

**AJ Institute of Engineering and Technology
Mangaluru.**



VTU Question Papers

BE-CSE, ISE & Allied Branches

[CSE-AIML, CSE-ICB, AIDS]

III to VIII Semester

Supplementary Exam

2022 SCHEME

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AJ Institute of Engineering and Technology, Mangaluru.

NH-66, Kottara Chowki, Mangaluru – 575 006

INDEX

Sl. No.	Subject Code	Subject	Date of Exam	Page No.
1	BCS302	Digital Design and Computer Organization	June/July 2024	1-2
2	BCS304	Data Structures and Applications	June/July 2024	3-4
3	BCS306A	Object Oriented Programming with Java	June/July 2024	5-6
4	BCS402	Microcontrollers	June/July 2024	7
5	BCS403	Database Management Systems	June/July 2024	8-9
6	BIS402	Advanced Java	June/July 2024	10-11



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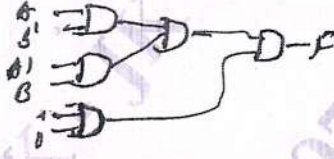
**Third Semester B.E./B.Tech. Degree Supplementary Examination
June/July 2024**

Digital Design and Computer Organization

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module – 1			M	L	C
Q.1	a.	Simplify the Boolean function i) $F(x, y, z) = \Sigma(2, 3, 4, 5)$ ii) $F(x, y, z) = \Sigma(3, 4, 6, 7)$	10	L3	CO1
	b.	Obtain a minimum product of sum with a Karnaugh Map $F(w, x, y, z) = x'z' + wyz + w'y'z' + x'y$	10	L3	CO1
OR					
Q.2	a.	Define multiplexer. Explain 2 to 1 line multiplexer.	10	L2	CO1
	b.	Write the verilog code and time diagram for the given circuit with propagation delay where the AND, OR gate has a delay of 30ns and 10ns. <div style="text-align: center;">  <p>Fig Q2(b)</p> </div>	5	L2	CO1
c.	Explain implementation of full adder with logic diagram.		5	L3	CO1
Module – 2					
Q.3	a.	Explain with neat diagram and 4 input priority encodes.	10	L2	CO2
	b.	Explain 2 : 4 time decoder with help of logic diagram and truth table.	10	L2	CO2
OR					
Q.4	a.	Define Latch. Explain S-R flip flop based on NOR Gate with neat diagram.	10	L2	CO2
	b.	Explain clocked D flip flop with neat diagram.	10	L2	CO2
Module – 3					
Q.5	a.	With neat diagram, explain the basic operational concepts of computers.	10	L2	CO3
	b.	Write a program to evaluate arithmetic statement $Y = (A + B) * (C + D)$ using 3 address, 2 address, one address and zero address instruction.	10	L3	CO3
OR					
Q.6	a.	Describe the concept of Branch instruction with example.	10	L2	CO3
	b.	Explain 5 addressing modes with example.	10	L2	CO3

Module – 4					
Q.7	a.	Explain the I/O interfacing and I/O device with computers.	10	L2	CO4
	b.	What is Bus Arbitration? Explain types of bus arbitration.	10	L2	CO4
OR					
Q.8	a.	What is cache memory? Explain the different type of cache mapping function.	10	L2	CO4
	b.	Explain basic concepts involved for memory structures of computers.	10	L2	CO4
Module – 5					
Q.9	a.	Explain with neat diagram of single bus organization.	10	L2	CO5
	b.	Explain complete execution steps for instruction ADD (R3), R1.	10	L2	CO5
OR					
Q.10	a.	Explain execution of complete instruction carry out.	10	L2	CO5
	b.	What is pipeline? Explain with example of pipeline performance.	10	L2	CO5



