

Enrol. No.

S	R	H	U								
---	---	---	---	--	--	--	--	--	--	--	--

Regn. No.

D	D										
---	---	--	--	--	--	--	--	--	--	--	--

END SEMESTER EXAMINATION, JUNE- 2024**BCA Semester – II / B. Tech. Semester - II****Course Name: Human Values & Professional Ethics****Course Code: HS121T/HST121**

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 value is essential for fostering trust and credibility in personal and professional relationships? i. Empathy ii. Honesty iii. Courage iv. Self-exploration	PO-6,8,12 CO-1
b.	According to the Indian concept of values, Purushartha emphasizes: i. Pleasure and enjoyment ii. Duty, righteousness, and wealth iii. Meditation and asceticism iv. Compassion and forgiveness	PO-6,8,12 CO-3
c.	Which of the following is NOT one of the Yamas in Indian ethical principles? i. Ahimsa (non-violence) ii. Satya (truthfulness) iii. Asteya (non-stealing) iv. Daya (compassion)	PO-6,8,12 CO-2
d.	The Value Spectrum emphasizes that a good life is not solely dependent on: i. Wealth accumulation ii. Power and influence iii. Personal relationships iv. Physical health	PO-6,8,12 CO-2
e.	What do professional ethics govern? i. Personal friendships ii. Business profits iii. Behaviour of professionals iv. Political affiliations	PO-6,8,12 CO-4
f.	How to achieve family harmony and which values help?	PO-6,8,12 CO-3
g.	Provide an example of how empathy can be practiced in daily life.	PO-6,8,12 CO-1
h.	How Tapas leads to personal growth?	PO-6,8,12 CO-2
i.	List two components of harmony in the family.	PO-6,8,12 CO-2
j.	Define Professional Ethics .	PO-6,8,12 CO-4

P.T.O./-

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-
b.	How does the Value Spectrum encourage individuals to pursue happiness?	PO-6,8,12 CO-
c.	Define safety needs.	PO-6,8,12 CO-3
d.	How does Saucha manifest physically and mentally?	PO-6,8,12 CO-2
e.	How are Indian values explained through the concept of Niyamas?	PO-6,8,12 CO-2
f.	How to achieve family harmony and which values help?	PO-6,8,12 CO-3
g.	List three universal values.	PO-6,8,12 CO-1

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

a.	i) What are human values and their importance in daily life? ii) How do values shape behaviour, iii) and can you provide examples?	PO-6,8,12 CO-1
b.	i) What are the five Yamas according to the Indian philosophy. ii) In what ways does Santosha (contentment) contribute to overall well-being and inner peace, as emphasized in the Niyamas? iii) How does Tapas strengthen one's resolve and resilience in pursuing long-term goals?	PO-6,8,12 CO-2
c.	i) What does the term "family" mean in the broader sense? ii) How does the concept of family contribute to an individual's sense of identity? iii) In what ways can understanding the meaning of family enhance personal development?	PO-6,8,12 CO-3
d.	i) What is the concise definition of "Computer Ethics"? ii) How does computer ethics focus on the moral and social impacts of technology? iii) Provide a brief example illustrating the role of computer ethics in decision-making.	PO-6,8,12 CO-4

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

a.	(i) Define "human values" and explain their societal significance. (ii) How does value education contribute to the holistic development of students?	PO-6,8,12 CO-1
b.	(i) What is Purushartha? (ii) How the concept of Purushartha influences ethical decision-making and moral conduct in today's world.	PO-6,8,12 CO-2
c.	(i) What are the five levels of Maslow's Hierarchy of Needs? (ii) Provide a brief explanation of each level.	PO-6,8,12 CO-2

Enrol. No.

S	R	H	U								
---	---	---	---	--	--	--	--	--	--	--	--

Regn. No.

