R22

Code No: R22A0507

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech II Semester Regular Examinations, June 2024

Object Oriented Programming through Java

(CSE,IT,CS&IT,CSE-CS,CSE-AIML,CSE-DS,CSE-IOT & B.Tech-AIML)

Roll No										

Time: 3 hours **Max. Marks: 60**

Note: This question paper contains two parts A and B
Part A is compulsory which carries 10 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

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		PART-A (10 Marks) **(Write all answers of this part at one place)**	**BCLL**	**CO(s)**	**Marks**
1	A	Define type conversion.	**L1**	**CO-I**	**[1M]**
	B	What is the data type in Java?	**L1**	**CO-I**	**[1M]**
	C	What is multiple inheritance?	**L1**	**CO-II**	**[1M]**
	D	Define a package in Java.	**L1**	**CO-II**	**[1M]**
	E	Define an exception in Java.	**L1**	**CO-III**	**[1M]**
	F	What is the benefit of threads?	**L2**	**CO-III**	**[1M]**
	G	Write an example of try, catch in Java.	**L1**	**CO-IV**	**[1M]**
	H	List different JDBC drivers.	**L1**	**CO-IV**	**[1M]**
	I	What is a layout manager?	**L1**	**CO-V**	**[1M]**
	J	Define event in JAVA.	**L1**	**CO-V**	**[1M]**
		PART-B (50 Marks)			
		SECTION-I			
2		Discuss Java buzzwords in detail.	**L2**	**CO-I**	**[10M]**
		OR			
3	A	What is this reference? Write a Java program to demonstrate the use of this reference.	**L3**	**CO-I**	**[5M]**
	B	Explain any five methods of string class with suitable examples.	**L2**	**CO-I**	**[5M]**
		SECTION-II			
4	A	Discuss different types of inheritance in object-oriented programming.	**L2**	**CO-II**	**[6M]**
	B	Develop a Java program to implement method overriding.	**L3**	**CO-II**	**[4M]**
		OR			
5	A	Compare and contrast an abstract class and an interface.	**L2**	**CO-II**	**[5M]**
	B	Write steps to create and import a user-defined package with an example.	**L2**	**CO-II**	**[5M]**
		SECTION-III			
6	A	Discuss the hierarchy of exceptions in Java in detail.	**L2**	**CO-III**	**[5M]**
	B	Explain try and catch blocks with a suitable example	**L2**	**CO-III**	**[5M]**

		program.			
		OR			
7	A	Explain life thread cycle.	**L4**	**CO-III**	**[5M]**
	B	Write a Java program to create threads.	**L3**	**CO-III**	**[5M]**
		SECTION-IV			
8	A	Write a Java program to demonstrate the Vector class.	**L3**	**CO-IV**	**[5M]**
	B	Discuss the differences between byte streams and character streams in Java I/O.	**L2**	**CO-IV**	**[5M]**
		OR			
9	A	Explain the types of JDBC drivers.	**L2**	**CO-IV**	**[3M]**
	B	Develop a Java program the implementation of insert and update operations using JDBC.	**L3**	**CO-IV**	**[7M]**
		SECTION-V			
10	A	What is the swings framework? Explain the motivation behind the development of Swing and how it addresses the limitations of AWT.	**L2**	**CO-V**	**[4M]**
	B	Discuss JButton, JText and JTextArea swing components in detail.	**L2**	**CO-V**	**[6M]**
		OR			
11		Explain about mouse and key events with example program.	**L3**	**CO-V**	**[10M]**

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Code No: R22A0508 **R22**

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech II Semester Regular Examinations, June 2024

Computer Organization

(CSE)

Roll No										

Time: 3 hours **Max. Marks: 60**

Note: This question paper contains two parts A and B
Part A is compulsory which carries 10 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks

