WALCHAND COLLEGE OF ENGINEERING
(Government Aided Autonomous Institute)
Visharambag, Sangli – 416415
Third Year B.Tech. Computer Science and Engineering
MSE, ODD SEMESTER, AY 2023-24
Compiler Design (6CS301)

MSE

PRN: _____

Date: Thursday, 21/09/2023

Time : 10.30 am to 12.00 noon

Max Marks: **30**

Marks

Define Single Pass and Two-pass/Multi-pass compiler. List down the various functions of Lexical Analyzer.	4	CO1
In what situation error occurs in Lexical Analysis? How Lexical Analyzer tackle these errors.	4	CO2
Draw a transition diagram for all relational operators	2	CO2

What is left recursion? Eliminate the left recursion from the following Grammar — CO3

$$E \rightarrow E + T|T$$
$$T \rightarrow T * F|F$$
$$F \rightarrow (E)|id$$

5

What is Operator Precedence grammar? Demonstrate with suitable example the procedure of finding handle in Operator Precedence parsing — 5 — CO2

Choose the correct statement/statements from the following options and comment on the same to justify your choice. — CO3

i) **LR (1)-Grammars $\subset$ LL(1)-Grammars**

ii) **LL(1)-Grammars $\subset$ LR(1)-Grammars**

iii) **LR (1)-Grammars $\subseteq$ LL(1)-Grammars**

iv) **LL(1)-Grammars $\subseteq$ LR(1)-Grammars**

3

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Q3 A) Explain with suitable example Inherited and synthesized attributes in a typical Syntax-Directed Definition.

5

B) Draw a DAG for following set of operations.

T1 = a + b

T2 = T1 + c

T3 = T1 x T2

2

· · · · · End of question paper · · · · ·

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Third Year B.Tech. Computer Science and Engineering

MSE, ODD SEMESTER, AY 2023-24

Design and Analysis of Algorithm (6CS302)

| MSE |

PRN: _____

& Date: Friday, 22/09/2023   Time : 10.30 am to 12.00 noon

Max Marks: | 30 |

IMP: Verify that you have received question papers with correct course code, branch etc.

Instructions
a) All questions are compulsory.
b) Writing question number on answer book is compulsory otherwise answers may not be assessed.
c) Assume suitable data wherever necessary.
d) Figures to the right of question text indicate full marks.
e) Mobile phones, smart gadgets and programmable calculators are strictly prohibited.
f) Except PRN anything else writing on question paper is not allowed.
g) Exchange/Sharing of stationery, calculator etc. not allowed.

on the right of marks indicates course outcomes (Only for faculty use)   Marks

A)	What is an algorithm? Name two types of algorithmic complexities based on computer resources and also list out the strategies.	06	CO1
B)	Solve the following recurrence relation, $T(n) = T(n-1) + 1$ with $T(0) = 0$ as initial condition.	04	CO3
A)	Explain the general principle of divide & conquer method and list its applications.	02	CO2
B)	State and derive the time complexity of binary search for successful and unsuccessful search.	04	CO2
C)	Show the steps in multiplying 957 and 9873 integers using integer multiplication.	04	CO3
A)	Explain the general principle of Greedy method and list its applications.	02	CO2
B)	Solve the given fractional knapsack problem with capacity M=20, profit p = (25,24,15) & weight w= (18,15,10).	04	CO3
C)	Use an algorithm for greedy strategies for the Job sequencing with deadline problem to find an optimal solution, where i = 5 and Deadline Di = {2,1,2,1,3} and profit Pi = {100,50,10,20,30}.	04	CO3

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Third Year B.Tech. Computer Science and Engineering
MSE, ODD SEMESTER, AY 2023-24
Artificial Intelligence (6CS303)

| MSE |

PRN: _____

& Date: Saturday, 23/09/2023   Time: 10.30 am to 12.00 noon

Max Marks: | **30** |

**IMP: Verify that you have received question papers with correct course code, branch etc.**

Instructions
a) All questions are compulsory.
b) Writing question number on answer book is compulsory otherwise answers may not be assessed.
c) Assume suitable data wherever necessary.
d) Figures to the right of question text indicate full marks.
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A) Explain ANY ONE of the following in brief.   CO1
   a. Conceptual components in learning agent with suitable diagram   3
   b. Non-deterministic environment with suitable example

B) Describe PAGE for the following AI agent. Give justification for each design   CO3
choice.
Satellite image analysis system: The agent is supposed to analyze the images   4
taken by the satellite and identify/classify the objects.

