Enrol. No. | S | R | H | U | | | | | | | | | 16/06/25 Regn. No. | D | D | | | | | | | | | |

END SEMESTER EXAMINATION, JUNE- 2025

BCA Semester – II

Course Name: Human Values & Professional Ethics Course Code: BCT126/HS121

Time allotted: 03 Hours **Max. Marks: 100**

Note: Read all the instructions carefully.

Q.1. Objectives Type (Very short/ Short Answer, MCQ, One-liners, Fill in the Blank, True/ False) Attempt all. **(10×2=20)**

a.	Which type of value teaches us to treat others with dignity and care?	PO-6,8,12,CO-1
b.	What happens when there is an intellectual value crisis?	PO-6,8,12, CO-2
c.	What good values should we have in relationships?	PO-6,8,12, CO-2
d.	What is the purpose of a code of professional ethics?	PO-6,8,12, CO-4
e.	How can we show care and understanding to others?	PO-6,8,12, CO-2
f.	Why is value education important in today's society?	PO-6,8,12, CO-1
g.	How the concept of "Sanyam" in ensuring health.	PO-6,8,12, CO-3
h.	Why is trust important in human relationships?	PO-6,8,12, CO-1
i.	What is the concept of Yama in Indian values?	PO-6,8,12CO-2
j.	Name any two purposes of a Code of Ethics.	PO-6,8,12, CO-3

Q.2. Short notes / Short Answer Type (Attempt any five out of Seven) **(5×4=20)**

a.	How does discipline contribute to personal success?	PO-6,8,12, CO-1
b.	How does correct prioritization lead to prosperity and harmony?	PO-6,8,12, CO-2
c.	What are some indications that Indian society is facing a crisis in its values or norms?	PO-6,8,12, CO-2
d.	How does Aparigraha relate to the concept of detachment and letting go?	PO-6,8,12, CO-2
e.	How is self-exploration linked to value education?	PO-6,8,12, CO-3
f.	How do cultural changes impact traditional values in Indian society?	PO-6,8,12, CO-2
g.	How can Sukh (happiness) and Suvidha (comfort) contribute to one's well-being?	PO-6,8,12, CO-3

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Q.3. Structured Question (Attempt any three out of four) **(3×10=30)**

a.	i.	How does value education shape individual behavior?	PO-6,8,12, CO-1
	ii.	How does it contribute to maintaining social relationships?	
	iii.	How can value education help in reducing conflicts?	
b.	i.	What is the significance of the family in the context of human harmony?	PO-6,8,12, CO-3
	ii.	How can harmony be maintained within a family unit?	
	iii.	Can you identify specific values that contribute to family harmony?	
c.	i.	Define individual-level value crisis with examples.	PO-6,8,12, CO-2
	ii.	What are the major causes of this crisis in modern life?	
	iii.	How can self-awareness and reflection help overcome it?	
d.	i.	What role do self and body harmony play in achieving happiness and well-being?	PO-6,8,12, CO-3
	ii.	How can the concepts of Sanyam, and Swasthya be applied in daily life?	
	iii.	Why is it important to balance personal needs for overall harmony?	

Q.4. Long Answer / Essay type (Attempt any two out of three) **(2×15=30)**

a.	i.	Define *Puruṣārtha* and mention its four components.	
	ii.	Explain the role of Dharma in achieving Artha and Kāma ethically.	
b.	i.	What are the five levels of Maslow's Hierarchy of Needs?	PO-6,8,12, CO-3
	ii.	Provide a brief explanation of each level.	
c.	iii.	Define the term "profession" and elaborate on the meaning of professional ethics.	PO-6,8,12, CO- 4
	iv.	How does adherence to professional ethics contribute to the credibility and integrity of a given profession?	

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(3×10=30)
8,12, CO-1

Roll. No. S R H U | Regn. No. D D

END SEMESTER EXAMINATION, JUNE- 2025

BCA Semester – II

Course Name: Environmental Studies **Course Code: BCT125**

Time allotted: 03 Hours **Max. Marks: 100**

Note: Read all the instructions carefully.

