

Time: 3 Hours**Max Marks: 70**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

<u>UNIT-I</u>		Marks	CO	BTL
1.	a) Explain the components and segments of the environment with suitable examples.	7M	CO1	K2
	b) Discuss the importance of food security and sustainable agricultural practices.	7M	CO1	K2
(OR)				
2.	a) Explain the evolution of the man–environment relationship.	7M	CO1	K2
	b) Mention the significance of resource conservation for sustainable development.	7M	CO1	K2
<u>UNIT-II</u>				
3.	a) Explain the structure and functions of ecosystem.	7M	CO2	K2
	b) Discuss the importance of India as a mega-diverse nation.	7M	CO2	K3
(OR)				
4.	a) Explain the threats to biodiversity and measures for its conservation.	7M	CO2	K2
	b) Analyse the role of carrying capacity in maintaining ecological balance.	7M	CO2	K3
<u>UNIT-III</u>				
5.	a) Explain the causes, effects, and control measures of noise pollution.	7M	CO3	K2
	b) Discuss the concept and environmental consequences of acid rain.	7M	CO3	K3
(OR)				
6.	a) Explain marine pollution and its impact on aquatic ecosystems.	7M	CO3	K2
	b) Explain how pollution control measures can improve environmental quality and public health.	7M	CO3	K3
<u>UNIT-IV</u>				
7.	a) Explain the concept and principles of environmental ethics.	7M	CO4	K2
	b) Discuss the significance of environmental ethics in promoting sustainable development.	7M	CO4	K3
(OR)				
8.	a) Explain the concept of environmental refugees and the reasons for their displacement.	7M	CO4	K2
	b) Analyse the environmental and social consequences of rapid urbanization in India.	7M	CO4	K3
<u>UNIT-V</u>				
9.	a) Explain the objectives and provisions of the Water (Prevention and Control of Pollution) Act, 1974.	7M	CO5	K2
	b) Enumerate the role of Public Interest Litigation (PIL) in environmental protection.	7M	CO5	K3
(OR)				
10.	a) Explain the significance of environmental justice in sustainable development.	7M	CO5	K2
	b) Illustrate the role of pollution control boards in enforcing environmental laws.	7M	CO5	K3

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

	<u>UNIT-I</u>	Marks	CO	BTL
1. a)	Define the concept of business and Explain its features	7	1	K2
b)	Analyse the primary objectives of a business organization and why they are critical for long-term success.	7	1	K2
	(OR)			
2. a)	Distinguish between Industry and Commerce with relevant examples.	7	1	K2
b)	Describe the various stages of business development.	7	1	K2
	<u>UNIT-II</u>			
3. a)	Elucidate the essential traits of a successful entrepreneur.	7	2	K2
b)	What are the key considerations an entrepreneur must evaluate when establishing a new business?	7	2	K2
	(OR)			
4. a)	Discuss Sole Proprietorship as a form of business ownership, highlighting its advantages and limitations.	7	2	K2
b)	Explain the concept of a One Person Company (OPC) and its significance for small entrepreneurs.	7	2	K2
	<u>UNIT-III</u>			
5. a)	Explain the importance of plant location in the context of industrial success.	7	3	K2
b)	Explain the different methods and criteria used to measure the size of a business.	7	3	K2
	(OR)			
6. a)	Describe the different types of plant layouts	7	3	K2
b)	Evaluate the challenges businesses face when trying to optimize their size in a competitive market.	7	3	K2
	<u>UNIT-IV</u>			
7. a)	Define Business Combinations and state their primary objectives.	7	4	K2
b)	Distinguish clearly between Rationalization and Nationalization.	7	4	K2
	(OR)			
8. a)	Discuss the major benefits and potential limitations of implementing rationalization in industries.	7	4	K2
b)	Describe the various forms and types of business combinations.	7	4	K2
	<u>UNIT-V</u>			
9. a)	Outline the milestones in computer evolution across the generations.	7	5	K2
b)	Define Malware and describe three different types and their impact on data security.	7	5	K2
	(OR)			
10. a)	Discuss the role of firewalls in protecting networks.	7	5	K2
b)	Evaluate the importance of Data Privacy laws for modern digital businesses.	7	5	K2