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			BCLL	CO(s)	Marks
		PART-A (10 Marks)			
		(Write all answers of this part at one place)			
1	A	What is the difference between Multiprocessors, Multicomputer	**L1**	**CO-I**	**[1M]**
	B	Define computer organization, computer architecture.	**L1**	**CO-I**	**[1M]**
	C	What is Register Transfer language	**L1**	**CO-II**	**[1M]**
	D	What is the format of instruction code in Micro operations ?	**L2**	**CO-II**	**[1M]**
	E	What is Address sequencing?	**L2**	**CO-III**	**[1M]**
	F	Draw the internal structure of CPU	**L1**	**CO-III**	**[1M]**
	G	List the various Memory Access Methods	**L1**	**CO-IV**	**[1M]**
	H	What is content addressable memory ?	**L1**	**CO-IV**	**[1M]**
	I	Define miss penalty for cache memory.	**L1**	**CO-V**	**[1M]**
	J	What is Pipelining?	**L1**	**CO-V**	**[1M]**
		PART-B (50 Marks)			
		SECTION-I			
2	A	Explain in detail about a basic operational concept of computer.	**L1**	**CO-I**	**[5M]**
	B	Draw the Flow Chart for Add and Subtract operations and explain with suitable example.	**L1**	**CO-I**	**[5M]**
		OR			
3	A	Explain in detail about the Error detection and correction codes.	**L1**	**CO-I**	**[5M]**
	B	Explain the Hardware implementation of signed 2's complement for addition/subtraction.	**L2**	**CO-I**	**[5M]**
		SECTION-II			
4	A	Explain the Flow chart for Interrupt cycle with a neat sketch	**L2**	**CO-II**	**[5M]**
	B	Explain bus system for four registers.	**L2**	**CO-II**	**[5M]**
		OR			
5	A	Write short notes on types of interrupts	**L1**	**CO-II**	**[5M]**
	B	Explain 4-bit arithmetic circuit with a neat sketch	**L2**	**CO-II**	**[5M]**

SECTION-III

6	A	How the stack machine execute the given A = B + C * D - E + F + A?	**L3**	**CO-III**	**[5M]**
	B	What is the purpose of One-Address Machines explain with example	**L2**	**CO-III**	**[5M]**
		OR			
7	A	Explain various Addressing Modes with examples.	**L1**	**CO-III**	**[5M]**
	B	Discuss about the Comparisons between RISC and CISC:	**L2**	**CO-III**	**[5M]**

SECTION-IV

8	A	Explain Associative memory page table	**L2**	**CO-IV**	**[5M]**
	B	Explain the relation between Memory Mapping and Concept of Virtual Memory	**L2**	**CO-IV**	**[5M]**
		OR			
9	A	Explain the process involved in Address mapping using pages.	**L2**	**CO-IV**	**[5M]**
	B	Writing in to cache and cache Initialization:	**L1**	**CO-IV**	**[5M]**

SECTION-V

10	A	Explain CPU Bus signals for DMA Transfer.	**L1**	**CO-V**	**[5M]**
	B	Briefly discuss about four stage pipeline.	**L1**	**CO-V**	**[5M]**
		OR			
11	A	Discuss about the Modes of I/O Data Transfer.	**L2**	**CO-V**	**[5M]**
	B	Explain the process of destination initiated strobe for Data transfer	**L1**	**CO-V**	**[5M]**

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Code No: R22A0509 **R22**

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech II Semester Regular Examinations, June 2024

Operating Systems

(CSE & IT)

Roll No										

Time: 3 hours **Max. Marks: 60**

Note: This question paper contains two parts A and B
Part A is compulsory which carries 10 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