Q.1. Attempt all. (10×2=20)

QN	Questions	CO	PO
a.	Give two examples of manmade ecosystem.	1	8
b.	Ozone layer is present in _____ layer of atmosphere.	2	5
c.	Define detritus food chain.	2	5
d.	The cycling of matter in an ecosystem is called biogeochemical cycle. (True/False)	2	5
e.	Incineration process is used to control water pollution. (True/False)	3	5
f.	Sound level is measured in _____.	2	5
g.	The Silent valley movement was started in 1976. (True/False)	1	5
h.	Define aerosol.	2	5
i.	What are the constituents of acid rain?	2	5
j.	Wildlife Protection act was enacted in 1974. (True/False)	1	5

Q.2. Attempt any five out of Seven. (5×4=20)

QN	Questions	CO	PO
a.	Write short note on multidisciplinary nature of environmental studies.	1	5
b.	Brief the characteristics of forest ecosystem.	2	5
c.	What are the consequences of big hydropower dams on environment?	2	5
d.	Why India is a mega-diversity nation in terms of biodiversity?	1	5
e.	Write short note on sanitary landfills.	2	5
f.	Write short note on Kyoto Protocol.	2	5
g.	Write the effects of overpopulation.	2	8

Q.3. Attempt any three out of four. (3×10=30)

QN	Questions	CO	PO
a.	Describe the principles and objectives of sustainable development.	3	8
b.	Brief on different types of terrestrial ecosystem.	2	5
c.	Discuss the regulative and protective functions of the forest.	1	8
d.	Differentiate between in-situ and ex-situ biodiversity conservation practices.	2	5

Q.4. Attempt any two out of three. (2×15=30)

QN	Questions	CO	PO
a.	Describe the various approaches used to manage solid waste.	4	5
b.	Brief the chemical process of ozone layer formation and depletion. Also write a short note on the significance of ozone layer.	2	5
c.	i. How environmental problems can be minimized at individual levels? ii. Explain your environmental field visit/studies experience in detail.	4 3	7 8

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Enrol. No. S R H U | Regn. No. D D

END SEMESTER EXAMINATION, JUNE- 2025

BCA Semester – II

Course Name: Data Communication and Computer Networks **Course Code: BC125T**

Time allotted: 03 Hours **Max. Marks: 100**

Note: Read all the instructions carefully.

Q. 1. Attempt **all** questions. All carry equal marks. (2 x 10 = 20)

S.No	Questions	CO	PO
a.	What is the purpose of FTP?	1	1
b.	Mention the uses of data compression.	1	1
c.	What is the purpose of bridge?	1	1
d.	Can you discriminate bandwidth and latency?	2	2
e.	Explain the operation of WWW	2	1
f.	What is modem?	3	2
g.	List the various guided media used for transmission	3	2
h.	How HTTP differs from HTTPS? Explain	2	1
i.	Why subnetting is necessary?	2	1
j.	List two uses of presentation layer.	4	2

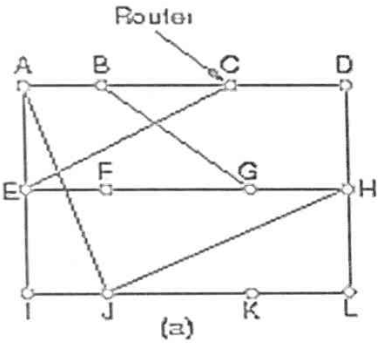
Q. 2. Attempt **any 5** questions. All carry equal marks (4 x 5 = 20)

S.No	Questions	CO	PO
a.	Explain the types of transmission modes.	1	1
b.	What is network topology? Explain the different network topologies.	1	1
c.	What are the different types of networks? Explain in detail	1	1
d.	What are the applications of Computer Networks?	1	1
e.	Write a short note on Bus and Star Topology with a neat diagram	3	1
f.	Define Switching and Briefly explain the Datagram Approach in Packet Switching Method with neat diagram?	2	3
g.	Explain about Electronic mail?	3	1

Q. 3. Attempt **any 3** questions. All carry equal marks. (10 x 3 = 30)

S.No	Questions	CO	PO
a.	(i) Explain structure of IPv6 frame header. (ii) What are the responsibilities of Application Layer? (iii) What is the relevance of CIA?	1	1
b.	**(i)** What is the Main Goal of Network Security? **(ii)** Outline the services provided by data link layer. **(iii)** Illustrate Sliding window protocol working using stop and wait.	2	2
c.	(i) Explain in detail congestion control algorithms with a neat diagram (ii) Describe in detail about the Network architecture. (iii) Explain the ISO-OSI model of computer network with a neat diagram?	2	2
d.	**(i)** Explain the working of electronic mail. How SMTP used in Email applications **(ii)** Define the concept of ALOHA. **(iii)** How CSMA/CD works?	4	3

