Name:

## SAINTGITS COLLEGE OF ENGINEERING (AUTONOMOUS)

(AFFILIATED TO APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY, THIRUVANANTHAPURAM) SIXTH SEMESTER B.TECH DEGREE EXAMINATION (S), AUGUST 2023 COMPUTER SCIENCE AND ENGINEERING
(2020 SCHEME)

## Course Code : 20CST308

Course Name : Comprehensive Course Work
Max. Marks :50
Duration : 75 Minutes

## PART A

(Answer all questions. Each question carries 1 mark)

What does 'stack underflow' refer to?
A. accessing item from an undefined stack
C. removing items from an empty stack
B. A structure used for storage
B. Both Statement I and Statement II are false
D. Statement I is false but Statement II is true
given below.
A. Both Statement I and Statement
II are true
C. Statement I is true but Statement II is false
Who coined the term Sparse Matrix?
B. Chris Messina
D. Carl Hamacher
A. Arthur Cayley
C. Harry Markowitz What is a hash table?
A. A structure that maps values to keys
C. A structure that maps keys to values
D. A structure used to implement stack and queue

If several elements are competing for the same bucket in the hash table, what is it called?
A. Diffusion
B. Collision
C. Replication
D. Duplication

The given array is arr $=\{1,2,4,3\}$. Bubble sort is used to sort the array elements. How many iterations will be done to sort the array?
A. 1
B. 2
C. 3
D. 4

System calls of the operating system provides interface to
A. programs
B. processes
C. services
D. Utilities

A systematic procedure for providing the CPU to new process is known as
A. Context Switching
B. Synchronization
C. Deadlock
D. Semaphore

Logical memory is broken into blocks of the same size called
A. Frames
B. Backing store
C. Pages
D. None of the mentioned

In the ..... algorithm, the disk arm goes as far as the final request in each direction, then reverses direction immediately without going to the end of the disk.
A. LOOK
B. SCAN
C. C-SCAN
D. C-LOOK

A system is in the safe state if
A. The system can allocate
B. There exist a safe sequence resources to each process in some order and still avoid a deadlock
C. All of the mentioned
D. None of the mentioned

In a timeshare operating system, when the time slot assigned to a process is completed, the process switches from the current state to?
A. Ready state
B. Blocked state
C. Suspended state
D. Terminated state

The size of virtual memory depends on the size of the
A. data bus
B. main memory
C. address bus
D. none of the above

The memory devices which are similar to EEPROM but differ in the cost effectiveness is
A. Flash memory
B. Blue-ray devices
C. Memory sticks
D. CMOS

What does VLIW stands for?
A. Very Large Instruction Word
B. Very Long Instruction Word
D. Very Long Instruction Width
C. Very Long Instruction Width

The access time of memory is $\qquad$ .the time required for performing any single

## CPU operation

A. Shorter than
B. Longer than
C. Negligible than
D. Same as

Which of the following interrupts are initiated by an instruction?
A. External
B. Internal
C. Hardware
D. Software
$\qquad$ is the branch logic that provides decision-making capabilities in the control unit:
A. Unconditional transfer
B. Controlled transfer
C. Conditional transfer
D. None of these

Which of the following is a procedure for acquiring the necessary locks for a transaction where all necessary locks are acquired before any are released?
A. Record controller
B. Exclusive lock
C. Authorization rule
D. Two phase lock

BCNF is not used for cases where a relation has
A. Two (or more) candidate keys
B. Two candidate keys and composite
C. The candidate key overlap
D. Two mutually exclusive foreign keys Relations produced from E-R Model will always be in $\qquad$ .
A. 1 NF
B. 2 NF
C. 3 NF
D. 4 NF

If the attribute of relation schema $R$ is member of some candidate key then this type of attributes are classified as
A. atomic attribute
B. candidate attribute
C. nonprime attribute
D. prime attribute

Set of possible data values is called
A. attribute
B. degree
C. tuple
D. domain
A. Key
B. Key revisited
C. Superset key
D. None of the mentioned