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			BCLL	CO(s)	Marks
		PART-A (10 Marks)			
		(Write all answers of this part at one place)			
1	A	What are the system components?	**L2**	**CO-I**	**[1M]**
	B	What is the purpose of cat command? Write its syntax.	**L2**	**CO-I**	**[1M]**
	C	Classify the various types of shells in LINUX.	**L2**	**CO-II**	**[1M]**
	D	Define the term "Turnaround Time".	**L1**	**CO-II**	**[1M]**
	E	What is a Resource allocation graph?	**L1**	**CO-III**	**[1M]**
	F	What is binary semaphore ?	**L3**	**CO-III**	**[1M]**
	G	What is a pipe?	**L2**	**CO-IV**	**[1M]**
	H	Differentiate between contiguous and non-contiguous memory allocation.	**L2**	**CO-IV**	**[1M]**
	I	Identify the various methods for file allocation.	**L3**	**CO-V**	**[1M]**
	J	SSTF stands for……	**L1**	**CO-V**	**[1M]**
		PART-B (50 Marks)			
		SECTION-I			
2	A	Write short notes on i) Time Sharing Systems ii) Real Time Systems	**L2**	**CO-I**	**[5M]**
	B	Describe the various services provided by the operating systems.	**L2**	**CO-I**	**[5M]**
		OR			
3	A	Demonstrate with a neat sketch LINUX file system.	**L2**	**CO-I**	**[4M]**
	B	Write the syntax to define a command or utility in LINUX. Give an example for the following utilities i) ln ii) wc iii) ls	**L3**	**CO-I**	**[6M]**
		SECTION-II			
4	A	Illustrate with a neat sketch process state diagram.	**L2**	**CO-II**	**[5M]**
	B	Explain about semaphore and the solution provides for dining Philosophere.	**L3**	**CO-II**	**[5M]**
		OR			
5	A	What is a process? Describe the various operations performed on process.	**L2**	**CO-II**	**[5M]**
	B	Consider the following processes with Burst time in nsec	**L3**	**CO-II**	**[5M]**

Process	Arrival Time	Burst Time
P1	4	6
P2	2	2
P3	0	2
P4	5	7
P5	7	4

Calculate the average waiting time and turnaround time using FCFS and SJF scheduling algorithms.

SECTION-III

6 A What kind of approaches would you use to prevent deadlock in a system? Elaborate on each of the approach. **L3 CO-III [5M]**

B Consider the following snapshot of a system: **L3 CO-III [5M]**

	Allocation	Max	Available
	A B C D	A B C D	A B C D
P0	4 0 0 1	6 0 1 2	3 2 1 1
P1	1 1 0 0	1 7 5 0	
P2	1 2 5 4	2 3 5 6	
P3	0 6 3 3	1 6 5 3	
P4	0 2 1 2	1 6 5 6	

The current state of the system is safe. If a request from process P1 arrives for (0, 1, 0, 0) can the request be granted immediately or not? How would you solve the problem using Banker's algorithm?

OR

7 A Define the structure of a Critical Section Problem. Identify the conditions a critical section problem may satisfy for process synchronization. **L2 CO-III [5M]**

B Demonstrate with pseudo code how to provide synchronization for Readers-Writers Problem. **L3 CO-III [5M]**

SECTION-IV

8 A What is shared memory? Explain the various system calls to implement shared memory. **L2 CO-IV [5M]**

B What are the characteristics of dead lock? explain bankers algorithm. **L3 CO-IV [5M]**

OR

9 A Demonstrate with a neat sketch how paging is implemented in operating systems. **L3 CO-IV [5M]**

B Consider a main memory with 3 page frames and the following sequence of page references: **L3 CO-IV [5M]**

3, 8, 2, 3, 9, 1, 6, 3, 8, 9, 3, 6, 2, 1, 3.

What would be the number of page faults using LRU and OPT page replacement?

SECTION-V

10 A What is a directory? Demonstrate with an example various directory structures. **L3 CO-V [4M]**

B Explain with an example the following system calls **L3 CO-V [6M]**

i) open

ii) Create

OR

11 A Describe the various methods for accessing a file. **L2 CO-V [5M]**

B Suppose the head of moving-arm disk with 100 cylinders, numbered 0 to 99 is currently serving a request at cylinder 50 and previously finished a request at cylinder 75. If the queue of requests is kept in the FIFO order as follows. **L3 CO-V [5M]**

45, 21, 67, 90, 4, 89, 52, 61, 87, 25.