Q. 4. Attempt **any 2** questions. All carry equal marks. **(15 x 2 = 3**

S.No	Questions	CO	
a.	**(i)** In RSA algorithm if p=7, q=11 and e =13 then what will be the value of d? **(ii)** Explain Cyclic Redundancy Check? Suppose we want to transmit the message 11001001 and protect it from errors using the CRC polynomial $x^3 + 1$. Use polynomial long division to determine the message that should be transmitted.	1	1
b.	(i) Construct the even parity Hamming code word for a data byte 1001101.The number (1001101) of bits is 7. (ii) Using distance vector routing protocol, draw a new routing table for node j with respect to other nodes in the network.  (a) (a) A subnet. (b) Input from *A*, *I*, *H*, *K*, and the new routing table for *J*. New estimated delay from J To A I H K A 0 24 20 21 B 12 36 31 28 C 25 18 19 36 D 40 27 8 24 E 14 7 30 22 F 23 20 19 40 G 18 31 6 31 H 17 20 0 19 I 21 0 14 22 J 9 11 7 10 K 24 22 22 0 L 29 33 9 9 JA delay is 8 JI delay is 10 JH delay is 12 JK delay is 6 Vectors received from J's four neighbors Line 8 A 20 A 28 I 20 H 17 I 30 I 18 H 12 H 10 I 0 – 6 K 15 K New routing table for J (b)	3	1
c.	**(i)** What is Line coding? Explain different types of Line coding for data 101001110. **(ii)** Relate persistent CSMA with non-persistent CSMA.	2	2

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(15 x 2 = 30)

CO	P
1	1

Roll No. | S | R | H | U | | | | | | | | | Regn. No. | D | D | | | | | | | | | |

END SEMESTER EXAMINATION, JUNE- 2025

BCA Semester - II

Course Name: Data Structures Using 'C' **Course Code: BCT122**

Time allotted: 03 Hours Max. Marks: 100

Note: Attempt all Sections & Questions.

Q. 1. Attempt **all** questions. All carry equal marks. (10 x 02 = 20)

S.No	Questions	CO	PO
a.	Define Linear and Non-Linear Data structure.	1	1
b.	Mention the graph traversal methods.	4	2
c.	Define asymptotic notations.	1	2
d.	Define priority queue.	3	1
e.	What is dynamic memory allocation?	2	1
f.	Differentiate between linear and binary search.	5	1
g.	Mention the disadvantages of an array.	1	1
h.	What are pointers?	1	1
i.	What is binary search tree?	4	1
j.	Define different operations that can be performed on data structures.	1	1

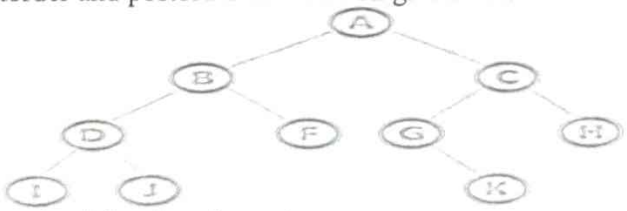
Q. 2. Attempt **any 5** questions. All carry equal marks (5 x 4 = 20)

a.	Explain array as a parameter.	1	1
b.	Define an algorithm. Explain its characteristics with the help of suitable examples.	1	1
c.	Describe time and space complexity. Discuss best, average and worst case.	1	1
d.	What do the term Enqueue and Dequeue mean? Explain with an example.	3	1
e.	Define stack? Write an algorithm to POP and PUSH an element into the stack using array.	3	1
f.	Evaluate the following postfix expression: 6 5 * 7 8 + * 8 7 – 4 5 * + +	3	3
g.	Define properties of Binary search tree. How to create a BST? Explain with example.	4	1

Q. 3. Attempt **any 3** questions. All carry equal marks. (02 x 15 = 30)

a.	Write a program to add two matrices.	1	1
b.	Explain Breadth First and Depth First search with the help of examples.	4	2
c.	Given the following input(4322,1334,1471,9679,1989,6171,6173,4199) and the hash function x mod 10, what is the final hash table.	5	2
d.	Sort the given array using insertion sort: 73, 30, 21, 56, 80, 48, 68,99,12,23	4	3

Q.4. Long Answer / Essay type (Attempt any two out of three) (2×15=30)

a.	i) Write a Pseudo code for insertion and deletion in linear queue. ii) Write an algorithm to push an element in a stack.	3	1
b.	i) Define complete binary tree. Find the height of the binary tree. Explain the different ways of traversing a binary tree. ii) Differentiate between graph and tree with the help of examples.	4	2
c.	i) Perform preoder, inorder and postorder traversal on given tree:  ii) Apply bubble sort on the following elements: {21, 11, 5, 78, 49, 54, 72, 88}	4	3

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END SEMESTER EXAMINATION, JUNE- 2025

BCA Semester – II

Course Name: Data Structures **Course Code: BC122T**

Time allotted: 03 Hours **Max. Marks: 100**

Note: Read all the instructions carefully.