D	D										
---	---	--	--	--	--	--	--	--	--	--	--

END SEMESTER EXAMINATION, JUNE- 2024**BCA Semester - II****Course Name: Advanced concepts of C programming****Course Code: BCA108****Time allotted: 03 Hours****Max. Marks: 100****Note: Read all the instructions carefully.****Attempt all Sections & Questions.****Section (A)****(2 x 10 = 20)****Q. 1. Attempt all questions.**

- a. Mention some advantages and disadvantages of arrays.
- b. Write the use of a bit-field.
- c. Distinguish between declaration and initialization of a variable.
- d. List the datatypes supported in C programming language.
- e. Differentiate between call by value and call by reference.
- f. Is that possible to add pointers to each other?
- g. Discuss about file pointer with a suitable example.
- h. Can the size of an array be declared at runtime? If no, state your answer.
- i. Explain bitwise shift operators.
- j. **Differentiate between getch() and getche().**

Section (B)**(7 x 5 = 35)****Q. 2. Attempt any 5 questions.**

- a. Write the difference between near, far and huge pointers.
- b. Define double pointer. List the advantages of pointer used in C.
- c. Differentiate between 'actual parameters' and 'formal parameters'.
- d. Define string. Is it different from character array? If yes, how?
- e. Explain bit manipulation operations in detail.
- f. Define file concept in C. Write the difference between text file and binary file.
- g. Explain recursion. Differentiate between direct recursion and indirect recursion.

Section (C)**(15 x 3 = 45)****Attempt any 3 questions.**

- Q.3.**
 - a. Explain the use of a pointer to a function. 8
 - b. Explain the terms "Dimension" and "Subscript" when we talk about arrays. 7
- Q.4.**
 - a. **Differentiate between the macros and the functions.** 7
 - b. Explain preprocessor directives in detail. 8
- Q.5.**
 - a. Write a note on gets (), puts (), getchar () and putchar (). 7
 - b. Write a brief note on formatted I/O Operations. 8
- Q.6.**
 - a. Write a program in C to create and store information in a text file. 8
 - b. Write the uses of rewind (), ftell (), and seek () functions in file handling. 7
- Q.7.**
 - a. Compare system calls vs. library calls. 8
 - b. Write a program to draw smiley face in C. 7

07/6/23

Enrol. No.

S	R	H	U											
---	---	---	---	--	--	--	--	--	--	--	--	--	--	--

Regn. No.

D	D													
---	---	--	--	--	--	--	--	--	--	--	--	--	--	--

END SEMESTER EXAMINATION, JUNE- 2024
BCA Semester - II**Course Name: Object Oriented Pgme. 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)**

QN	Questions	CO	PO
a.	What are the advantages of overloading in C++?	1	1
b.	Virtual function is used to achieve _____ polymorphism.	5	1
c.	Function overloading and operator overloading are used to achieve ____ polymorphism.	5	1
d.	Explain the term scenarios used in state modeling?	2	1
e.	Write the operators that cannot be overloaded.	5	1
f.	Differentiate sequence diagram and activity diagram.	3	1
g.	Differentiate generalization and aggregation.	1	1
h.	State diagram is related to which modeling?	2	1
i.	What is the role of actor in use case?	3	1
j.	Differentiate data abstraction and data encapsulation?	1	1

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

QN	Questions	CO	PO
a.	Explain the term abstract class? How do we represent it in UML? Draw an example using UML notations.	1,5	1,2
b.	Why do we use virtual destructor in C++? Explain with an example.	5	1,2,4
c.	Explain the following terms: i. Virtual function ii. Pure virtual function	5	1,2
d.	What is the difference between direct base class and indirect base class? Explain with example.	4	1,2,4
e.	What do you mean by event and state? Explain with an example.	2	1,2
f.	Differentiate link and association concept in UML with example.	1	1,2
g.	Explain transition and guard condition in UML.	2	1,2

P.T.O./-

Q.3. Attempt any three out of four.