A) Evaluate Depth first search based on following criteria by giving justification: CO4
   1. Time complexity
   2. Space complexity
   3. Completeness   5
Based on completeness criteria, justify which among the strategies is better –
Depth limited search and Iterative deepening search.

B) Apply A* algorithm on following graph. Start state is S and goal state is G. Heuristic values for each state are written near node.
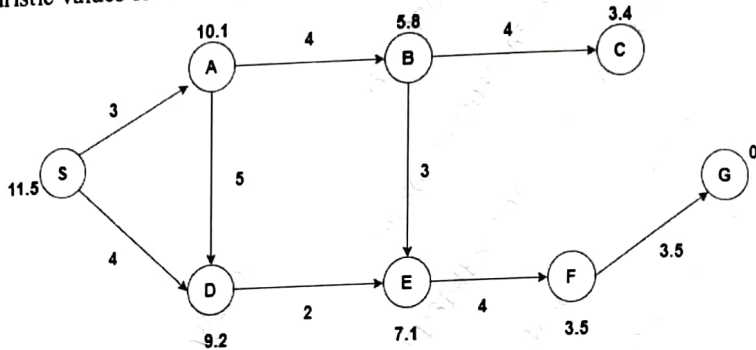
C) Explain basic steps of execution for ANY ONE of the following:
   a) Hill climbing search
   b) Simulated annealing search

Q3 A) Translate ANY FIVE of the following English statements into FOL.
   a. There is a barber who shaves all men in the town who do not shave themselves.
   b. Nobody is loved by no one.
   c. If someone is noisy, everybody is annoyed.
   d. Every person who buys a policy is smart.
   e. There is a mechanic who is liked by every nurse.
   f. Every connected and circuit-free graph is a tree.

C) Consider following set of axioms and corresponding FOL representation. Prove by resolution 'If John does not study, then Mary does not love John.'
   1. Anyone whom Mary loves is a football star.
   $\forall x: loves(Mary, x) \rightarrow football\text{-}star(x)$

   2. Any student who does not pass does not play.
   $\forall x: student(x) \land \neg pass(x) \rightarrow \neg play(x)$

   3. John is a student.
   $student(John)$

   4. Any student who does not study does not pass.
   $\forall x: student(x) \land \neg study(x) \rightarrow \neg pass(x)$

   5. Anyone who does not play is not a football star.
   $\forall x: \neg play(x) \rightarrow \neg football\text{-}star(x)$

· · · · · *End of question paper* · · · · ·

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Third Year B.Tech. Computer Science and Engineering

MSE, ODD SEMESTER, AY 2023-24

Internet of Things (6CS312)

MSE

PRN: _____

& Date: Monday, 25/09/2023   Time: 10.30 am to 12.00 noon

Max Marks: | 30 |
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Instructions
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			Marks	
A)	Elaborate logical design of IoT.		5	CO1
B)	Explain any three IoT enabling technologies.		5	CO1
CO2 **A)**	Illustrate MQTT protocol with neat labelled diagram.		5	CO2
B)	Describe various challenges & characteristics of IoT.		4	CO1
A)	Explain HADOOP architecture with components (HDFS, NameNode, DataNode, Structure, MapReduce).		6	CO2
B)	Illustrate the working of CoAP protocol.		5	CO2

· · · · · *End of question paper* · · · · ·

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Third Year B.Tech. Computer Science and Engineering
MSE, ODD SEMESTER, AY 2023-24
Image Processing (6CS311)

MSE

PRN: _____

& Date: Monday, 25/09/2023   Time : 10.30 am to 12.00 noon

Max Marks: **30**

t on the right of marks indicates course outcomes (Only for faculty use)   Marks

		Marks	CO
A)	Enlist various fundamental steps in Digital Image Processing with neat block diagram.	8	CO1
B)	Categories Images according to their source.	2	CO1
A)	Is Image Transform is important in image processing explain with example.	4	CO2
B)	Perform KL transform for the following matrix,	6	CO2

$$X = \begin{bmatrix} 4 & -2 \\ -1 & 3 \end{bmatrix}$$

		Marks	CO
A)	Perform histogram equalization of the image,	4	CO3

$$\begin{bmatrix} 4 & 4 & 4 & 4 & 4 \\ 3 & 4 & 5 & 4 & 3 \\ 3 & 5 & 5 & 5 & 3 \\ 3 & 4 & 5 & 4 & 3 \\ 4 & 4 & 4 & 4 & 4 \end{bmatrix}$$

		Marks	CO
B)	Write Limitations of Averaging Filter.	2	CO1
C)	Illustrate Bit plane Slicing with example.	4	CO1

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