Q.1. Attempt all. **(10×2=20)**

S.No	Questions	CO	PO
a.	What is Circular queue?	1	1
b.	Define Graph.	2	2
c.	Array is a non-linear data structure?	3	2
d.	Define hashing.	2	1
e.	What are the types of dynamic memory allocation?	1	1
f.	Define Data structure.	2	1
g.	Mention the graph traversal methods.	2	1
h.	Define space and time complexities of an algorithm.	2	1
i.	What is recursion?	3	1
j.	What is dynamic memory allocation?	2	1

Q.2. Attempt any five out of Seven. **(5×4=20)**

S.No	Questions	CO	PO
a.	An array X [-15.....10][15.....40] requires one byte of storage. If beginning location is 1500 determine the location of X [15][20].	1	1
b.	Write an algorithm to insert an element in Circular queue. Explain with an example.	1	1
c.	Explain the complexities of the following sorting algorithm: Insertion sort, Quick sort, merge sort.	1	1
d.	Define bubble sort with example.	1	1
e.	What are the different types of data structure? Describe the need of complexity of analysis of algorithm.	3	1
f.	Define an algorithm. Explain its features with the help of suitable examples.	2	3
g.	Describe time and space complexity. Discuss best, average and worst case for finding a given number from an array of integers.	3	1

Q.3. Attempt any three out of four. **(3×10=30)**

S.No	Questions	CO	PO
a.	What is priority queue? How it is implemented?	1	1
b.	Write an algorithm to delete a given item from a two way list.	2	2
c.	Given the following input(4322,1334,1471,9679,1989,6171,6173,4199) and the hash function x mod 10, what is the final hash table.	3	2
d.	Compare BFS and DFS traversal methods for graph with suitable example.	3	3

Q.4. Attempt any two out of three. **(2×15=30)**

S.No	Questions	CO	PO
a.	i) Write an algorithm and explain Linear and Binary search with suitable example. ii) Write a C program to implement stack using linked list.	1	1
b.	i) Write an algorithm to insert an item into a one way list. ii) Explain open addressing mode of hashing.	2	2
c.	i) Explain circular queue with example and write an algorithm to insert and delete an element from a circular queue. ii) Apply bubble sort on the following elements: {21, 11, 5, 78, 49, 54, 72, 88}	3	3

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Enrol. No. S R H U | Regn. No. D D

END SEMESTER EXAMINATION, JUNE- 2025

BCA Semester – II

Course Name: Introduction to Data Science **Course Code: BCT121**

Time allotted: 03 Hours **Max. Marks: 100**

Note: Read all the instructions carefully.

Q.1. Attempt all. **(10×2=20)**

QN	Questions	CO	PO
a.	Define Data Science.	2	1
b.	A data scientist is responsible for interpreting and analyzing complex data to help companies make decisions. **True/ False**	3	2
c.	In Excel, every function is started with _____symbol.	2	1
d.	The **correlation coefficient** ranges from _____ to _____.	2	1
e.	Explain IQR (Inter Quartile Range).	3	2
f.	Mean, median, and mode are all measures of central tendency. **True/ False**	2	1
g.	The Mode is the value that appears most frequently in a dataset. **True/ False**	3	2
h.	The Standard Deviation measures the average distance of each data point from the mean. **True/ False**	2	1
i.	A scatter plot can help visualize correlations between two variables. **True/ False**	2	1
j.	Define median.	3	2

Q.2. Attempt any five out of Seven. **(5×4=20)**

QN	Questions	CO	PO
a.	Describe the different types of graphs and chart for data visualization.	3	2
b.	Explain the uses of power query with suitable example.	3	1
c.	Explain the main steps involved in the Data Preprocessing.	2	1
d.	What are the key responsibilities of a Data Analyst? How does a Data Scientist differ from a Data Engineer?	1	2
e.	Explain null hypothesis (H_0), alternate hypothesis (H_1). Explain role of p-value in hypothesis.	3	2
f.	Explain time Series Analysis with suitable examples.	3	1
g.	Explain Five Cs of ethical data science.	5	1

P.T.O./-

Q.3. Attempt any three out of four. (3×10=30)

