Memory refreshing. What is address translation page fault routine, page fault and demand paging?

**Q7.** What is bus master and slave master? List down the functions performed by an Input/output unit.

**Q8.** Differentiate between RAM and ROM. Explain Static and Dynamic RAM.

**Q1.** A RAM has 1M rows each having 16 cells:

- (i) How many data input and data output lines does this RAM needs?  
Explain your answer.

(ii) What is the capacity of RAM in byte?

**SECTION B**

**3X15=45**

**(Each question carries 15 marks)**

**Answer any 3 of the following questions**

- Q1.** a) Design and implement the Exclusive-OR gate using AND and OR gates.  
b) Design a combinational circuit that takes a 3-bit number and the output of that circuit should be the square of the input Number.  
c) What are the advantages of Base Register addressing scheme?  
d) What are the differences between circular and logical shift micro-operations?

- Q2.** a) What is pipelining?  
b) Draw a space-time diagram for a four segment pipeline showing the time it takes to process six tasks.  
c) What are the parameters to measure the performance of a pipeline processor?

**Q3.** Write Short Notes on (Any three):-

- i) RISC vs CISC
- ii) Inter Processor Communication
- iii) Flynn's Classification
- iv) Virtual Memory

- Q4.** a) What is multiplexer?  
b) Design a 2x1 Mux.  
c) Write short note on Shift Register.  
d) Explain the concept of memory interleaving.

- Q5.** a) What is firmware? How is it different from software?  
b) Write the characteristics of 8086 processor.  
c) Explain the flags in 8086 with the help of a diagram.  
d) Explain the function of S-R flip-flop with characteristic table.

**MCA (1<sup>st</sup> SEM) Examination, 2021**

**COMMUNICATION SKILLS**

**Paper-MCA105**

**Time Allotted: Three Hours**

**Maximum Marks: 70**

**SECTION-A**

**Note: Attempt any 4 question from 1 to 7 and each question carry 7 marks.**

**4X7=28**

- Q.1 Explain the need for using technology in business. Justify your answer with an example
- Q.2 Discuss various patterns in which content of a presentation can be organised.
- Q.3 Define non-verbal communication. Discuss at least four forms of nonverbal communication.
- Q.4 Explain different types of communication with examples.
- Q.5 What are the objectives of interviews? Explain exit interview in brief.
- Q.6 Discuss various types and structure of report
- Q.7 Explain the various steps involved in a group discussion.

**SECTION-B**

**Note: Attempt any 3 question from 8 to 12 and each questions carry 14 marks.**

**3X14=42**

- Q.8 What is the role of Electronic communication in designing and delivering business presentation?
- Q.9 What do you understand by business etiquettes. Discuss the significance of (a) dressing (h) table manners (c) handshake in corporate with suitable example.
- Q.10 Elaborate the various steps involved in the process of communication. Distinguish between oral and written communication.
- Q.11 Elucidate the essentials of a good business letter. Write a letter to Mayor of your city telling him the condition of Bad Roads in your locality.
- Q.12 Your Company is considering a proposal to make an in home canteen for office employees. Your office has around 100 employees. Make a report to give an estimate of the area, manpower and money required to set up and run the canteen.