

B.Tech. DEGREE EXAMINATION, MAY 2023

Sixth & Seventh Semester

18CSC303J – DATABASE MANAGEMENT SYSTEMS

(For the candidates admitted during the academic year 2018-2019 to 2021-2022)

Note:

- (i) Part - A should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.

(ii) Part - B & Part - C should be answered in answer booklet.

Time: 3 hours

Max. Marks: 100

PART - A ($20 \times 1 = 20$ Marks)

Marks BL CO PO

Answer ALL Questions

- Answer ALL Questions

1.	An unsophisticated user who interact with the system by invoking one of the application programs that have been written previously.	1	1	1
(A)	Application programmers	(B)	Naive user	
(C)	Specialized users	(D)	Maintenance user	
2.	Which manages the allocation of space on disk storage and the data structures used to represent information stored on disk.	1	2	1
(A)	File manager	(B)	Buffer manager	
(C)	Transaction manager	(D)	Integrity manager	
3.	The lowest level of abstraction describes how the data are actually stored.	1	2	2
(A)	Logical level	(B)	View level	
(C)	Data independence	(D)	Physical level	
4.	SQL provides a rich language that allows one to define tables, integrity constraints, assertions	1	1	2
(A)	Application programs	(B)	Design language	
(C)	Data manipulation language	(D)	Data definition language	
5.	An entity set that does not have sufficient attributes to form a primary key.	1	2	3
(A)	Strong entity set	(B)	Weak entity set	
(C)	Cardinality set	(D)	Relationship set	
6.	Which of the following is a derived attribute?	1	2	3
(A)	Street name	(B)	Phone number	
(C)	City	(D)	Age	
7.	An important property of the higher and lower level entities created by specialization and generalization.	1	2	3
(A)	Cardinality	(B)	Transform	
(C)	Schema	(D)	Attribute inheritance	
8.	For each attribute of a relation, there is a set of permitted values called the _____ of that attribute.	1	1	3
(A)	Domain	(B)	Tuple	
(C)	Instance	(D)	Schema	

9. Which of the following best describes the process of parsing in query processing? 1 1 4 1

- (A) Checking the syntax of the SQL query
(B) Translating the SQL query into an internal representation
(C) Executing the SQL query
(D) Optimizing the SQL query

10. Identify the statement that best describes a view in a database. 1 1 4 2

- (A) A view is a type of index
(B) A view is a stored procedure
(C) A view is a virtual table that is based on the result of a select statement
(D) A view is a type of table that contains data

11. Transaction control language commands such as _____ are used to manage transactions in a database. 1 2 4 1

- (A) COMMIT, ROLLBACK and SAVE POINT
(B) EXIT and CLOSE
(C) LOCK and TIME
(D) GRANT and REVOKE

12. A _____ constraint is a constraint that ensures that a column or set of columns satisfies a specified condition. 1 2 4 2

- (A) Participation
(B) Referential
(C) Count
(D) Check

13. A relation is said to be in 2NF if it is 1NF and if all of its non-key attributes are _____ dependent on the entire primary key. 1 2 5 1

- (A) Fully functionally
(B) Closure
(C) Decomposition
(D) Join

14. Which of the following operators in relational algebra is used to combine two relations and return a relation that contain all the rows from both the relations, with duplicates removed? 1 2 5 2

- (A) Union
(B) Intersection
(C) Difference
(D) Prolog

15. The _____ refers to the set of all functional dependencies that can be inferred from the given set of dependencies. 1 2 5 1

- (A) Isolation
(B) Redundancy
(C) Inverse
(D) Closure

16. Which of the following is a primary goal of normalization in database design? 1 2 5 2

- (A) To reduce data redundancy
(B) To improve data access speed
(C) To increase the number of relations
(D) To reduces the number of attributes

17. This property ensures that a transaction once committed will persist even in the event of a system failure. 1 1 6 1

- (A) Atomicity
(B) Consistency
(C) Isolation
(D) Durability

18. Which of the following is used in database to prevent data inconsistency caused by concurrent access to the same data? 1 2 6 2

- (A) Locking
(B) Blocking
(C) Indexing
(D) Clustering

19. _____ is a property of schedule in database that ensures that the schedule is equivalent to same serial execution of transactions in the schedule. 1 1 6 2

- (A) Ordering
(B) Conflict
(C) Serializability
(D) Deadlock

20. In two phase locking protocol a transaction can release locks but it cannot acquire any new locks in this phase. 1 1 6 2

- (A) Shrinking
(B) Growing
(C) Time stamp
(D) Serial

Marks BL CO PO

PART – B (5 x 4 = 20 Marks)