QN	Questions	CO	PO
a.	Define Data Science and how is it different from traditional data analysis. Explain the key applications of Data Science in different industries. Explain the main steps involved in the Data Science process.	1	
b.	Define probability. Explain event, sample space and probability of event (E). Explain Baye's theorem. Solve the following questions: (i) Find the probability of 'getting tail on tossing a coin'. (ii) Find the probability of 'getting 5 on rolling a dice'. (iii) On rolling two dices, find the probability of coming 4 on both dices. (iv) Draw a random card from a pack of cards. What is the probability that the card drawn is a King card?	4	2
c.	Define primary and secondary data with example. Explain the difference between structured, semi-structured, and unstructured data. Explain the key responsibilities and skills required by Data Scientist. How does a Data Analyst differ from a Data Scientist?	5	1
d.	Define Data Visualization Techniques. Explain the Charts and Plots with suitable example. Define variance and standard deviation. Calculate variance and standard deviation of: 2, 4,6,8,10.	3	1

Q.4. Attempt any two out of three. (2×15=30)

QN	Questions	CO	PO
a.	Explain following Excel functions: SUM, SUMIF, AVERAGE functions. For the given data in table solve the following questions.	5	1

	A	B	C
1	Name	Department	Salary
2	John	Sales	50000
3	Alice	HR	60000
4	Bob	Sales	55000
5	Eve	HR	40000
6	Sam	IT	70000
7	Rachel	Sales	48000
8	Michael	IT	67000

(i)	Calculate the Total Salary.
(ii)	Calculate the Average Salary
(iii)	Calculate total salaries of people in the Sales department
(iv)	Calculate Average salary of HR department
(v)	Count the toal number of employees
(vi)	Counts how many people are in the IT department
(vii)	Finds Bob in column A and returns his salary from column C

b.	Define correlation. Explain types of correlation and measures of correlation. Explain correlation coefficient(r) and its range. You are given the following two variables representing hours studied (X) and marks obtained (Y) by 5 students. Calculate the correlation coefficient (r) between X and Y. X (Hours) = [2, 4, 6, 8, 10] Y (Marks) = [10, 20, 30, 40, 50]	4	2
c.	Explain Exploratory data analysis (EDA). Differentiate between mean, median, and mode. Calculate the mean, median and mode value of following data: 4, 2, 4, 2, 6, 4, 8, 4, 8, 6, 4, 6.	3	1

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Enrol. No. S R H U | Regn. No. D D

END SEMESTER EXAMINATION, JUNE- 2025

BCA Semester – II

Course Name: Object Oriented Programming and Design using C++

Course Code: BC121T

Time allotted: 03 Hours | **Max. Marks: 100**

Note: Read all the instructions carefully.

Q.1. Attempt all. (10×2=20)

		CO	PO
a.	Define the concept of Encapsulation.	1	1
b.	Describe Private access specifier in inheritance.	2	1
c.	What is cout?	2	2
d.	Name different types of Inheritance.	3	1
e.	Illustrate the concept of Function Overloading.	2	2
f.	What is scope resolution operator?	4	4
g.	What are class and an object in object-oriented programming?	5	4
h.	Define dynamic binding.	1	2
i.	Define the concept of UML Modeling.	2	1
j.	What are static data members?	3	1

Q.2. Attempt any five out of Seven. (5×4=20)

a.	Define the concept of data members and member functions in a C++ class with the help of suitable examples.	1	2
b.	Elaborate the role of different access specifiers in C++ classes along with the help of examples.	2	1
c.	What are destructors? Explain with the help of suitable example.	3	2
d.	If a person wants to define member function outside the class which operator will be used to perform this task? Explain with the help of an example.	4	8
e.	Illustrate different benefits of using inheritance in object-oriented programming using suitable examples.	5	8
f.	Discuss concurrency in state modeling	2	2
g.	Define different elements of state modeling, including events, states, transitions, and conditions, with examples.	2	1

P.T.O./-

Q.3. Attempt any three out of four. **(3×10=30)**

a.	(i) Describe the elements of a use case diagram, including actors, use cases, and their relationships. (ii)Why we need use cases in software development and how they capture system functionality. (iii) How are business actors identified in use case modeling?		
b.	(i) What is the purpose of operator overloading in C++? Provide an example demonstrating function overloading. (ii) What are virtual functions in C++? How do they facilitate runtime polymorphism? (iii) Describe the concept of generic programming in C++ using templates. Provide examples of class template.	3	
c.	(i) Define the role of operations and methods in state modeling. How could they relate to transitions? (ii) Describe the relationship between object models and state models. (iii) Explain the process of adding details to states in a state diagram.	4	
d.	(i) Differentiate between default constructors and parameterized constructors with the help of an example. (ii) Describe the concept of default arguments in C++ functions. Provide an example demonstrating their use. (iii) What is inline function? Explain with the help of an example.	1	2