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BCS304

**Third Semester B.E./B.Tech. Degree Supplementary Examination,
June/July 2024**

Data Structures and Applications

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module – 1			M	L	C
Q.1	a.	Define Data Structures.	04	L1	CO1
	b.	Explain the classification of Data Structures with example.	10	L2	CO1
	c.	Explain all operations of Data Structures.	06	L2	CO1
OR					
Q.2	a.	Explain any five string handling functions supported by 'c' with syntax and example.	10	L2	CO1
	b.	Convert the following infix expression to postfix expression using stack: $A + (B * C - (D/E \wedge F) * G) * H$	10	L3	CO1
Module – 2					
Q.3	a.	List the disadvantages of linear queue and how is it solved in circular queues. Give the algorithm to insert and delete an element in circular queues.	12	L2	CO2
	b.	Explain in detail about multiple queues with relevant functions in 'C'.	08	L2	CO2
OR					
Q.4	a.	Develop a linked list with the basic operations performed on Singly Linked List (SLL) and different types of linked list.	12	L3	CO2
	b.	Examine a node structure for linked representation of polynomial. Explain algorithm to add two polynomial represented using linked list.	08	L2	CO2
Module – 3					
Q.5	a.	Summarize Sparse Matrix. For the given sparse matrix, write the diagrammatic linked list representation. $\begin{bmatrix} 8 & 0 & 0 & 0 \\ 5 & 0 & 0 & 3 \\ 0 & 0 & 0 & 0 \\ 4 & 0 & 0 & 8 \\ 0 & 0 & 9 & 1 \end{bmatrix}$	08	L3	CO3
	b.	Define Doubly linked list. Write the functions to perform the following operations on doubly linked list. (i) Insert a node at rear end of the list (ii) Delete a node at rear end of the list (iii) Search a node with a given key value	12	L3	CO3
OR					
Q.6	a.	Define Tree with any six tree terminology.	06	L1	CO3
	b.	Write the function for copying and testing of binary tree.	06	L3	CO3
	c.	Draw a binary tree and find out the binary tree traversals for the following expression $3 + 4 * (7 - 6) / 4 + 3$.	08	L3	CO3

Module – 4

Q.7	a.	Construct binary search tree for the given set of values 14, 15, 4, 9, 7, 18, 3, 5, 16, 20 Also perform inroder, preorder and post order traversals of the obtained tree.	08	L3	CO4
	b.	Build a linked list representation of disjoint sets in detail.	06	L3	CO4
	c.	Simplify recursive search algorithm for a binary search tree.	06	L3	CO4

OR

Q.8	a.	Compare a graph with tree. For the graph shown in Fig.Q8(a), show the adjacency matrix and adjacency list representation.	08	L3	CO4
		<p style="text-align: center;">Fig.Q8(a)</p>			
	b.	Explain all methods used for traversing a graph with suitable example and write 'C' function for the same.	12	L3	CO4

Module – 5

Q.9	a.	Differentiate between static hashing and dynamic hashing in detail with operations.	10	L2	CO5
	b.	Describe double ended priority queue.	04	L2	CO5
	c.	Explain Hashing with any three Hash functions.	06	L2	CO5

OR

Q.10	a.	What is collision? Explain the method to resolve collision with suitable algorithm of linear probing. Insert keys 72, 27, 36, 24, 63, 81, 92, 101 into % [size 10].	10	L3	CO5												
	b.	Construct an optimal binary search tree for the following keys with the probabilities as	10	L3	CO5												
		<table border="1" style="margin-left: 20px;"> <tr> <td>Keys</td> <td>A</td> <td>B</td> <td>C</td> <td>D</td> <td>E</td> </tr> <tr> <td>Probability</td> <td>0.25</td> <td>0.2</td> <td>0.05</td> <td>0.2</td> <td>0.3</td> </tr> </table>	Keys	A	B	C	D	E	Probability	0.25	0.2	0.05	0.2	0.3			
Keys	A	B	C	D	E												
Probability	0.25	0.2	0.05	0.2	0.3												





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BCS306A

Third Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024

Object Oriented Programming with Java

Time: 3 hrs.