Answer ANY FIVE Questions

21. List three responsibilities of a database management system. For each responsibility, explain the problems that would arise if the responsibility were not discharged. 4 2 1 1

22. Explain the distinctions among the terms primary key, candidate key and super key. 4 2 3 2

23. Provide an example to illustrate the relationship between a weak entity and its owner entity. 4 3 2 3

24. Examine why it is important to include a logical level in the database architecture and what role this level plays in data abstraction. 4 3 1 2

25. Define check constraints and provide an example of how they can be used to enforced data integrity. 4 4 4 3

26. Define first normal form in DBMS with an example. 4 2 5 2

27. Discuss the properties of a transaction in a DBMS. 4 4 6 3

Marks BL CO PO

PART – C (5 x 12 = 60 Marks)

Answer ALL Questions

28. a. Since many database system users are not computer trained, developers hide the complexity from users through several levels of abstraction to simplify users interaction with the system. Illustrate the various levels of abstraction with an analogy, to the concept of data types in programming languages. 12 3 1 2

(OR)

b. Keeping organizational information in a file processing system has a number of major disadvantages. Explain them in detail to understand the purpose of database systems. 12 3 1 2

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29. a. The basic ER concepts can model most database features. Some aspects of a database may be more aptly expressed by certain extensions to the basic ER model. Discuss the extended ER features of specialization and generalization with examples. 12 4 3 2

(OR)

- b. A university has multiple departments, each of which offers several courses. Each course is taught by a professor who may teach multiple courses. Based on this scenario, construct an ER model for the university and explain its various entities and relationships. Also show the mapping cardinalities. 12 4 3 2

30. a. Show how developers can write their own functions and procedures, store them in the database and then invoke them from SQL statements. Demonstrate with syntax and examples. 12 3 4 3

(OR)

- b. Demonstrate the steps involved in processing a query with examples. 12 3 4 3

31. a. Define tuple relational calculus and state the formal syntax of the expression form with examples. 12 4 5 2

(OR)

- b. Discuss the concepts of functional dependency that are required for a database to be in third normal form. Illustrate them with proper examples. 12 4 5 2

32. a. Explain the two phase locking protocol and define how does it provide solutions to concurrency related problems. 12 2 6 3

(OR)

- b. Discuss the basic concepts of serializability in transactions and suggest methods for testing a given schedule. 12 2 6 3

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Reg. No.

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B.Tech. DEGREE EXAMINATION, MAY 2023
Sixth Semester

18CSC304J – COMPLIER DESIGN

18CSC304J – COMPLIER DESIGN
(For the candidates admitted during the academic year 2018-2019 to 2021-2022)

Note:

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Time: 3 hours

Max. Marks: 100

PART - A ($20 \times 1 = 20$ Marks)

Marks BL CO PO

Answer ALL Questions

9. A bottom-up parser generates _____.
 (A) Right most derivation (B) Right most derivation in reverse
 (C) Left most derivation (D) Left most derivation in reverse
10. What is the similarity between LR, LALR and SLR?
 (A) Use same algorithm, but different parsing table
 (B) Same parsing table, but different algorithm
 (C) Their parsing tables and algorithm are similar but uses top-down approach
 (D) Both parsing tables and algorithm are different
11. Which is not a shift reduce parser action?
 (A) Shift (B) Goto
 (C) Reduce (D) Accept
12. LR parser construct a _____ type of derivation.
 (A) MMD (B) RMD
 (C) LMD (D) CLR
13. _____ is a tool that depicts the structure of basic blocks, helps to see the flow of values flowing among basic blocks.
 (A) DAG (B) CAG
 (C) SAG (D) PAG
14. In algebraic expression simplification, $a = a + 1$ can simply be replaced by _____.
 (A) a (B) INC a
 (C) DEC a (D) MUL a
15. Which of the following is not a form of intermediate representation?
 (A) Abstract syntax tree (B) 3-address code
 (C) Directed cyclic graph (D) Reverse polish notation
16. Code generator uses _____ function to determine the status of available registers and the location of name values.
 (A) setReg (B) cinReg
 (C) pfReg (D) getReg
17. Which optimization technique is used to reduce the multiple jumps?
 (A) Latter optimization technique (B) Peephole optimization technique
 (C) Local optimization technique (D) Code optimization technique
18. The graph that shows basic blocks and their successor relationship is called
 (A) Dag (B) Flow graph
 (C) Control graph (D) Hamiltonian graph
19. Which is not part of runtime memory subdivisions?
 (A) Stack (B) Heap
 (C) Static data (D) Access link

- 1 1 3 1
20. Which of the following symbol table implementation makes efficient use of memory?
 (A) List (B) Search tree
 (C) Hash table (D) Self-organizing list