What would be the total distance travelled by the head using FCFS and SCAN disk scheduling algorithms?

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R22

Code No: R22A0510

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech II Semester Regular Examinations, June 2024

Formal Languages and Automata Theory

(CSE)

Roll No										

Time: 3 hours **Max. Marks: 60**

Note: This question paper contains two parts A and B
Part A is compulsory which carries 10 marks and Answer all questions.
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***

		PART-A (10 Marks) **(Write all answers of this part at one place)**	BCLL	CO(s)	Marks
1	A	List the Applications of Finite Automata.	**L1**	**CO-I**	**[1M]**
	B	Compare DFA, NFA & Language.	**L2**	**CO-I**	**[1M]**
	C	Define NFA with example.	**L1**	**CO-II**	**[1M]**
	D	Define derivation, types of derivation, Derivation tree & ambiguous grammar.	**L1**	**CO-II**	**[1M]**
	E	Define grammar? Give an example.	**L1**	**CO-III**	**[1M]**
	F	Compare Leftmost and Rightmost derivations.	**L2**	**CO-III**	**[1M]**
	G	List the applications of Pumping Lemma.	**L1**	**CO-IV**	**[1M]**
	H	Illustrate the mathematical description of PDA.	**L2**	**CO-IV**	**[1M]**
	I	State the types of Turing Machines.	**L1**	**CO-V**	**[1M]**
	J	Define Turing Machines	**L1**	**CO-V**	**[1M]**
		PART-B (50 Marks) **SECTION-I**			
2	A	Outline formal language with an example.	**L2**	**CO-I**	**[5M]**
	B	Draw a DFA which accepts strings ending with 11 where the input is {0,1}.	**L2**	**CO-I**	**[5M]**
		OR			
3	A	List the various operations on languages in detail and relate with transition diagrams?	**L3**	**CO-I**	**[5M]**
	B	Draw a DFA which accepts strings ending with 01 where the input is {0,1}.	**L2**	**CO-I**	**[5M]**
		SECTION-II			
4	A	List and explain the closure properties of Regular sets.	**L3**	**CO-II**	**[5M]**
	B	Give the Regular expression for the following L = { $a^n b^m$: m, n are even} L = { $a^n b^m$: m>=2, n>=2}.	**L3**	**CO-II**	**[5M]**
		OR			
5	A	List the Identity rules for Regular Expressions.	**L3**	**CO-II**	**[5M]**
	B	Obtain an NFA to accept the following language L = {w | w: $abab^n$ or aba^n where n > 0}	**L3**	**CO-II**	**[5M]**

SECTION-III

6	A	Simplify the grammar with the following productions. S ->Aa/B/cA B -> A/bb/E A ->bc/B	**L4**	**CO-III**	**[5M]**
	B	Demonstrate the importance of PDA using a case study.	**L4**	**CO-III**	**[5M]**
		OR			
7	A	Simplify the following grammar: S→Aa|B, B-> A|bb, A->a|bc|B	**L3**	**CO-III**	**[5M]**
	B	Using Pumping Lemma show that the language $L = \{a^n b^n c^n \mid n \geq 1\}$ is not a CFL.	**L2**	**CO-III**	**[5M]**

SECTION-IV

8	A	Develop a PDA to accept the language WCW^R where W belongs to (0+1)* and W^R is the reverse of the string	**L6**	**CO-IV**	**[5M]**
	B	Discuss the equivalence of PDA and Context free grammar.	**L6**	**CO-IV**	**[5M]**
		OR			
9	A	Discuss the use of NPDA in solving real-world problems.	**L6**	**CO-IV**	**[5M]**
	B	Develop a PDA to accept the strings of the form a^n b^n where n>=1.	**L6**	**CO-IV**	**[5M]**