Max. Marks: 100

- Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.*

		Module – 1	M	L	C
Q.1	a.	List and explain OOP's principles in JAVA.	8	L2	CO1
	b.	Class Helloworld { Public static void main (String [] args) { int a ; for (a = 0 ; a < 3 ; a ++) { int b = -1 ; system.out.println (" " +b) ; b = 50 ; system.out.println (" " +b) ; } system.out.println ("Hello, world!") ; } } What is the output of the above code?	6	L3	CO1
	c.	Develop a program to find an average among the elements {1, 2, 3, 4, 5} using for each loop in JAVA.	6	L3	CO1
OR					
Q.2	a.	How arrays are defined and used in Java? Give examples.	6	L2	CO1
	b.	Briefly explain the various primitive data types used in Java.	6	L2	CO1
	c.	Explain the following jump statements : (i) Break (ii) Continue	8	L2	CO1
Module – 2					
Q.3	a.	Explain the constructor method and parameterized constructors methods with suitable examples.	10	L3	CO2
	b.	Discuss the significant features of the following keyword : (i) this (ii) static	4	L2	CO2
	c.	What is method overloading? Illustrate the concept of method overloading using java program.	6	L2	CO2
OR					
Q.4	a.	Write a java program to illustrate : (i) Passing object as parameters. (ii) Returning objects	10	L3	CO2
	b.	A class called Employee, which models an employee with an ID, name and salary. The method raiseSalary (percent) increases the salary by the given percentage. Develop the Employee Class and suitable main method for demonstration.	10	L3	CO2

Module – 3					
Q.5	a.	With example, give two uses of super.	6	L2	CO3
	b.	What is dynamic method dispatch? Write a simple example that illustrates dynamic method dispatch.	8	L2	CO3
	c.	Briefly explain the final keyword with inheritance.	6	L2	CO3
OR					
Q.6	a.	What is an interface? Briefly explain the general forms of an interface.	6	L2	CO3
	b.	Discuss the significance of nested interfaces in Java.	8	L2	CO3
	c.	With proper syntax, explain the method overriding.	6	L2	CO3
Module – 4					
Q.7	a.	What is a package? What are the steps involved in creating user defined packages? Explain.	10	L2	CO4
	b.	Define exception and explain the exception handling mechanism with an example.	6	L2	CO4
	c.	Discuss about throw and throws features.	4	L2	CO4
OR					
Q.8	a.	Write a program to illustrate for nested fry statements.	6	L2	CO4
	b.	Enlist any three java Built-in exceptions and explain.	6	L2	CO4
	c.	What is chained exception? Give an example that illustrates the mechanics of handling chained exceptions.	8	L2	CO4
Module – 5					
Q.9	a.	Write a program to create multiple threads in JAVA.	10	L3	CO5
	b.	With syntax, explain the use of isAlive () and join () methods.	6	L3	CO5
	c.	Discuss the significance of thread priorities in JAVA.	4	L2	CO5
OR					
Q.10	a.	With Syntax, explain values () and value of () methods.	6	L2	CO4
	b.	List and Discuss the Numeric type wrappers methods.	6	L2	CO4
	c.	Write a program to demonstrate the following : (i) A type wrapper (ii) Autoboxing/Unboxing	8	L2	CO4