- Marks BL CO PO
- PART – B (5 x 4 = 20 Marks)**
Answer ANY FIVE Questions
21. Discuss in detail on compiler construction tools.
22. Construct a deterministic finite automata that accepts numbers that are divisible by five.
23. i. Build a grammar without left recursion for the following
 $A \rightarrow ABd \mid Aa \mid a$
 $B \rightarrow Be \mid b$
- ii. Build the grammar by doing left factoring for the following grammar
 $A \rightarrow aAB \mid aA \mid a$
 $B \rightarrow bB \mid b$
24. Explain the parsing techniques with a hierarchical diagram.
25. Discuss the rules involved in constructing the SLR parsing table.
26. Build the syntax tree and DAG for the following expression
 $(a * b) + (c - d)^*(a^*b)$
27. Discuss in detail on stack storage allocation.
- Marks BL CO
- PART – C (5 x 12 = 60 Marks)**
Answer ALL Questions
28. a. Discuss in detail on phases of compiler and write down the output of each phase for the expression $a := b + c * 50$.
- (OR)
- b. Construct DFA for the regular expression $ba(a+b)^*ab$ using first pos, last pos and follow pos.
29. a. Construct predictive parsing table for the grammar,
 $E \rightarrow E + T \mid T$
 $T \rightarrow T * F \mid F$
 $F \rightarrow (E) \mid id$
- And parse the input $id + id * id$
- (OR)

- b. Rahul is applying for his dream job in Indian army. His father has brought an advertisement about the eligibility criteria. Rahul can apply in any of the two categories. The first category says height should be greater than 174 cm. The second category says mandatory height should be greater than 174 cm and optional educational qualification. The educational qualification can be Tenth (T) or Higher Secondary (HS) or Under Graduate (UG) or Post Graduate (PG). Design CFG and eliminate left recursion and common prefixes wherever applicable.
 [Grammar construction: 6 Marks
 Left recursion : 2 Marks
 Left Factoring: 4 Marks]

12 3 2 3

30. a. Consider the following grammar

$$S \rightarrow AS \mid b$$

$$A \rightarrow SA \mid a$$

Construct the SLR parse table for the grammar. Show the actions of the parser for the input string *abab*.

(OR)

- b. Construct a canonical parsing table for the grammar given below

12 3 3 3

$$E \rightarrow E + T$$

$$F \rightarrow (E)$$

$$E \rightarrow T$$

$$F \rightarrow id$$

$$T \rightarrow T * F$$

$$T \rightarrow F$$

And parse any string derived from the grammar.

31. a. Generate the three address code statement and construct the DAG representation for the expression $I = a + a^*(b + c) - (b + c)^*d$.

12 3 4 3

(OR)

- b. Discuss in detail on three address code representation with appropriate examples.

12 2 4 2

32. a. Explain in detail about displays. Also explain how variable length data is handled by compilers.

12 2 5 2

(OR)

- b. Discuss in detail about storage allocation strategies with a block diagram.

12 2 5 2

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B.Tech. DEGREE EXAMINATION, MAY 2023

Fifth and Sixth Semester

18ECO107T – FIBER OPTICS AND OPTOELECTRONICS

(For the candidates admitted from the academic year 2018-2019 to 2021-2022)

Note:

- (i) Part - A should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.
(ii) Part - B & Part - C should be answered in answer booklet.

Time: 3 hours



Max. Marks: 100

PART – A (20 × 1 = 20 Marks)

Answer ALL Questions

- | | Marks | BL | CO | PO |
|--|---------------------------------------|----|----|-----|
| 1. The expression for the refractive index 'n' is given by _____ | 1 | 1 | 1 | 1.2 |
| (A) $n = \frac{v}{c}$ | (B) $n = \frac{c}{v}$ | | | |
| (C) $n = cv$ | (D) $n = \frac{1}{cv}$ | | | |
| 2. The numerical aperature of a coaxial cable with core and cladding indices given by 2.33 and 1.4 respectively is _____ | 1 | 2 | 1 | 1.2 |
| (A) 3.73 | (B) 0.83 | | | |
| (C) 3.46 | (D) 1.86 | | | |
| 3. Identify the device that distributes light from a main fiber to one or more branch fibers. | 1 | 2 | 1 | 1.2 |
| (A) Optical Coupler | (B) Optical Slice | | | |
| (C) Optical Connector | (D) Optical Isolator | | | |
| 4. Numerical aperature in optical fiber is used to describe _____ | 1 | 1 | 2 | 1.2 |
| (A) Light Spreading Ability | (B) Light Gathering Ability | | | |
| (C) Light Leakage Ability | (D) Light output from External Shield | | | |
| 5. In single mode fibers, the dominant dispersion mechanism is _____ | 1 | 1 | 2 | 1.3 |
| (A) Inter modal Dispersion | (B) Intra modal Dispersion | | | |
| (C) Modal Delay | (D) Frequency Distribution | | | |
| 6. Inter modal dispersion occurring in a large amount in multi-mode step index fiber results in _____ | 1 | 1 | 2 | 1.3 |
| (A) Propagation of the Fiber | (B) Attenuation of Waves | | | |
| (C) Pulse Broadening at Output | (D) Compression through Fiber | | | |
| 7. _____ dispersion arises due to the variations of the refractive index of the core material as a function of wave length | 1 | 1 | 2 | 1.3 |
| (A) Material | (B) Waveguide | | | |
| (C) Polarization | (D) Scattering | | | |