(3×10=30)

QN	Questions	CO	PO
a.	Differentiate structured programming and OOP? Explain all the properties of OOP.	1	1
b.	What do you mean by modeling? Explain the following: i. Class/Object Modeling ii. Dynamic/State Modeling iii. Interaction/Functional Modeling	1	1
c.	Explain the following terms used in UML: i. Ordering ii. Bags iii. Sequence	1	1,2
d.	What do you mean by generic programming in C++? Explain both function template and class template with example.	5	1,2,4

Q.4. Attempt any two out of three.

(2×15=30)

QN	Questions	CO	PO
a.	i. What do you mean by state diagram? Explain the component of state diagram. ii. Write a program of multiple inheritance in C++.	2,4	1,2,4
b.	i. What is Use case diagram and explain how to construct it? ii. Explain the following keywords used in C++: • public • private • protected	3,4	1,2,8
c.	i. What is inline function? Why do we use it? Explain with an example. ii. What is the role of friend function in C++? Write the rules and program.	4	1,2,4

Enrol. No.

S	R	H	U						
---	---	---	---	--	--	--	--	--	--

Regn. No.

D	D								
---	---	--	--	--	--	--	--	--	--

END SEMESTER EXAMINATION, JUNE- 2024**BCA Semester – II****Course Name: Human Values & Professional Ethics****Course Code: BCA114****Time allotted: 03 Hours****Max. Marks: 50****Note: Read all the instructions carefully.****Note: Attempt all Sections & Questions.****SECTION A****(10 x 1 = 10)****Q. 1. Attempt all questions.**

- a. What is right understanding?
- b. Where does self exploration take place – self or body?
- c. What do you mean by natural acceptance.
- d. What do you understand by the term Swarajya.
- e. What is Sukh?
- f. The natural acceptance of all human beings is to be in the category of SVDD, SSDD or SSSS?
- g. What do you mean by professional ethics.
- h. What is the meaning of prosperity?
- i. Define Profession.
- j. Which is the foundational value in relationship?

SECTION B**(5 x 4 = 20)****Q. 2. Attempt any 4 questions.**

- a. The needs of the self are qualitative and continuous. Illustrate with examples.
- b. Explain how physical facilities are necessary but not complete for humans while they are complete for animals.
- c. What do you mean by your natural acceptance? How can we verify proposals on the basis of our natural acceptance? Explain with example.
- d. How do we differentiate in relationships on the basis of body, physical facilities, or beliefs? What problems do we face because of such differentiation?
- e. Suggest programmes to ensure proper functioning of your body. Can we sustain them without right understanding?

SECTION (C)**(02 x 10 = 20)**Attempt any 2 questions.**Q3 Read the passage given below and answer the questions that follow :-**

The Ford Motor Company decided to produce the first lowest-priced car in the USA. The Company President Mr. Lee Lacocca wanted to rush the development of a car costing less than \$2,000, as he promised the public that his company will bring out a car at that price (as low as \$2,000) and also fight the growing popularity of Volkswagen's Beetle. Preliminary tests showed that it involved an additional cost of \$11 to enhance the safety of the car. He organised a meeting of company executives to decide how to reduce the cost below \$2,000. Many executives suggested that the company should sell the car at \$2,011 but include the safety feature. Some executives thought that the company should sell the car at \$2,000 as promised but exclude the safety feature. The company decided to go ahead without the safety feature.

The car was released and sold at \$2,000. After six months of release, one of the cars was involved in an accident killing all the passengers. Competitors influenced newspapers to publish this accident and the newspapers in the U.S.A. highlighted the absence of the safety feature. This incident resulted not only in the loss of sales, but also in the closure of the unit resulting in a loss of \$250 million to the company.

What ethical issues are involved in this case?

Q4. What is your present vision of a happy and prosperous life? Elaborate**Q5 Have you ever seen commercial ads for a product that looks great, but when you actually buy the product it doesn't look anything like it did on TV? Give any example of such product as per your experience. Are there any ethical issues involved in such case? Discuss.**

Enrol. No.

S	R	H	U											
---	---	---	---	--	--	--	--	--	--	--	--	--	--	--

Regn. No.