Q.4. Attempt any two out of three. **(2×15=30)**

a.	(i) Discuss the role of friend functions in C++ classes. Provide an example demonstrating their usage. (ii) Explain the concept of inheritance in C++. Explain the concept of Multilevel inheritance with the help of an example.	3	2
b.	(i)What is Hybrid Inheritance? Define the concept of ambiguity that a programmer face while implementing hybrid inheritance. (ii)Implement the concept of call by value and call by reference using suitable examples.	2	8
c.	(i) Develop a sequence diagram illustrating the interactions between objects in a restaurant ordering system, including customers, servers, and kitchen staff. (ii) Create a state diagram for an elevator system, modeling states such as "Idle," "Moving Up," and "Moving Down," along with transitions triggered by events.	4	4

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Roll No. S R H U 10/06/25 Regn. No. D D

END SEMESTER EXAMINATION, JUNE- 2025

BCA Semester – II

Course Name: Computer Organization and Architecture **Course Code: BC124T**

Time allotted: 03 Hours **Max. Marks: 100**

Note: Read all the instructions carefully.

Q.1. Objectives Type

(Very short/ MCQ, One-liners, Fill in the Blank, True/ False) Attempt all. (10×2=20)

a.	What is Register?	CO1	PO1
b.	What is logic operation?	CO1	PO1
c.	What is BUS?	CO1	PO1
d.	Explain Flip-Flop.	CO3	PO1
e.	What is primary operation in stack?	CO3	PO1
f.	What is role of DMA with CPU?	CO4	PO2
g.	What are instruction fetch and decode.	CO3	PO2
h.	What is meant by instruction?	CO1	PO1
i.	What is Von-Neumann Architecture?	CO1	PO2
j.	What peripherals devices? With example.	CO5	PO1

Q.2. Short notes / Short Answer Type (Attempt any five out of Seven) (5×4=20)

a.	Write a note on input and output interface.	CO4	PO1
b.	What is memory? Explain with example.	CO5	PO2
c.	Discuss about the computer instructions.	CO1	PO1
d.	Write a note on micro operation.	CO1	PO1
e.	What is program loops?	CO2	PO2
f.	What is control memory?	CO2	PO2
g.	What is the role of DMA in computer organization?	CO4	PO2

Q.3. Structured Question (Attempt any three out of four) (3×10=30)

a.	Explain the micro-operation with. (i) Arithmetic Micro-Operations (ii) Logic Micro-Operations (iii) Shift micro-operations	CO1	PO1
b.	Explain the following on computer language. (i)Machine Language (ii) assembly language (iii) high level language	CO2	PO2
c.	How to understand by pipelining in following terms (i) Arithmetic Pipeline (ii) Instruction Pipeline (iii) Pipeline Conflicts	CO3	PO1
d.	Explain the following term in accept memory. (i)Cache Memory, (ii)RAM& ROM, (iii) Virtual memory	CO5	PO2

Q.4. Long Answer / Essay type (Attempt any two out of three) (2×15=30)

a.	(i) Explain The Register Transfer Language with examples of register used for data transfer. (ii)Explain the BUS organization.	CO1	PO1
b.	(i)What is addressing Mode? Explain it. (ii) Explain DTM?	CO3	PO1
c.	(i)What is DMA? Draw the block diagram of DMA. (ii)Explain working of DMA.	CO4	PO2

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Roll No. S R H U | Regn. No. D D

END SEMESTER EXAMINATION, JUNE- 2025

BCA Semester – II

Course Name: Computer Organization **Course Code: BCT123**

Time allotted: 03 Hours **Max. Marks: 100**

Note: Attempt all Sections & Questions.