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

		<u>UNIT-I</u>	Marks	CO	Blooms Level
1.	a)	Convert $8620_{(10)}$ into	7	CO1	Analysing
	i)	BCD ii) Binary iii) 2421			
	b)	Perform subtraction using 2's complement: (1000100-1010100).	7	CO1	Analysing
(OR)					
2.	a)	Convert $(163.875)_{10}$ to binary, octal, hexadecimal.	7	CO1	Analysing
	b)	Convert Binary $(10101110)_2$ into gray code	7	CO1	Analysing
<u>UNIT-II</u>					
3.	a)	Design a 3-to-8-line decoder using 2-to-4-line decoder and explain it.	7	CO2	Analysing
	b)	Reduce the following function using K- map $F(A,B,C,D) = \sum m(5,6,7,12,13,14) + d(8,9)$.	7	CO2	Analysing
(OR)					
4.	a)	Reduce the following function using k-map $F = B'C + A'BC' + AB'C + ABC'$	7	CO2	Analysing
	b)	Differentiate between a MUX and a DEMUX. Draw a logic circuit of 8x1 multiplexer.	7	CO2	Understanding
<u>UNIT-III</u>					
5.	a)	What is a bus? Explain the bus structure for connecting different components of a computer	7	CO3	Understanding
	b)	Define Computer. Explain the various Functional units of a Computer with the help of a block diagram.	7	CO3	Understanding
(OR)					
6.	a)	Describe instruction cycle with flowchart.	7	CO3	Understanding
	b)	What is an addressing mode? Explain the different addressing modes with examples	7	CO3	Understanding
<u>UNIT-IV</u>					
7.	a)	Explain in detail RAM and ROM chips.	7	CO4	Understanding
	b)	Illustrate how cache memory reduces the average memory access time with an example.	7	CO4	Analysing
(OR)					
8.	a)	Explain about DMA interface.	7	CO4	Understanding
	b)	Explain asynchronous data transfer methods?	7	CO4	Understanding
<u>UNIT-V</u>					
9.	a)	Explain about cache coherence.	7	CO5	Understanding
	b)	Describe in detail about multiprocessors?	7	CO5	Understanding
(OR)					
10.	a)	Describe types of pipeline hazards?	7	CO5	Understanding
	b)	Describe interconnection networks?	7	CO5	Understanding

Time: 3 Hours**Max Marks: 70**

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

	<u>UNIT-I</u>	Marks	CO	Blooms Level
1.	a) Analyze the time and space complexity of recursive algorithms with an example	7	CO1	2
	b) Describe in detail time and space complexity? Give examples.	7	CO1	1
	(OR)			
2.	a) Explain best case, worst case, and average case analysis with examples	7	CO1	2
	b) Differentiate between iterative and recursive algorithms	7	CO1	1
	<u>UNIT-II</u>			
3.	a) Explain quick sort with example and complexities	7	CO2	2
	b) Define hash function and collision	7	CO2	1
	(OR)			
4.	a) Explain binary search algorithm with complexity analysis	7	CO2	2
	b) Explain merge sort with example and complexities	7	CO2	2
	<u>UNIT-III</u>			
5.	a) Explain what is a circular linked list	7	CO3	2
	b) Explain creation, insertion, and deletion in a singly linked list	7	CO3	2
	(OR)			
6.	a) Explain traversal and deletion operations in a doubly linked list	7	CO3	2
	b) Define linked list and its types	7	CO3	1
	<u>UNIT-IV</u>			
7.	a) Explain stack operations and implementation using linked lists	7	CO4	2
	b) Differentiate between stack and queue	7	CO4	1
	(OR)			
8.	a) Evaluate an expression using stack with example	7	CO4	2
	b) Explain what is a queue? List its operations	7	CO4	2
	<u>UNIT-V</u>			
9.	a) Explain binary tree traversal methods (inorder, preorder, postorder)	7	CO5	2
	b) Define BFS and DFS	7	CO5	1
	(OR)			
10.	a) Describe Dijkstra's algorithm for shortest path with example	7	CO5	2
	b) Explain types of tree traversals and graph representation	7	CO5	1