D	D													
---	---	--	--	--	--	--	--	--	--	--	--	--	--	--

END SEMESTER EXAMINATION, JUNE- 2024
BCA Semester – II

Course Name: Data Communication and Computer Networks

Course Code: BCA109

Time allotted: 03 Hours

Max. Marks: 100

Note: Read all the instructions carefully.

Note: Attempt all Sections & Questions.

Section (A)

Q. 1. Attempt all questions. All carry equal marks.

(10 x 2 = 20)

- a. Port address of FTP is.....
- b. Port address of HTTP is and
- c. Socket address is a combination of.....
- d. ALOHA protocol is used for.....
- e. CRC algorithm is used for.....
- f. IPV4 consist ofbits.
- g. IPV6 consist ofbytes.
- h. Routing algorithms runs in
- i. TCP/IP model consist of.....layers.
- j. DNS stands for.....

Section (B)

Q. 2. Attempt any 5 questions. All carry equal marks.

(7 x 5 = 35)

- a. Explain the advantages of Star topology in detail.
- b. What is the working of Network layer in OSI model? Explain in detail.
- c. What is the purpose of error control algorithm? Where these algorithm works? Explain in detail.
- d. Why DNS maps IP with URL? Explain in detail the working of DNS.
- e. Explain all type of switching methods in detail.
- f. What is multiplexing? Why it is important? Explain all type of multiplexing in detail.
- g. Explain the difference between Pure ALOHA and slotted ALOHA.

Section (C)

Attempt any 3 questions. All carry equal marks.

(15 x 3 = 45)

- Q.3. Explain Network address translator and Port address translator in detail.**
- Q.4. What is HTTP service? How to run it in packet tracer? Explain step by step procedure.**
- Q.5. What do you mean by connection less and connection oriented networks? Explain in detail.**
- Q.6. What socket programming is needed? Explain in detail with the help of an example.**
- Q.7. What do you understand by IEEE802 standards? Explain in detail why these standards are required?**

END SEMESTER EXAMINATION, JUNE- 2024
BCA Semester – II

Course Name: Fundamentals of Accounting and Finance

Course Code: BCA113

Time allotted: 03 Hours

Max. Marks: 100

Note: Read all the instructions carefully.

Note: Attempt all Sections & Questions.

Section (A)

Q.1 Attempt all questions.

(10 x 2 = 20)

- a. If BEP Sales = 20000 and Actual Sales = 50000 then MOS = ?
- b. If F = 10000 and P/V = 0.5, then BEP (in Rs.) = ?
- c. If S = 40 & V = 30 then P/V = ?
- d. If Sales Turnover = 50000 and Closing Stock = 10000 then Stock Turnover Ratio = ?
- e. Given: Closing Stock = 5000, Debtors = 6000, Cash = 9000 and Creditors = 8000. Compute Current Ratio.
- f. Distinguish between *trade* and *cash Discounts*.
- g. Discuss the term capital in accounting.
- h. Explain the *matching* concept of accounting principles.
- i. Explain the term *prepaid expenses*.
- j. Write down two examples of direct expenses.

Section (B)

Q.2 Attempt any 5 questions.

(7 x 5 = 35)

- a. Draw the Performa of Trading & Profit & Loss Account and Balance Sheet.
- b. Discuss the objectives of Financial Management.
- c. Explain the significance of Ratios for business decision making.
- d. Mr. X is wholesale trader; following transactions are to be recorded in *Accounting Equation*.
 - i. Commence business with cash Rs. 200,000 and Land Rs. 50,000.
 - ii. Bought goods for cash Rs. 80,000.
 - iii. Cash sales of worth Rs. 25,000.
 - iv. Bought goods from Mr. Y worth Rs. 50,000.
 - v. Sales on account to Mr. Z Rs. 12,000.
 - vi. Purchase furniture of the value of Rs. 5,000 for cash.
 - vii. Received cash from Mr. Z Rs. 10,000.
- e. Journalize the following transactions in the books of Mr. X