18. The sensitivity of a PIN HBT photo receiver is proportional to _____
(B is Bit Error Rate)
(A) B (B) B^2
(C) B^3 (D) B^4

19. The Mach Zehnder interferometer is a modulator switching device based on
(A) Acusto Optic Effect (B) Magneto Optic Effect
(C) Electro Optic Effect (D) Incandescence

20. Monolithic Integration can be achieved in _____ configuration
(A) Vertical or Horizontal (B) Vertical and Horizontal
(C) Circular or Planar (D) Circular and Planar

PART - B ($5 \times 4 = 20$ Marks)

Answer ANY FIVE Questions

- | | | | | | |
|-------------------------------------|--|-------|----|----|-----------|
| 21. | A step index fiber has an acceptance angle of 20° in air and a relative refractive index difference of 3%. Estimate the Numerical Aperature (NA) and the critical angle at the Core Cladding Interface. | 4 | 3 | 1 | 1.2 |
| 22. | For silica the fictive temperature T_f is 1400K, the isothermal compensability B_i is $6.8 \times 10^{-12} \text{ cm}^2/\text{dyn} = 6.8 \times 10^{-11} \text{ m}^2/\text{N}$ and the photo elastic coefficient loss at a $1.3\mu\text{m}$ wavelength where $x = 1.450$. | 4 | 3 | 2 | 1.3 |
| 23. | State the phenomenon of Cathodo luminescence. Mention the applications of Cathodo luminescence. | 4 | 2 | 3 | 1.2
.3 |
| 24. | Elaborate on the types of Optical Amplifiers. | 4 | 4 | 4 | 1.2 |
| 25. | Comment on the reasons on why it is difficult to integrate Lasers with associated Electrons | 4 | 2 | 6 | 1.2 |
| 26. | Using Snell's Law define the relationship at interface between two different media. | 4 | 2 | 1 | 1.2 |
| 7. i. | Describe on the Principle of Photo detection. | 2 | 2 | 3 | 1.2
.3 |
| ii. | Differentiate between PIN and Avalanche Photodiode. | 2 | 2 | 3 | 1.2
.3 |
| PART – C (5 x 12 = 60 Marks) | | | | | |
| Answer ALL Questions | | | | | |
| a. i. | Derive the expression for acceptangle angle and Numerical aperature. | Marks | BL | CO | PO |
| | | 10 | 3 | 1 | 1. |
| ii. | Differentiate between step index and graded index fibers. | 2 | 2 | 1 | 1.2 |
| (OR) | | | | | |
| b. i. | With the aid of neat diagram, elaborate on the Fiber Optical Communication system. | 10 | 2 | 1 | 1.2 |
| ii. | When a ray of light moves from medium 1 to medium 2 with different refractive indices, explain the condition for total internal reflection. | 2 | 2 | 1 | 1.2 |

PART – C ($5 \times 12 = 60$ Marks)

Answer ALL Question

28. a. i. Derive the expression for acceptance angle and Numerical aperture. 10 3 1 1.0

ii. Differentiate between step index and graded index fibers. 2 2 1 1.0
(OR)

b. i. With the aid of neat diagram, elaborate on the Fiber Optical Communication system. 10 2 1 1.0

ii. When a ray of light moves from medium 1 to medium 2 with different refractive indices, explain the condition for total internal reflection. 2 2 1 1.0

29. a. i.	Explain in detail about material dispersion with relevant mathematical expressions.	2	2	1,3
ii.	Differentiate between intrinsic and extrinsic absorption losses.	2	2	1,3
	(OR)			
b. i.	With neat diagrams, explain about Macro bending and Micro bending losses.	2	2	1,3
ii.	What is group velocity? What is its impact on dispersion?	2	2	1,3
30. a. i.	With neat sketches, Explain the Construction and Operation of Avalanche Photodiode	10	2	3 1,2 3
ii.	Differentiate between Luminescence and incandescence	2	2	1,2 3
	(OR)			
b. i.	Derive the expression for quantum efficiency and Optical Power of Light Emitting Diode (LED).	10	3	3 1,2 3
ii.	Define: Responsivity.	2	1	1,2 3
31. a.	Explain in detail with neat diagrams, the construction and working of Longitudinal Electro Optic Modulator.	12	2	4 1,3
	(OR)			
b.	With neat diagrams, explain in detail about Acousto Optic Modulator.	12	2	4 1,3
32. a.	Explain with neat diagram, the operation of Mach Zehnder Interferometer.	12	2	5 1,2
b.	Describe the fabrication process of an Optoelectronic Transmitter Circuit.	12	2	5 1,3