SECTION-V

10	A	Discuss the languages accepted by Turing machines.	**L6**	**CO-V**	**[5M]**
	B	Explain Church's Hypothesis and Halting problem?	**L6**	**CO-V**	**[5M]**
		OR			
11	A	List and explain various Turing Machines with suitable diagrams.	**L3**	**CO-V**	**[5M]**
	B	Design TM which accepts strings ending with 111 where the input is taken from {0,1}.	**L3**	**CO-V**	**[5M]**

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Code No: **R22A0028** **R22**

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

II B.Tech II Semester Regular Examinations, June 2024

Discrete Mathematics

(CSE,IT,CS&IT,CSE-CS,CSE-AIML,CSE-DS,CSE-IOT & B.Tech-AIML)

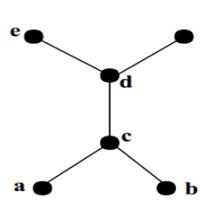
Roll No										

Time: 3 hours **Max. Marks: 60**

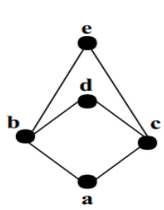
Note: This question paper contains two parts A and B
Part A is compulsory which carries 10 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer **FIVE** Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

***

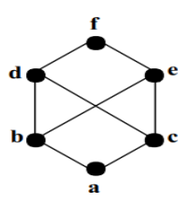
		PART-A (10 Marks) **(Write all answers of this part at one place)**	**BCLL**	**CO(s)**	**Marks**
1	A	Define statement in the context of logic and give any two examples.	**L1**	**CO-I**	**[1M]**
	B	What is valid argument in statement calculus ?	**L1**	**CO-I**	**[1M]**
	C	What is a relation between sets? Give an example.	**L1**	**CO-II**	**[1M]**
	D	Define POSET in the context of relations.	**L1**	**CO-II**	**[1M]**
	E	Give an example of a non-abelian group under addition.	**L3**	**CO-III**	**[1M]**
	F	Define an isomorphism between two groups.	**L1**	**CO-III**	**[1M]**
	G	How many integers between 1 and 100 are divisible by either 2, 3, or 5?	**L2**	**CO-IV**	**[1M]**
	H	In an examination, a candidate is required to pass all five different subjects. The number of ways he can fail is ?	**L3**	**CO-IV**	**[1M]**
	I	Draw a directed graph with 4 vertices and 5 edges where each vertex has outdegree 1 and indegree 1.	**L6**	**CO-V**	**[1M]**
	J	Defineand draw the complete graph with 4 vertices.	**L1,L6**	**CO-V**	**[1M]**
		PART-B (50 Marks) **SECTION-I**			
2		Verify whether the compound proposition $\sim (p \wedge q) \rightarrow (\sim p \vee (\sim p \vee q)) \wedge (\sim p \vee q)$ is a tautology, contradiction, or contingency using a (a) truth table and (b) logical equivalence.	**L3,L4**	**CO-I**	**[10M]**
		OR			
3	A	Establish the validity of the following argument using rules of inference. If the band could not play rock music or the refreshments were not served on time, then the new year party could have been cancelled and Alica would have been angry. If the party were cancelled, then refunds would have to be made. No refunds were made, therefore the band could play rock music.	**L2,L3**	**CO-I**	**[5M]**
	B	Find the negation of the following quantified statement $\forall x, \exists y, [\{p(x,y) \wedge q(x,y)\} \rightarrow r(x,y)]$	**L3,L4**	**CO-I**	**[5M]**
		SECTION-II			
4		Draw a Hasse diagram for the divisibility relation (/) on the set A={2,3,6,12,24,36}	**L2**	**CO-II**	**[10M]**
		OR			
5		Explain which of the following Hasse diagram of partially ordered sets are lattices.	**L4,L5**	**CO-II**	**[10M]**