2018

	₹
1-Mar Started business with cash	60,000
2 Purchased furniture for cash	10,000
4 Purchased goods for cash	25,000
5 Bought goods from Mr. Y	15,000
10 Paid cash to Mr. Y	15,000
16 Purchased goods from Mr. Z	6,000
18 Purchased goods from <i>for cash</i>	8,000
20 Paid rent for the office	1,000

- f. Journalize the following transactions:
 - i. Salary due 2000 Amount paid 1500.
 - ii. Salary due 2000 Amount paid 2500.
 - iii. Goods worth 20000 purchased from Sun Ltd. at 20% discount. Sun Ltd. allows another 10% discount for cash payments. 50% of the amount due was paid in cash.

iv. Purchased goods worth 10000 from Mr. A. Later on goods worth 2000 were returned due to damages.

g. Observe the given figures carefully:

	Jul-18	Aug-18
Sales	50000	80000
Profit	10000	17500

From the above mentioned figures you are required to compute:

- P/V Ratio
- Fixed Cost
- BEP (in Rs.)
- Margin of Safety (MOS) for July and August.

Section (C)

Attempt any 3 questions.

(15 x 3 = 45)

Q.3

Answer the following:

- What is accounting? Define its objectives.
- Describe the role of accounting in the modern world.

Q.4

Answer the following:

- Describe the purpose for the preparation of trial balance.
- Explain the different types of errors that are usually committed in recording a business transaction.

Q.5

Take a glance of the table given below:

		S= 20		V=12	F=16000		
QUANTITY (Q)	SALES(S Q)	TOTAL VARIABLE COST(V Q)	TOTAL FIXED COST(F)	TOTAL COST(VQ +F)	TOTAL CONTRIBUTION(CQ)	PROFIT (CQ-F)	MARGIN OF SAFETY (MOS)
0							
500							
1000							
1500							
2000							
2500							
3000							

You are required to:

- Complete the above table
- Construct a BEP chart on the basis of above table.

Q.6

Stock	10000
Debtors	20000
Cash	2000
Equity Share Capital	100000
Bank Loan	160000
Total Assets	50000
Sales	200000
Net Profit	40000

On the basis of the table given above you are required to compute:

- Super Quick Ratio, Quick Ratio & Current Ratio.
- Total Assets Turnover Ratio, Stock Turnover Ratio & Net Profit Ratio.

Q.7

You have been provided with the following Trial Balance for the year ending 31st March 2021.

	Dr.	Cr.
Opening Stock	25000	
Purchases	30000	
Sales		103000
Wages	2000	
Interest Received		4000
Rent Paid	1500	
Salary	3500	
Land & Building	50000	
Machinery	25000	
Capital		45000
Loan from Bank		20000
Creditors		15000
Debtors	15000	
Cash	35000	
	187000	187000
Closing Stock		40000

You are required to:

- Prepare Trading & Profit and Loss A/c
- Prepare Balance Sheet for the year.

Enrol. No.

S	R	H	U											
---	---	---	---	--	--	--	--	--	--	--	--	--	--	--

Regn. No.

D	D													
---	---	--	--	--	--	--	--	--	--	--	--	--	--	--

END SEMESTER EXAMINATION, JUNE- 2024

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

a	What is computer architecture?	CO1	PO1
b	What is pipelining?	CO3	PO1
c	What is a cache?	CO5	PO2
d	What is interrupts in a microprocessor system?	CO1	PO1
e	What are flip-flops?	CO1	PO1
f	What are the types of micro-operations?	CO1	PO1
g	What is a DMA?	CO4	PO2
h	What are instruction?	CO1	PO1
i	What is logic operation?	CO1	PO1
j	What is BUS?	CO1	PO1

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

a	Differentiate SRAM and DRAM.	CO5	PO2
b	What is role of main memory in computer Architecture?	CO5	PO2
c	Discuss basic computer instruction format with example.	CO1	PO1
d	Write a note on memory reference instruction.	CO1	PO1
e	What is function of CPU?	CO3	PO1
f	Write a short note on machine language.	CO2	PO2
g	What is the role of DMA controller in computer organization?	CO4	PO2