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Reg. No. RA2011026020065

B.Tech. DEGREE EXAMINATION, MAY 2023
Sixth Semester

18CSC305J – ARTIFICIAL INTELLIGENCE

(For the candidates admitted during the academic year 2018-2019 to 2021-2022)

Note:

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Time: 3 hours

Max. Marks: 100

PART – A (20 × 1 = 20 Marks)

Marks BL CO PO

Answer ALL Questions

1. Which tool is used for describing the judgment or common sense part of problem solving? 1 1 1 1
 - (A) Heuristic
 - (B) Critical
 - (C) Value based
 - (D) Analytical

2. Artificial intelligence is defined as _____. 1 1 1 1
 - (A) Making machine intelligent
 - (B) Putting more memory to computer
 - (C) Programming with your intelligence
 - (D) Transferring your intelligence into computers

3. A problem solving approach works well for _____. 1 1 1 2
 - (A) 8-puzzle problem
 - (B) 8-queen problem
 - (C) Finding a optimal path from a given source to a destination
 - (D) Robot navigation

4. Turing test is used to check _____. 1 2 1 1
 - (A) The intelligent of humans
 - (B) Intelligent of machines
 - (C) Both intelligent of humans and machines
 - (D) It can't check intelligence but check the speed

5. A problem is a search space defined by one of these _____. 1 1 2 1
 - (A) Initial state
 - (B) Last state
 - (C) Intermediate state
 - (D) Final state

6. Which of the following uses a priority queue? 1 2 2 2
 - (A) Uniformed search
 - (B) Depth first search
 - (C) Best first search
 - (D) Iterative deepening

7. Heuristic is used in _____. 1 2 2 1
 - (A) Informed search
 - (B) Uninformed search
 - (C) Brute force
 - (D) Blind search

8. The time complexity for breadth first search is _____. 1 2 2 2
 - (A) O (b^d)
 - (B) O (bd)
 - (C) O (d)
 - (D) O (n)

9. Contradiction in propositional logic represents the truth value of compound sentence?
 (A) Always true (B) Always false
 (C) Some are true, some are false (D) Can't be inferred
10. A production rule consist of _____.
 (A) Set of rules (B) Sequence of steps
 (C) Set of rules and sequence of steps (D) Arbitrary representation to problem
11. What will happen if two literals are identical?
 (A) Remains the same (B) Added as three
 (C) Reduced to one (D) One variable less
12. Which is not a property of representation of knowledge?
 (A) Representation verification (B) Representation adequacy
 (C) Inferential adequacy (D) Inferential efficiency
13. What are the major aspects which combines AI planning problem?
 (A) Search dLogic (B) Logic dKnowledge based system
 (C) FOL dLogic (D) Knowledge based system
14. Unsupervised learning is one in which _____.
 (A) Input output pairs given (B) Learning is done automatically
 (C) Learning is done in semi supervised manner (D) Only inputs are given
15. One of the main challenges of NLP is _____.
 (A) Handling ambiguity of sentences (B) Handling tokenization
 (C) Handling POS-tagging (D) Linguistics
16. How many types of quantifiers are available in AI?
 (A) 6 (B) 2
 (C) 3 (D) 4
17. Pruning is used for _____.
 (A) Traverse the tree from left to right (B) Top down search
 (C) Reduce the search space (D) Bottom up search
18. The main component of the expert systems are _____.
 (A) Inference engine (B) Knowledge base
 (C) Inference engine and knowledge base (D) Meta data
19. General games involve _____.
 (A) Single agent (B) Multi agent
 (C) Neither single-agent nor multi-agent (D) Only single-agent and multi-agent

- 1 1 3 1
- 1 1 3 1
- 1 1 3 1
- 1 1 3 1
- 1 1 4 1
- 1 2 4 12
- 1 2 4 1
- 1 1 4 1
- 1 1 5 12
- 1 1 5 12
- 1 1 5 12
- 1 1 5 12

20. In fuzzy expert system conversion to crisp value is done by
 (A) Inference mechanism (B) Composition
 (C) Fuzzification (D) Defuzzification

1 1 5 12

PART – B (5 × 4 = 20 Marks)
 Answer ANY FIVE Questions

- Marks BL CO PO
- 4 1 1 2
- 4 1 1 1
- 4 2 3 1
- 4 2 4 1
- 4 2 2 2
- 4 3 5 2
- 4 2 3 3
21. Define the following
 (i) AI
 (ii) State space search problem
22. What is turing test?
23. What is forward chaining? Explain it with an example.
24. Discuss about the learning. Give some examples.
25. State the differences between BFS and DFS.
26. Illustrate how knowledge is represented in fuzzy based expert system.
27. How is predicate logic helpful in knowledge representation and state the syntax of first order predicate logic?