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BCS402

Fourth Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024 Microcontrollers

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module - 1			M	L	C
Q.1	a.	List and explain 4 major design rules in RISC design philosophy.	10	L2	CO1
	b.	With a neat diagram explain ARM based embedded device, a microcontroller.	10	L2	CO1
OR					
Q.2	a.	Explain in detail ARM Design Philosophy.	10	L2	CO1
	b.	Explain in detail software abstraction layers executing on hardware (embedded system software).	10	L2	CO1
Module - 2					
Q.3	a.	Explain arithmetic and logical data processing instructions with syntax, examples and code snippet for each.	10	L3	CO2
	b.	Explain four steps of stack implementation in ARM with examples for each.	10	L2	CO2
OR					
Q.4	a.	Write note on : i) Coprocessor Instructions ii) Software Interrupt instructions	10	L2	CO2
	b.	Develop ARM ALP to find largest number in an array of 32 bit numbers. Program should be neatly commented.	10	L3	CO2
Module - 3					
Q.5	a.	Discuss with C function and target ARM assembly code how optimization can be done with respect to data types.	10	L2	CO3
	b.	Explain optimizations with respect to C loop structures considering fixed number of iterations, variable number of iterations and loop unrolling. Explain with examples for each.	10	L2	CO3
OR					
Q.6	a.	Discuss and analyze optimization with respect to pointer aliasing, effects of pointer aliasing with simple C code / function.	10	L3	CO3
	b.	Analyze and explain the way structure arrangement to be done in order to access the structure members efficiently.	10	L3	CO3
Module - 4					
Q.7	a.	Discuss the following : i) Interrupt latency ii) Types of interrupts available on ARM processor.	10	L2	CO4
	b.	Write short code snippet to enable and disable interrupts. Explain in detail.	10	L3	CO4
OR					
Q.8	a.	What is firmware? Explain firmware execution flow and bootloader.	10	L2	CO4
	b.	Explain / Discuss Sandstone execution flow in detail.	10	L2	CO4
Module - 5					
Q.9	a.	Discuss basic architecture of a cache memory with a neat diagram.	10	L2	CO5
	b.	Explain in detail memory hierarchy and cache memory.	10	L2	CO5
OR					
Q.10	a.	Discuss Cache policy in detail.	10	L2	CO5
	b.	Write note on: i) Allocation policy on a cache miss ii) Coprocessor 15 and Caches	10	L2	CO5

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BCS403

**Fourth Semester B.E./B.Tech. Degree Supplementary Examination,
June/July 2024**

Database Management System

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module – 1			M	L	C
Q.1	a.	What is DBMS? List the characteristics of database approach. Bring out major advantages of the database approach.	8	L2	CO1
	b.	Explain data independence. Draw 3 schema architecture and discuss the mapping.	7	L2	CO1
	c.	Define following : i) Database Administrator ii) Canned transaction iii) Weak entity iv) Meta data v) Database Instance.	5	L2	CO1
OR					
Q.2	a.	Describe components modules of DBMS and its interaction with neat diagram.	8	L2	CO1
	b.	Draw ER diagram of library database schema atleast 4 entities. Also specify primary keys, structural constraints and explain.	8	L3	CO2
	c.	Briefly discuss different types of end users of Database.	4	L2	CO2
Module – 2					
Q.3	a.	Briefly explain different types of update operation on relation database. Show an example of violation of referential and entity integrity in each of update operation.	10	L2	CO3
	b.	Consider following schema : Suppliers (SID , SName , address) Parts (PID , PName , Colour) Catalog (Sid , PID , Price) Write relational algebra expression for following queries : i) Find the names of all red parts. ii) Find all prices for parts that were red or green. iii) Find the SID's of all suppliers who supply part that is red or green. iv) Find the SID's of all supplier who supply part that is red and green.	10	L3	CO2
OR					
Q.4	a.	Describe the steps of ER – to – relational mapping with suitable examples and schema for each step.	10	L2	CO2
	b.	Explain with example : i) Division operation ii) Full outer join iii) Aggregate function iv) Project operation v) Cartesian product.	10	L2	CO2

Module – 3					
Q.5	a.	What is the need for normalization? Explain 2 nd normal form. Consider the relation EMP_PROJ = {SSn , Pnumber , Hours , Ename , Pname , Plocation}. Assume {SSn , Pnumber} as a primary key. The dependencies are SSn ; Pnumber → {Hours} SSn → {Ename} Pnumber → {Pname, Plocation} , Normalize above relation into 2NF.	10	L3	CO4
	b.	Illustrate the informal design guidelines for relation schemes with examples.	10	L2	CO4
OR					
Q.6	a.	Write syntax with example in SQL for the DDL and DML SQL statements.	10	L2	CO3
	b.	Consider the schema for college database. Student (USN , Sname , Address , Phone , Gender) SemSec (SSID , Sem , Sec) Class (USN , SSID) Subject (Subcode , Title , Sem , Credits) IAMarks (USN , Subcode , SSID , Test1 , Test2, Test3, Final IA) Write SQL Query. i) List all the students studying in 4 th sem 'C' section. ii) Compute total number of male students in each semester. iii) List Test1 marks of all students in all subjects.	10	L3	CO3
Module – 4					
Q.7	a.	How are triggers and assertion defined in SQL? Explain with example.	10	L2	CO4
	b.	Write the syntax and example of view in SQL. Explain efficient view implementation.	10	L2	CO4
OR					
Q.8	a.	List the problems that occur during concurrency control and also explain them with supporting transaction diagrams.	10	L2	CO5
	b.	Explain the various DBMS – Specific Buffer replacement policies.	10	L2	CO5
Module – 5					
Q.9	a.	Demonstrate with example deadlock in transaction. Discuss deadlock prevention algorithm.	10	L2	CO5
	b.	What are Binary locks? Explain with Lock and unlock operations with algorithm.	10	L2	CO5
OR					
Q.10	Write a short note on : i) Properties of NOSQL system ii) The CAP theorem iii) Document based NO – SQL system iv) NOSQL Graph database.		20	L2	CO4