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

a	Explain the following Register. (i)Address Register (ii)Program counter (iii) Accumulator	CO1	PO1
b	Explain the various addressing mode. (i)Immediate mode (ii) Register indirect mode (iii) Indexed addressing mode.	CO3	PO1
c	Explain the role of computer Instruction about the following (i) Memory –reference instruction (ii) register-reference Instruction (iii) input -output instruction	CO1	PO1
d	Explain the micro-operation with. (i) Arithmetic Micro-Operations (ii) Logic Micro-Operations (iii) Shift micro-operations	CO1	PO1

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

a	(i)What is micro operation? Explain Types of Micro-Operations. (ii)Explain von Neumann architecture of computer	CO1	PO1
b	(i) Discuss about Bus and memory transfer with suitable example. (ii) What are the advantages of multiple bus organization over a single bus organization address sequencing?	CO1	PO1
c	(i)What is difference between machine language and assembly language? (ii)Explain the assembler and its working using first pass.	CO2	PO2

Enrol. No.

S	R	H	U												
---	---	---	---	--	--	--	--	--	--	--	--	--	--	--	--

Regn. No.

D	D														
---	---	--	--	--	--	--	--	--	--	--	--	--	--	--	--

END SEMESTER EXAMINATION, JUNE- 2024
BCA Semester – II/ B. Sc. (Hons.) in Data Science Semester - II

Course Name: Data Structures**Course Code: BC122T/BDS124****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.	Define stack.	1	1
b.	What is circular queue?	2	2
c.	What is the difference between stack and queue?	3	2
d.	Mention the different ways of tree traversal.	2	1
e.	Give the node structure of singly linked list.	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.	What are queue and its applications?	1	1
b.	Explain in detail about ordered list, sparse matrix and Vector.	1	1
c.	Write a program to calculate the factorial of a number using recursion.	1	1
d.	What is recursion? Explain the significance of recursion.	1	1
e.	Create function in C which checks full or empty for a linear queue. Also find out the number of elements in a queue.	3	1
f.	What is priority queue? How it is implemented?	2	3
g.	Write an algorithm to delete a given item from a two way list.	3	1

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

S.No	Questions	CO	PO
a.	Write an algorithm to evaluate postfix expression. Convert the following infix expression into equivalent postfix expression $(a+b)*c-d+e/(f-g)$	1	1
b.	Define a tree. Explain the different types of binary tree. What is predecessor and successor of a node in a binary search tree?	2	2
c.	Given the following input(4322,1334,1471,9679,1989,6171,6173,4199) and the hash function $x \text{ mod } 10$, 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 to insert an item into a one way list. ii) What are the various operations possible on doubly linked list? Explain with suitable example.	1	1
b.	i) What is hash table? What is the purpose of using hash table? How the use of hash table is more beneficial as compared to its contemporary techniques. ii) What are the various applications of Stack? Explain with an example.	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

Enrol. No.

S	R	H	U						
---	---	---	---	--	--	--	--	--	--

Regn. No.

D	D								
---	---	--	--	--	--	--	--	--	--

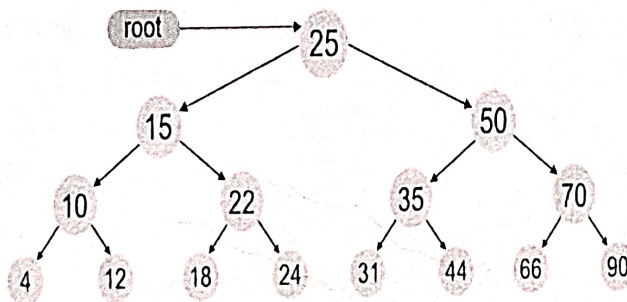
END SEMESTER EXAMINATION, JUNE- 2024
BCA Semester - II

Course Name: Data Structures**Course Code: BCA110****Time allotted: 03 Hours****Max. Marks: 100****Note:** Attempt all Sections & Questions.**Section (A)****Q. 1.** Attempt **all** questions. All carry equal marks.**(10 x 02 = 20)**

- a. What is a non-linear data structure?
- b. List advantages of linked list.
- c. What is binary search tree?
- d. Mention different ways of graph traversal.
- e. Mention the disadvantages of an array.
- f. Define the terms:
 - i. Graph
 - ii. Tree
- g. Differentiate between stack and queue.
- h. What is Circular queue?
- i. What are the types of dynamic memory allocation?
- j. Define hashing.