Marks BL CO PO

PART – C (5 × 12 = 60 Marks)
 Answer ALL Questions

Marks BL CO PO

- 12 3 1 2
- 12 3 1 2
- 12 3 1 2
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- 12 3 1 2
28. a. Construct production rules for the situation where there are two jugs, one with capacity of 4 liters and the other with capacity of 3 liters, both without measurements. Imagine there is a pump that can be used to draw water in any quantity find 2 liters of water in a 4 liters jug.
 (OR)
- b. There are three missionaries and 3 cannibals stand on the left bank of a river. A boat is available which can take maximum 2. At any point of time number of missionaries should not be out numbered by cannibals which is fatal. Make a plan to safely take all to the right bank. Represent the above problem by state space search problem.
 (i) Represent initial state
 (ii) Goal state operators
 (iii) Action plan
 (iv) Find the entire solution
29. a.i. State A* algorithm and explain it with appropriate example.
 ii. Discuss about hill climbing problem.

8 2 2 4

4 2 2 2

(OR)

b.i. Find the solution for the following 8-puzzle problem using best first search 6 3 2 4

Initial state			Goal state		
1	2	3	1	2	3
4		6	4	5	6
7	5	8	7	8	

ii. State the simulated annealing algorithm. Explain how it is used in optimization problems. 6 2 2 2

30. a. Explain the knowledge representation using predicate and propositional logic with a unification algorithm. 12 2 3 4

(OR)

b.i. What is semantic network? Explain it with an example. 6 2 3 2

ii. Represent WUMBUS word problem in FOL. 6 2 3 2

31. a. Write short notes on the following concepts with an example. 12 3 4 1

- (i) Reinforcement learning
- (ii) Adaptive learning
- (iii) Multi agent based learning
- (iv) Ensemble learning

(OR)

b. Describe the components of planning in detail. 12 2 4 1

32. a. Describe the frame-based expert systems functioning principles in detail. 12 2 5 1

(OR)

b. Write about alpha-beta pruning procedure with an example. 12 4 5 2

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Reg. No.

Reg. No. RA2011026020065

B.Tech. DEGREE EXAMINATION, MAY 2023
Sixth & Seventh Semester

18CSE481T – APPLIED MACHINE LEARNING

(For the candidates admitted during the academic year 2018-2019 to 2021-2022)

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PART – A ($20 \times 1 = 20$ Marks)

Answer ALL Questions

- Answer **ALL** Questions

 1. A group of related documents against which information retrieval employed is called _____. 1 1 1 1
(A) Text database (B) Corpus
(C) Index collection (D) Repository
 2. _____ is used to identify the category of each word in a sentence. 1 1 1 1
(A) POS tagging (B) Stemming
(C) Tokenization (D) Lemmatization
 3. In filtration process what happens 1 1 1 1
(A) Special characters are removed (B) Stop words are removed
(C) Stemming is performed (D) Bottom up parser is applied
 4. Identify the correct order for preprocessing in NLP. 1 1 1 1
(A) Tokenization → Stemming → (B) Lemmatization → Tokenization
Lemmatization → Stemming
(C) Stemming → Tokenization → (D) Tokenization → Lemmatization
Lemmatization → Stemming
 5. _____ means understanding voice by the computer and performing any required task. 1 2 2 2
(A) Speech translation (B) Speaker identification
(C) Voice recognition (D) Automatic speech recognition
 6. Which is not a type of speech recognition model? 1 2 2 2
(A) Speaker independent (B) Speaker dependent
(C) Speaker isolation (D) Speaker adaptive
 7. _____ is a method used to convert analog signals to digital signals. 1 1 2 2
(A) Pulse code modulation (B) Sampling
(C) Coding (D) Quantization