The value of n if Turing machine is defined using n -tuples:
A. 5
B. 7
C. 8
D. 9

Finite state machine can recognize
A. any grammar
B. only context-free grammar
C. Both (a) and (b)
D. only regular grammar

One of the following Regular Expressions is not the same as others. Which one?
A. $\left(a^{*}+b^{*} a^{*}\right)^{*}$
B. $\left(a^{*} b^{*}+b^{*} a^{*}\right)^{*}\left(a^{*} b^{*}\right)^{*}$
C. $\left((a b)^{*}+a^{*}\right)^{*}$
D. $(a+b)^{*} a^{*} b^{*} a^{*} b^{*}$

Let the string be defined over symbols a and $b$ then what will be the number of states in minimal DFA, if every string starts and ends with different symbols?
A. 5
B. 4
C. 3
D. 2

What is the transition function of a DFA
A. $\mathrm{Q} \times \sum \rightarrow \mathrm{Q}$
B. $\mathrm{Q} \times \sum \rightarrow 2 \mathrm{Q}$
C. $\mathrm{Q} \times \sum \rightarrow 2 \mathrm{n}$
D. $\mathrm{Q} \times \sum \rightarrow \mathrm{Qn}$

Let w be any string of length n is $\{0,1\}^{*}$. Let L be the set of all substrings of w . What is the minimum number of states in a non-deterministic finite automaton that accepts L?
A. $\mathrm{n}-1$
B. n
C. $\mathrm{n}+1$
D. $2 \mathrm{n}-1$

## PART B

## (Answer all questions. Each question carries 2 marks)

What would be the worst case time complexity of the insertion sort algorithm, if the inputs are restricted to permutation of $1 \ldots . . \mathrm{n}$ with at most n inversion?
A. $\quad \theta(\mathrm{n} 1.5)$
B. $\theta$ (nlogn)
C. $\theta(\mathrm{n})$
D. $\theta\left(\mathrm{n}^{\wedge} 2\right)$

Consider the following graph.


Apply breadth first search traversal of the above graph. Which of the following traversal is possible if start vertex is G? (Assume lexicographic ordering)
A. GAHJIBCEKD
B. GAHJIBCDEK
C. GAHIJBDEKC
D. GAHIJBCEKD

A process refers to 5 pages, A, B, C, D, E in the order: A, B, C, D, A, B, E, A, B, $\mathrm{C}, \mathrm{D}, \mathrm{E}$. If the page replacement algorithm is FIFO, the number of page frames is increased to 4 , then the number of page transfers
A. Increases
B. Remains the same
C. None of the mentioned
D. Decreases

For 3-page frames, the following is the reference string:
70120304230321201701
How many page faults does the LRU page replacement algorithm produce?
A. 12
B. 10
C. 11
D. 14

35 In a 4M-bit chip organisation has a total of 19 external connections, then it has $\ldots$ address if 8 data lines are there.
A. 2
B. 5
C. 9
D. 8 In a six-stage pipeline assuming that there are no branch instructions. If we want to execute 15 instructions. What is the time required to execute these instructions?
A. 16
B. 12
C. 21
D. 20

Which will be best query for deleting row from the table $\qquad$
A. DELETE FROM TABLE _NAME WHERE CUSTOMER-STATE=" ";
C. DELETE TABLE _NAME WHERE CUSTOMER-STATE=" ";
The main task carried out in the $\qquad$
B. DELETE WHERE CUSTOMERSTATE=" ";
D. DELETE FROM CUSTOMER WHERE CUSTOMER-=" "; separate tables.
A. First Normal Form
B. Second Normal Form
C. Third Normal Form
D. Forth Normal Form

Which of the following language cannot be accepted by a regular expression?
A. Language of a set of numbers divisible by 4
B. Language of a set of binary
C. Language of a set of 0 n 1 n
D. Language of a set of string with odd number of 0
If we want to describe the complement of a language, then it is very important to describe the -- of that language over which the language is defined.
A. Regular Expression
B. String
C. Word
D. Alphabet