Section (B)**Q. 2.** Attempt **any 5** questions. All carry equal marks**(5 x 7 = 35)**

- a. Explain the working of Quick sort techniques with example.
- b. What do you understand by a dynamic memory allocation? Explain in detail.
- c. Find In-order, Pre-order and Post-order traversal of following tree:



- d. Differentiate between singly linked list and a doubly linked list.
- e. Discuss various collision resolution techniques with suitable examples.
- f. Given the following in order and preorder traversal reconstruct a binary tree
In order – D, G, B, E, A, F, I, C
Preorder – A, B, D, E, H, C, F, I
- g. Define array Write algorithm to delete an element from a linear array

P.T.O./-

Section (C)

(03 x 15 = 45)

Attempt **any 3** questions. All carry equal marks.

- Q.3. a.** What are the different notations for algorithm complexity? Explain.
b. What is pointer? How it is used to access elements of an array? Explain the concept by suitable example.
- Q.4. a.** How breadth first search operations are performed on graphs? Explain.
b. Write an algorithm to insert and delete an element from an array.
- Q.5. a.** Write an algorithm for Bubble sort. Discuss Bubble sort with the help of an example.
b. What is stack? What are the basic operations associated with stack?
- Q.6. a.** Convert the following infix notation into postfix notation using stack:
 $((A * B) + D) / ((E - F) * G)$
b. A hash table contains 7 buckets and uses linear probing to solve collision. The key values are integers and the hash function used is $key \% 7$. Draw the table that results after inserting in the given order the following values: 16, 8, 4, 13, 29, 11, 22.
- Q.7. a.** A file contains the following characters with the frequencies as shown. If Huffman Coding is used for data compression, determine-
 i. Huffman Code for each character
 ii. Average code length
 iii. Length of Huffman encoded message (in bits)

Characters	Frequencies
A	20
B	15
C	10
D	5
E	4
F	12
G	2

- b.** Give brief description about the priority queues.

Enrol. No.

S	R	H	U											
---	---	---	---	--	--	--	--	--	--	--	--	--	--	--

Regn. No.

D	D													
---	---	--	--	--	--	--	--	--	--	--	--	--	--	--

END SEMESTER EXAMINATION, JUNE- 2024
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 $(\frac{d^4y}{dx^4})^2 - 2(\frac{d^3y}{dx^3})^4 - 4(\frac{dy}{dx})^5 - y = 0$	2	1
h.	Define linear 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 $(D^2 + D + 1)y = \cos 2x$	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 <table border="1"><tr><td>Class</td><td>20</td><td>30</td><td>40</td><td>50</td><td>50</td></tr><tr><td>Number of worker</td><td>6</td><td>8</td><td>4</td><td>2</td><td>5</td></tr></table>	Class	20	30	40	50	50	Number of worker	6	8	4	2	5	3	1
Class	20	30	40	50	50										
Number of worker	6	8	4	2	5										
g.	Solve the following differential equation $(x + 1) \frac{dy}{dx} - y = e^x (x + 1)^2$	2	2												

P.T.O.-

Q.3. Attempt any three out of four.