8.	allows us to predict a sequence of unknown variables from a set of observed variables. (A) Gaussian mixture model (B) Naive Bayes (C) Hidden Markov Model (D) Bayes theorem	1	1	2	2		1	1	4	3		
9.	is used to understand how the value of some variable changes over time. (A) Graph analysis (B) Time series analysis (C) Linear regression (D) Logistic regression	1	2	3	2		1	2	4	3		
10.	Which is not a component of time series data? (A) Trend (B) Seasonality (C) Complexity (D) Cyclicity	1	2	3	2		1	2	4	3		
11.	Which is not a method to convert non-stationary time series data into stationary time series data? (A) Translation (B) Detrending (C) Differencing (D) Transformation	1	2	3	2		1	2	4	3		
12.	Wheat crops badly damaged on account of rains is (A) Cyclical movement (B) Random movement (C) Secular trend (D) Seasonal movement	1	2	3	2		1	2	4	3		
13.	is an image processing technique for finding the boundaries of an object in the given image. (A) Pattern recognition (B) Edge detection (C) Feature extraction (D) Image morphology	1	1	4	2		Marks	BL	CO	PO		
14.	If the histogram of same images with different contrast, are different, then what is the relation between the histogram equalized images? (A) They look visually different (B) They look visually similar to one another (C) They look like just the input (D) There is no relation between the histogram equalized images	1	2	4	3		21.	Define term frequency and inverse document frequency. Find the term frequency and inverse document frequency for the following example.	4	3	1	1
15.	Which of the following fact is the true for an image? (A) An image is the multiplication of the illumination and reflectance component (B) It is the subtraction of the illumination component from reflectance component (C) It is the addition of the illumination and reflectance component (D) It is the subtraction of the reflectance component from the illumination component	1	2	4	3		Sentence 1: Good Boy Sentence 2: Good Girl Sentence 3: Boy Girl Good	4	3	1	1	
16.	What is defined by the total number of pixels within the region? (A) Brightness (B) Intensity (C) Perimeter (D) Area	1	2	4	3		22.	What are the provisions available for text cleaning? How it can be done using the available python libraries?	4	3	1	1
17.	PCA is a technique for (A) Data augmentation (B) Dimensionality reduction (C) Variance normalization (D) Decomposition	1	2	4	3		23.	List the applications of speech recognition.	4	1	2	2
							24.	How music can be synthesized using available python libraries?	4	3	2	2
							25.	Compare stationary and non-stationary time series data.	4	3	3	3
							26.	Explain how images are stored in the computer.	4	3	4	4
							27.	What are the needs of biometrics in face recognition?	4	2	4	4
								PART – C (5 × 12 = 60 Marks)	Marks	BL	CO	PO
								Answer ALL Questions				
							28.	a. Explain the importance of “Bag of words” in NLP. Apply “Bag of words” for the following sentences. Sentence 1: “Welcome to Great learning, now start learning” Sentence 2: “Learning is a good practice”	12	4	1	1
								(OR)				

- b. Define the role of #hashtags, how twitter trends works? What are the technical aspects behind #hashtags or keyword trending? Write a detail analysis for any #hashtag. 12 4 1 1
29. a. Explain with python code how audio signals can be generated with custom parameters. 12 4 2 2
- (OR)**
- b. Describe how a speech recognizer can be build using python code. 12 4 2 2
30. a. Explain how to extract statistics form time series data using python code. 12 4 3 3
- (OR)**
- b. Explain Hidden Markov model for sequential data using python code. 12 4 3 3
31. a. Elaborate the ways to extract the edges from an image. 12 3 4 4
- (OR)**
- b. Discuss Scale Invariant Feature Transform (SIFT) in detail. 12 3 4 4
32. a. Explain building a face detector using Haar cascade. 12 3 4 4
- (OR)**
- b. Discuss in detail about principal component analysis (PCA) in face recognition. 12 3 4 4

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B.Tech. DEGREE EXAMINATION, JUNE 2023

Fifth & Sixth Semester

18CSE479T – STATISTICAL MACHINE LEARNING*(For the candidates admitted during the academic year 2018-2019 to 2021-2022)***Note:**

- (i) Part - A should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.
(ii) Part - B & Part - C should be answered in answer booklet.

Time: 3 hours

Max. Marks: 100

Marks BL CO PO

PART – A (20 × 1 = 20 Marks)

Answer ALL Questions

1 2 1 1

1. Identify which of the following is an unsupervised task?

(A) Predicting if a new edible item is sweet or spicy based on the information of the ingredients, their quantities, and level for many other similar dishes	(B) Grouping of hand-written digits from their image
(C) Predicting if a user would like to listen to newly released song or not based on historical data	(D) Predicting if a patient has diabetes or not based on historical medical records

2. Which one of the following is used for ANOVA?

(A) To compare 2 or more groups	(B) To determine the correlation between two variable
(C) To evaluate overall significant of a regression model	(D) To test a normal distribution

3. Which of the following methods do we use to find the best fit line for data in linear regression?

(A) Maximum likelihood	(B) Least square error
(C) Logarithmic loss	(D) R-square value

