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Reg. No. : .....

Name : .....

Third Semester M.Sc. Degree Examination, January 2023

Computer Science

CS 531 : AUTOMATA THEORY AND COMPILER DESIGN

(2021 Admission)

Time : 3 Hours Max. Marks : 75

PART – A

Answer **all** questions. **Each** question carries **3** marks.

1. Define NFA. Design a NFA to accept the strings with 0's and 1's such that string contains either two consecutive 0's or two consecutive 1's.

2. Compare NFA with DFA.

3. What is parse tree? What are the different ways we can represent a parse tree?

4. What are the properties of Context Free Language?

5. What is turing machine? How can we represent it?

6. Design a turing machine to find out 2's complement of given binary number.

7. Write short note on shift reduce parsing.

8. What is mean by quadruples? How can we construct the quadruples for the three address code?

9. What is mean by dead code elimination? Give example.

(9 × 3 = 27 Marks)

P.T.O.

PART – B

Answer **any one** questions from each module. **Each** question carries **8** marks.

Module – I

10. Design a DFA which accepts set of all strings containing odd number of 0's and odd number of 1's.

11. Explain steps with suitable example to convert the NEA to DFA.

Module – II

12. (a) What is mean by ambiguous grammar? **2**

    (b) Which of the following grammars are ambiguous? Explain.

    (i) $S \rightarrow S + S S^* S \; a \mid b$ **3**

    (ii) $S \rightarrow aAS \mid a$ **3**

    $A \rightarrow SbA \mid ba$

13. (a) Write a CFG to derive even and odd palindromes. **4**

    (b) Design PDA for the language $L = \{0^n 1^n / n \geq 1\}$ **4**

Module – III

14. Explain the types of turing machine

15. (a) Design a turing machine that replaces all occurrences of '111' by '101' from sequence of 0's and 1's. **4**

    (b) Construct a turing machine to accept the languages $\{0^n 1^n / where\ n > 0\}$. **4**

Module – IV

16. Construct the top-down parse tree and transition diagrams of the nonterminals E and $E`$ for the following grammar.

$E \rightarrow TE`$

$E \rightarrow TE` \mid \varepsilon$

$T \rightarrow FT`$

$T` \rightarrow *FT` \mid \varepsilon$

$F \rightarrow (E) \mid id$

17 Explain the phases of compiler with neat diagram.

Module – V

18 Explain dependency graphs with suitable example.

19 What is mean by type checking? Explain the rules for type checking.

Module – VI

20. Explain the characteristic of peephole optimization with examples.

21 Explain the usage of flow graph with neat diagram.

($6 \times 8 = 48$ Marks)

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Reg. No. : .....

Name : .....

Third Semester M.Sc. Degree Examination, January 2023

Computer Science

CS 533 : ARTIFICIAL INTELLIGENCE

(2021 Admission)

Time : 3 Hours Max. Marks : 75

SECTION – A

Answer **all** questions. Each question carries **3** marks.

1. Write short note on Knowledge base
2. Give details about First order logic.
3. How the case based reasoning is used?
4. What is Bayesian network?
5. Give details about machine learning applications.
6. How to use input/output functions in machine learning?
7. How do you train, test and validate the datasets?
8. What is mean- by unsupervised learning? Give example.
9. Write short note on Kernel functions

(9 × 3 = 27 Marks)

P.T.O.

SECTION – B

Answer any **one** question from each module. Each question carries **8** marks.

Module – I

10. Explain Conceptual dependency.

11. Explain the knowledge representation structure with neat diagram.

Module – II

12. Explain the following
    (a) Non-monotonic reasoning (4)
    (b) Reasoning with Fuzzy logic (4)

13. Explain the following
    (a) Model based reasoning systems (4)
    (b) Probabilistic inference (4)

Module – III

14. Explain different types of learning

15. Explain different aspects of machine learning.

Module – IV

16. Explain the ROC formulation with suitable example.

17. Explain any classification problem with an example.

Module – V

18. Explain K-means clustering with example.

19. Explain Hierarchical Agglomerative clustering with example.

Module – VI

20. Explain random forest algorithm.

21. (a) List out the difference between linear SVM and non-linear SVM. (4)

    (b) List out the applications of SVM. (4)

(6 × 8 = 48 Marks)

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Reg. No. : .....

Name : .....

Third Semester M.Sc. Degree Examination, January 2023

Computer Science

CS 532 : BIGDATA ANALYTICS

(2021 Admission)

Time : 3 Hours Max. Marks : 75

PART – A

Answer **all** questions. **Each** question carries **3** marks.

1 Give some examples of big data.

2 What is stream data model in big data?

3. List few examples of data streams.

4 Write short notes on Hadoop ecosystem.

5. State the major components of resource manager.

6 Write short notes on the input formats of MapReduce.

7. What is meant by predictive analytics?

8 What is multiple regression analysis used for?

9. How is hive used in data analysis?

(9 × 3 = 27 Marks)

P.T.O.

PART – B

Answer **any one** question from each module. **Each** question carries **8** marks.

Module – I

10 State the challenges of big data

11 Explain about classification of analytics.

Module – II

12. State the characteristics of stream data.

13. Write down the key issues in big data stream analysis?

Module – III

14. How does the Hadoop tackles the conditions of distributed system? Explain.

15. Explain the stages of a MapReduce framework in detail.

Module – IV

16 Explain in detail the anatomy of a MapReduce job run.

17 Briefly explain capacity scheduler in Hadoop. Give its advantages and disadvantages.

Module – V

18 Briefly explain simple linear regression with example.

19. Describe about big data pipelines for real time computing in detail.

Module – VI

20. List Hive DDL commands with example.

21. Give the classification of data types of Hive with examples.

(6 × 8 = 48 Marks)

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Reg. No. : .....

Name : .....

Third Semester M.Sc. Degree Examination, January 2023

Computer Science

CS 534 A : SOFT COMPUTING TECHNIQUES

(2021 Admission)

Time : Three Hours Max. Marks : 75

PART – A

Answer **all** questions. **Each** question carries **3** marks.

1. Write down the advantages of soft computing techniques?
2. State the importance of fuzzy sets.
3. What are the types of composition? Explain.
4. State the characteristics of artificial neural network.
5. Define bias and threshold.
6. What are the components of an optimization problem?
7. State the limitations of genetic algorithm.
8. Define multiobjective optimization problem.
9. What are the drawbacks of multiobjective based evolutionary algorithm?

(9 × 3 = 27 Marks)

P.T.O.

PART – B

Answer **any one** questions from each module. **Each** question carries **8** marks.

Module – I

10. State the applications of soft computing.

11. Write the pros and cons of soft computing.

Module – II

12. State the properties of classical sets.

13. Write short notes on fuzzy equivalence relation.

Module – III

14. Illustrate the architecture of multilayer feed forward network with a neat diagram.

15. Explain about supervised and unsupervised learning.

Module – IV

16. State the principles of swarm intelligence.

17. List the advantages of meta heuristics techniques in optimization problems.

Module – V

18. State the applications of genetic algorithm.

19. Explain the working methodology of genetic programming.

Module – VI

20. Give the applications of multi objective evolutionary algorithms?

21. Describe the posteriori approaches of multi objective evolutionary algorithm techniques.

(6 × 8 = 48 Marks)