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BIS402

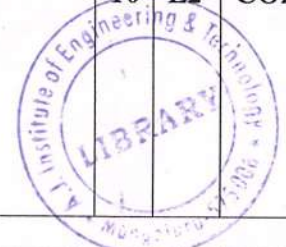
Fourth Semester B.E./B.Tech. Degree Supplementary Examination, June/July 2024 Advanced Java

Time: 3 hrs.

Max. Marks: 100

*Note: 1. Answer any FIVE full questions, choosing ONE full question from each module.
2. M : Marks , L: Bloom's level , C: Course outcomes.*

Module – 1			M	L	C
Q.1	a.	What is collection framework? Explain the methods defined by the collection interface with an example.	10	L2	CO1
	b.	Implement a java program to illustrate storing user defined classes in collection.	10	L3	CO1
OR					
Q.2	a.	What are comparators? Develop a java program to demonstrate the working of a comparator.	10	L3	CO1
	b.	Explain any four legacy collection in framework.	10	L2	CO1
Module – 2					
Q.3	a.	What is a string? Explain the string constructors with suitable programming example.	10	L2	CO2
	b.	Write a java program to remove duplicate characters from a given string "JAVA J2EE" and display the resultant string.	10	L3	CO2
OR					
Q.4	a.	Implement a java program to illustrate the use of different types of StringBuffer methods.	10	L3	CO2
	b.	Explain the following string methods with an example: i) getChars() ii) regionMatches() iii) Concat() iv) CompareTo() v) LastIndexOf()	10	L2	CO2
Module – 3					
Q.5	a.	What are Swings in Java? Explain two key swing features and also explain MVC architecture.	10	L2	CO3
	b.	Demonstrate a swing event handling application that creates 2 buttons Alpha and Beta and displays the text "Alpha pressed" when alpha button is clicked and "Beta pressed" when beta button is clicked.	10	L3	CO3



OR

Q.6	a.	Explain the following with example: i) JLabel and ImageIcon ii) JTextField.	10	L3	CO3
	b.	What is the difference between checkboxes and radiobuttons? Create a simple application that enables a user to select one of the following items: i) Radio1 ii) Radio2 iii) Radio3 iv) Radio4.	10	L2	CO3

Module – 4

Q.7	a.	What is servlet? Explain the life cycle of servlets.	8	L2	CO4
	b.	Write a Java servlet program that demonstrates how parameters can be accessed from HTML.	12	L3	CO4

OR

Q.8	a.	What is JSP? Explain the various types of JSP tags with example.	10	L2	CO4
	b.	A Java program to create and read the cookie for the given cookie name as "EMPID" and its value as "AN2356".	10	L3	CO4

Module – 5

Q.9	a.	Explain the different steps involved in JDBC with code snippets.	10	L2	CO5
	b.	Explain the four types of JDBC driver types.	10	L2	CO5

OR

Q.10	a.	Write a java program to insert data into student DATABASE and retrieve information based on particular queries (Explain update, delete, search).	10	L3	CO5
	b.	Write a short notes on: i) Resultset ii) Transaction processing.	10	L2	CO5