Q.1. Objectives Type

(Very short/ Short Answer, MCQ, One-liners, Fill in the Blank, True/ False) Attempt all. **(10×2=20)**

a.	What is instruction?	CO1	PO1
b.	What is the use of start bit and stop bit?	CO4	PO1
c.	What is program?	CO2	PO1
d.	What is flip-flop?	CO3	PO1
e.	What is instruction, fetch and decode.	CO3	PO8
f.	What is the primary purpose of DMA in a computer system?	CO4	PO2
g.	Why is cache memory important in computing systems?	CO5	PO2
h.	What is micro-operation?	CO1	PO1
i.	How does pipelining improve CPU performance?	CO3	PO1
j.	What is the full form of SD-RAM and DDR-1?	CO5	PO3

Q.2. Short notes / Short Answer Type (Attempt any five out of Seven) **(5×4=20)**

a.	Describe zero, one, two, or three address instructions by evaluating given expression: X= (A+B) * (C+D)	CO4	PO1
b.	Explain is the role of DMA in computer organization?	CO4	PO2
c.	Explain is control memory and control variable?	CO2	PO2
d.	Write a short note on BUS.	CO1	PO1
e.	What is ROM organization? Discuss various types of ROM chips.	CO5	PO2
f.	Differentiate b/w RISC & CISC.	CO1	PO1
g.	Discuss basic component of computer CPU.	CO3	PO1

Q.3. Structured Question (Attempt any three out of four) **(3×10=30)**

a.	Explain the role of computer Instruction about the following (i) Memory –reference instruction (ii) Register-reference Instruction **(iii)** Input -output instruction	CO1	PO1
b.	How to understand by pipelining in following terms (i) Arithmetic Pipeline (ii) Instruction Pipeline (iii) Pipeline Conflicts	CO3	PO2
c.	How are memories classified in a computer system? Differentiate between primary and secondary memory. And explain the key features of RAM and ROM.	CO5	PO1
d.	Describe the concept of Direct Memory Access (DMA) and its significance in computer architecture. Explain the basic operations of a DMA controller with block diagram. explain its key components and their respective functions.	CO4	PO2

Q.4. Long Answer / Essay type (Attempt any two out of three) **(2×15=30)**

a.	(i) Differentiate between Internal and External interrupts. (ii)Explain the microprogrammed control unit, also differentiate between the hardwired and microprogrammed control units.	CO3	PO3
b.	(i)Explain the assembler and show the first pass with diagram. (ii)What is difference between assembly language and machine language?	CO2	PO1
c.	(i) Define page fault. Explain the page replacement algorithms. (ii)Consider the following page reference string: 1, 3, 0, 3, 5, 6, 3, 0, 6, 4, 5, 6, 2, 3, 0 How many page faults would occur for the algorithm LRU, FIFO, Optimal page replacement using three frames?	CO5	PO5

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END SEMESTER EXAMINATION, JUNE- 2025

BCA Semester – II

Course Name: Foundation Course in Mathematics- II **Course Code: BCT124**

Time allotted: 03 Hours **Max. Marks: 100**

Note: Read all the instructions carefully.

Q.1. Very short/ short Answer. Attempt all. **(10×2=20)**

QN	Questions	CO	PO
a.	What is the integration of e^{2x}?	1	1
b.	Define the term "order" of a differential equation.	2	1
c.	Write the general solution of a first-order linear differential equation.	2	2
d.	What does a zero variance indicate in a dataset?	3	2
e.	State True/False: A higher standard deviation means more spread in data.	3	2
f.	Define independent events in probability.	4	1
g.	Fill in the blank: The sum of probabilities of all possible outcomes is _____.	4	1
h.	Name the probability distribution used for modeling the number of occurrences in a fixed interval.	5	2
i.	What is the shape of a normal distribution curve?	5	2
j.	State whether: Binomial distribution deals with continuous data. (True/False)	5	1

Q.2. Short notes / Short Answer Type (Attempt any five out of Seven) **(5×4=20)**

QN	Questions	CO	PO
a.	Evaluate: $\int sin^3 x dx$	1	2
b.	Solve the differential equation: $$\frac{dy}{dx} = \frac{x^2 y}{x^3 + y^3}$$	2	2
c.	Find the range and standard deviation of: 12, 15, 20, 25, 30	3	2
d.	Find the integral $\int \frac{1}{x(x^2-1)} dx$ by partial fraction decomposition.	3	2
e.	A coin is tossed 4 times. Find the probability of getting exactly 2 heads.	4	1
f.	A Poisson distribution has a mean of 2. Find $P(X=0)$.	5	2
g.	A continuous random variable X is uniformly distributed over (0, 5). Find the mean and variance.	5	2

Q.3. Structured Question (Attempt any three out of four) **(3×10=30)**

QN	Questions	CO	PO
a.	Solve $\frac{dy}{dx} + y \sec x = \tan x$	2	2
b.	Find the mean and variance of this frequency distribution: Value (x) 1 3 5 7 9 11 13 Frequency (f) 3 6 9 12 9 6 3	3	2
c.	(i) Calculate the correlation coefficient: X 6 8 10 12 14 Y 4 6 8 10 12 (ii) In a group of students: 60% like Programming (P), 50% like Mathematics (M) and 30% like both Programming and Mathematics. What is the probability that a student likes either Programming or Mathematics?	3,4	2
d.	A spam filter flags 95% of spam emails and 2% of non-spam emails. 20% of all emails are spam. If an email is flagged as spam, what is the probability it is actually spam?	4	2