(i)



(ii)



(iii)

SECTION-III

6		Prove that $G = \left\{\begin{bmatrix}1 & 0\\0 & 1\end{bmatrix}, \begin{bmatrix}-1 & 0\\0 & 1\end{bmatrix}, \begin{bmatrix}1 & 0\\0 & -1\end{bmatrix}, \begin{bmatrix}-1 & 0\\0 & -1\end{bmatrix}\right\}$ forms an abelian group under matrix multiplication.	**L2,L3**	**CO-III**	**[10M]**

OR

7		Let $G = (\mathbb{Z}, +)$ and $H = (2\mathbb{Z}, +)$ be two groups (for a fixed integer n). Verify the mapping $f: G \to H$ defined by $f(m) = 2m$ for $m \in \mathbb{Z}$ is a isomorphism from G to H.	**L2,L3**	**CO-III**	**[10M]**

SECTION-IV

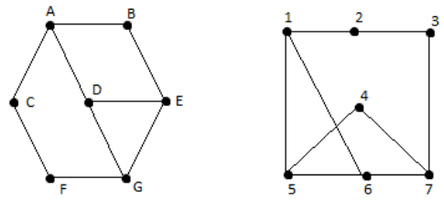
8	A	Suppose repetitions are not permitted. (i) How many three-digit numbers can be formed from the six digits 2, 3, 5, 6, 7, and 9? (ii) How many of these numbers are less than 400? (iii) How many are even?	**L2,L3**	**CO-IV**	**[5M]**
	B	A large software development company employs 100 computer programmers. Of them, 45 are proficient in Java, 30 in C#, 20 in Python, six in C# and Java, one in Java and Python, five in C# and Python, and just one programmer is proficient in all three languages above.Determine the number of computerprogrammers that are not proficient in any of these three languages.	**L3,L4**	**CO-IV**	**[5M]**

OR

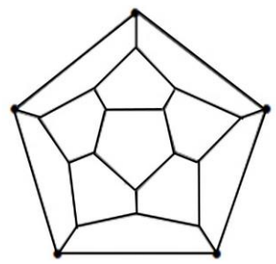
9		Solve the recurrence relation $a_n-5a_{n-1}-6a_{n-2}=0$, $a_0=1$, $a_1=3$ for $n \geq 2$	**L3,L4**	**CO-IV**	**[10M]**

SECTION-V

10	A	Verify the two graphs given below are isomorphic or not.	**L4,L5**	**CO-V**	**[5M]**

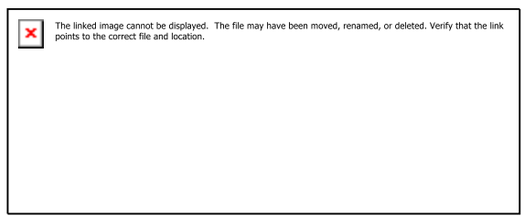


	B	Does the following graph has a Hamiltonian circuit and verify is it Euler graph or not.	**L4,L5**	**CO-V**	**[5M]**

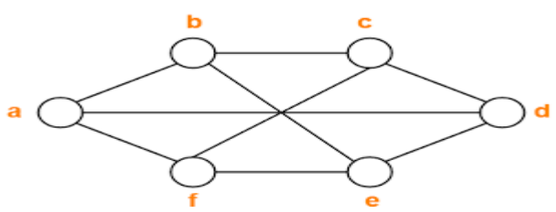


OR

11	A	Find the Chromatic Number of the following graphs. (i)	**L2,L3**	**CO-V**	**[5M]**



(ii)



	B	Given a switch board with 6 ports, determine how many different ways there are to connect the ports such that all devices are connected and there are no loops (i.e., it forms a spanning tree).	**L4,L5**	**CO-V**	**[5M]**

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