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

		<u>UNIT-I</u>	Marks	CO	BTL
1.	a)	Compare and contrast C and C++ programming languages with suitable examples.	7	CO1	K2
	b)	Discuss the limitations of procedural programming languages. How does Object-Oriented Programming overcome these limitations?	7	CO1	K2
(OR)					
2.	a)	Explain the evolution of C++ from the C programming language.	7	CO1	K2
	b)	Explain the concept of Object-Oriented Programming (OOP). Describe its importance in modern software development.	7	CO1	K2
UNIT-II					
3.	a)	Explain the concept of a class in C++. How is a class defined and implemented? Illustrate with a suitable example.	7	CO2	K2
	b)	What is constructor overloading? Explain its need and implementation with a suitable C++ program.	7	CO2	K2
(OR)					
4.	a)	What is encapsulation? Explain how encapsulation is achieved in C++ using classes and access specifiers.	7	CO2	K2
	b)	Discuss the default constructor in C++. Explain its working with a suitable program example.	7	CO2	K2
UNIT-III					
5.	a)	Discuss the concept of unary operator overloading in C++. Explain how unary operators can be overloaded using member functions.	7	CO3	K2
	b)	Explain type conversion in C++. Discuss implicit and explicit type conversion with suitable examples.	7	CO3	K2
(OR)					
6.	a)	What is inheritance in C++? Explain its features, advantages, and importance in code reusability.	7	CO3	K2
	b)	Explain virtual base classes in C++. Discuss their syntax, working, and applications with suitable examples.	7	CO3	K2
UNIT-IV					
7.	a)	What are pointers to objects in C++? Explain their declaration, initialization, and usage with suitable examples.	7	CO4	K2
	b)	Discuss how the this pointer is automatically associated with member functions. Illustrate with examples.	7	CO4	K2
(OR)					
8.	a)	Explain pointers to base classes and derived classes in C++. How are they used in inheritance hierarchies?	7	CO4	K2
	b)	Compare static binding and dynamic binding in C++. Highlight their differences with suitable examples.	7	CO4	K2
UNIT-V					
9.	a)	What are function templates in C++? Explain their syntax, working, advantages, and applications with suitable examples.	7	CO5	K2
	b)	Discuss the advantages of class templates in developing generic data structures and algorithms.	7	CO5	K2
(OR)					
10.	a)	Explain how templates can be used to implement a generic Bubble Sort algorithm. Illustrate with a suitable C++ program.	7	CO5	K2
	b)	Explain how exceptions are generated and handled in C++. Illustrate with a suitable example.	7	CO5	K2

I BCA II Semester Regular Examinations, June, 2026
MATHEMATICAL FOUNDATION TO COMPUTER SCIENCE
(BACHELOR OF COMPUTER APPLICATIONS)

Time: 3 Hours

Max Marks: 70

Answer ONE Question from each Unit

All Questions Carry Equal Marks

All parts of the Question must be answered at one place

UNIT-I

1. Construct the truth table for $(p \vee q) \rightarrow (r \wedge \neg p)$.
Determine if it is a tautology.

Marks 14 CO CO1 BTL Applying

(OR)

2. Show that $\forall x(P(x) \vee Q(x)) \equiv (\forall xP(x)) \vee (\forall xQ(x))$ is not valid.

14 CO1 Applying

UNIT-II

3. Show that relation $R = \{(a, b) : a \equiv b \pmod{3}\}$ is an equivalence relation

14 CO2 Applying

(OR)

4. Let $A = \{1, 2, 3\}$ and the relation $R = \{(1, 1), (2, 2), (3, 3), (1, 2), (2, 3), (1, 3)\}$. Verify whether R is a partial order relation. Draw the Hasse diagram

14 CO2 Applying

UNIT-III

5. Solve recurrence $a_n = a_{n-1} + 2n, a_0 = 0$ using generating functions.

14 CO3 Applying

(OR)

6. Differentiate between linear and non-linear recurrence relations with examples.

14 CO3 Applying

UNIT-IV

7. Find root of $x^3 - 4x + 1 = 0$ in $[1, 2]$ using bisection method.

14 CO4 Applying

(OR)

8. Using Lagrange's interpolation formula, estimate $f(2)$ given the data:

X	0	1	3	4
F(x)	1	2	10	22

14 CO4 Applying

UNIT-V

9. Using Newton's forward difference formula, find the value of $\frac{dy}{dx}$ at $x = 0$ from the following data:

X	0	1	2	3	4
Y	1	2	5	10	17

14 CO5 Applying

(OR)

10. Evaluate $\int_0^6 \frac{1}{1+x^2} dx$ by using Simpson's $\frac{1}{3}$ rule.

14 CO5 Applying