(3×10=30)

QN	Questions	CO																			
a.	Solve $(D^2 - D - 6)y = e^x$	2																			
b.	Calculate the mean by direct method <table><tr><td>Class</td><td>110</td><td>112</td><td>113</td><td>117</td><td>120</td><td>125</td><td>128</td><td>130</td></tr><tr><td>Number of worker</td><td>25</td><td>17</td><td>13</td><td>15</td><td>14</td><td>8</td><td>6</td><td>2</td></tr></table>	Class	110	112	113	117	120	125	128	130	Number of worker	25	17	13	15	14	8	6	2	3	1
Class	110	112	113	117	120	125	128	130													
Number of worker	25	17	13	15	14	8	6	2													
c.	Find the value of $\int x \cos 8x \, dx$	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. Then solve the differential equation for the value of n	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 $\frac{d^2y}{dx^2} + y = \sec x \tan x$	2	2
b.	To Prove that $\int_0^{\frac{\pi}{2}} \log \sin x \, dx = -\frac{\pi}{2} \log 2$	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

Enrol. No.

S	R	H	U								
---	---	---	---	--	--	--	--	--	--	--	--

Regn. No.

D	D										
---	---	--	--	--	--	--	--	--	--	--	--

END SEMESTER EXAMINATION, JUNE- 2024
BCA Semester – II

Course Name: Foundation Course in Mathematics -II**Course Code: BCA112****Time allotted: 03 Hours****Max. Marks: 100****Note: Read all the instructions carefully.**

Section (A)

Q. 1. Attempt all questions.**(2 x 10 = 20)**

- a. A differential equation $Mdx + Ndy = 0$ is exact if.....
- b. Write the real and imaginary part of $(3 - 5i)^2$.
- c. There are two children in a family. The probability that both of them are boys, is.....
- d. Relation between the direction cosines of a line (l, m, n) is.....
- e. If $\frac{dy}{dx} + Py = Q$ is a linear differential equation then the solution of differential equation is.....
- f. The relation between mean, mode and median is.....
- g. To complex number is equal to each other if.....
- h. The relation between direction cosine and direction ratio is.....
- i. The value of $(\cos \theta + i \sin \theta)^{-10}$ is.....
- j. Write the order and degree of differential equation $\left(\frac{d^4y}{dx^4}\right)^2 - 2\left(\frac{d^3y}{dx^3}\right)^4 - 4\left(\frac{dy}{dx}\right)^5 - y = 0$

Section (B)

Q. 2. Attempt any 5 questions.**(7 x 5 = 35)**

- a. Find the square root of $3 + 4i$.
- b. Convert into $A + iB$ form of $\frac{(1+i)^2}{3-i}$
- c. Find the coordinates of the points which trisects the line segment AB, given that $A(2, 1, -3)$ and $(5, -8, 3)$.
- d. Solve $(D^2 - 5D + 6)y = e^x \sin x$
- e. If $2\cos\theta = x + \frac{1}{x}$ and $2\cos\phi = y + \frac{1}{y}$, then prove that $2\cos(m\theta + n\phi) = x^m y^n + \frac{1}{x^m y^n}$.
- f. Solve $(x^2 + y^2)dx + 2xydy = 0$
- g. Solve $3e^x \tan y dx + (1 - e^x) \sec^2 y = 0$

P.T.O/-

Section (C)

(15 x 3 = 45)

Attempt **any 3** questions.**Q.3.** If a fair coin is tossed 10 times, find the probability of:

- \
- (a) exact six heads
- (b) at least six heads
- (c) at most six heads

Q.4 (a). Calculate the mean by direct method:

Class	10	20	30	40	50
Number of worker	4	5	3	2	5

(b) Find the standard deviation for the following data

Marks	0-10	10-20	20-30	30-40	40-50	50-60
Number of girls	6	8	14	16	4	2

Q.5 (a) If $x_r = \cos \frac{\pi}{2r} + i \sin \frac{\pi}{2r}$, then prove that $x_1 x_2 x_3 x_4 \dots \dots \dots \infty = \cos \pi$.**(b)** Solve $(D^2 - 6D + 9)y = 6e^{3x} - \log$ **Q.6. (a)** Formulate the differential equation of $y = Ax + A^2$ **(b)** Solve $(x + 1) \frac{dy}{dx} - y = e^x (x + 1)^2$ **Q.7** Solve $(D^2 + 1)y = \tan x$ by method of variation of parameters.