Q.4. Long Answer / Essay type (Attempt any two out of three)

QN	Questions		
a.	Solve $\frac{d^2y}{dx^2} - 3\frac{dy}{dx} + 2y = e^{3x}$	2	
b.	Find the regression lines Y on X and X on Y for the following data: X: 2 3 4 5 6 Y: 5 7 9 11 13 Also, show that $b.b' = r^2$.	3	
c.	(i) A machine fills oil bottles with a mean of 500 ml and a standard deviation of 5 ml. What percentage of bottles will have more than 510 ml of oil? (ii) A factory produces light bulbs with a 95% chance of working. Use binomial distribution to find the probability that all 10 bulbs work when 10 bulbs are chosen at random.	5	2

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Standard Normal Distribution Table

Z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990

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END SEMESTER EXAMINATION, JUNE- 2025

BCA Semester – II

Course Name: Foundation Course in Mathematics – II Course Code: BC123T

Time allotted: 03 Hours **Max. Marks: 100**

Note: Read all the instructions carefully.

Q.1. Attempt all. **(10×2=20)**

QN	Questions	CO	PO
a.	Find the value of the integral $\int \log x dx$	1	2
b.	The relation between mean, mode and median is.....	3	1
c.	A differential equation $Mdx + Ndy = 0$ is exact if.....	2	2
d.	Find the value of the integral $\int \frac{1-\cos 2x}{1+\cos 2x}\, dx$.	1	2
e.	Write the general solution of a differential equation of the type $\frac{dy}{dx} + Py + Q = R$. where P, Q and R are the function of variable x.	3	1
f.	What is the value of $\int_0^{\pi/2} \sin^m \theta \cos^n \theta \; d\theta$.	1	2
g.	Write the order and degree of differential equation $(\frac{d^4y}{dx^4})^2 - 2(\frac{d^3y}{dx^3})^6 - 4\left(\frac{dy}{dx}\right)^2 - y = 0$	2	1
h.	Define exact differential equation.	2	1
i.	There are two children in a family. The probability that both of them are boys,is.....	4	2
j.	Define differential equation.	3	1

Q.2. Attempt any five out of Seven. **(5×4=20)**

QN	Questions	CO	PO
a.	Obtain the differential equation of $y = A\cos x + B\sin x$	2	1
b.	Find The Value of $\int_0^{\frac{\pi}{2}} \frac{\sqrt{\cos x}}{\sqrt{\sin x}+\sqrt{\cos x}} dx$	1	2
c.	Solve $(D^2 + D + 1)y = cos2x$	2	2
d.	Find the value of the integral $\int \frac{\sin\frac{x}{2}+\cos\frac{x}{2}}{\sqrt{1+\sin x}} dx$.	1	2
e.	Solve the integral $\int x \sin x \; dx$.	1	2
f.	Calculate the mean by direct method	3	1
g.	Solve the following differential equation $\frac{dy}{dx} + 2y\tan x = \sin x.$	2	2

Class	20	30	40	50
Number of worker	6	8	4	2

P.T.O./-

Q.3. Attempt any three out of four. **(3×10=30)**

QN	Questions	CO	PO
a.	Solve $(D^2 + 2D + 3)y = sinx$	2	2
b.	Calculate the mean by direct method Class: 110, 112, 113, 117, 120, 125, 128, 130 Number of worker: 25, 17, 13, 15, 14, 8, 6, 2	3	1
c.	Find the value of $\int xcos6x\ dx$	1	2
d.	Find the value of n, for which the differential equation $(xy^2 + nx^2y)dx + (x + y)x^2dy = 0$ is exact.	2	2

Q.4. Attempt any two out of three. **(2×15=30)**

QN	Questions	CO	PO
a.	Apply the method of the variation of parameters to solve the differential equation $\frac{d^2y}{dx^2} + y = \sec x.$	2	2
b.	To Prove that $\int_0^{\frac{\pi}{2}} logcosx\ dx = -\frac{\pi}{2}log2$	3	1
c.	If a fair coin is tossed 10 times, find the probability of (i) exact six heads (ii) at least six heads (iii) at most six heads	1	2

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