4. Choose the valid categorical variable given below

(A) Gender	(B) Object
(C) Number	(D) Alphabet

5. In the mathematical equation of linear regression $Y = \beta_1 + \beta_2 X + E$, (β_1, β_2) refers to _____.

(A) (slope, X-intercept)	(B) (Y-intercept, slope)
(C) (Slope, Y-intercept)	(D) (X-intercept, slope)

6. What's the penalty term for the Lasso regression?

(A) The absolute sum of the coefficients	(B) The square of the magnitude of the coefficients
(C) The square root of the magnitude of the coefficients	(D) The sum of the coefficients

7. Identify which of the following reduce over fitting in decision trees. 1 2 2 2
- (A) Enforce a maximum number of samples in leaf nodes (B) Enforce a minimum depth for the tree and pruning
 (C) Make sure each leaf node is one pure class (D) Enforce a maximum depth for the tree and pruning
8. When handling training data with missing attribute values, handling continuous attributes and improving computational efficiency are issues in 1 2 2 2
- (A) Unsupervised learning (B) Decision tree learning
 (C) Supervised learning (D) Predictive learning
9. In Bayes theorem class conditional probability is called as _____. 1 2 2 3
- (A) Evidence (B) Likelihood
 (C) Prior (D) Posterior
10. The Euclidean distance between two a set of numerical attribute is called as 1 1 3 3
- (A) Closeness (B) Validation data
 (C) Error rate (D) Testing data
11. In optimal value of 'K' training part considered as _____. 1 1 3 3
- (A) P (B) $P - 1$
 (C) $1 - P$ (D) 1
12. Which one of the following is used in dimensionality reduction algorithm? 1 1 3 3
- (A) Linear regression (B) Logistic regression
 (C) Principal Component Analysis (PCA) (D) Support Vector Machine (SVM)
13. Which of the following algorithm can be slow to run on very large dataset? 1 2 4 4
- (A) Linear Discriminant Analysis (LDA) (B) PCM
 (C) Linear regression (D) Gradient descent
14. SVM's are less effective when _____. 1 2 4 4
- (A) The data is noisy and contain overlapping points (B) The data is linearly separable
 (C) The data is clean and ready to use (D) The data is non-linearly separable
15. ANN create its own organization of information it receives during learning time is called _____. 1 1 5 5
- (A) Adaptive learning (B) Self-organization
 (C) What-if analysis (D) Supervised learning
16. In _____ ANN information flow is unidirectional. 1 1 4 4
- (A) Backward propagation (B) Feed forward
 (C) Neural network (D) Hidden layer
17. PCA reduces the dimension by finding a few _____. 1 2 5 5
- (A) Pentagonal linear combination (B) Hexagonal linear combination
 (C) Octagonal linear combination (D) Orthogonal linear combination
18. Which of the following will be Manhattan distance between the two data points A(8, 3) and B(4, 3)? 1 2 5 5
- (A) 1 (B) 4
 (C) 2 (D) 8
19. Identify the reason, for feature scaling is an important step before applying the k-mean algorithm. 1 2 5 5
- (A) In distance calculation, it will give the same weight for all features
 (B) You always, give the same clusters, if you use of don't use feature scaling
 (C) In Manhattan, distance it is an important step, but in Euclidean distance, it is not
 (D) In distance calculation, it will give different weight
20. Which of the following algorithm is most sensitive to outliers? 1 1 5 5
- (A) K-means clustering algorithm (B) K-medians clustering algorithm
 (C) K-medoids clustering algorithm (D) K-meds clustering algorithm

PART – B (5 x 4 = 20 Marks)

Answer ANY FIVE Questions

21. Examine the importance of machine learning algorithm. 4 4 1 1
22. Compare description statistics Vs inferential statistics. 4 2 1 1
23. Short note on maximum likelihood estimate (MLE) and entropy. 4 2 2 2
24. Apply precision, recall to any model and F1 score. 4 3 2 2
25. State Bayes theorem with conditional probability. 4 1 3 3
26. List out the advantages of support vector machine. 4 2 4 4
27. Justify the important of dimensionality reduction in machine learning. 4 5 5 5

PART – C (5 x 12 = 60 Marks)

Answer ALL Questions

28. a. A clinical psychologist has run between subjects experiment comparing two treatments for depression and client centered therapy against a control condition, subjects were randomly assigned to the experimental condition. After 12 weeks, the subject depression scores were measured using CESD depression scale. The data are summarized as follows 12 4 1 1

	<i>n</i>	mean	<i>Sd</i>
Control	40	21.4	4.5
CBT	40	16.9	5.5
CCT	40	19.1	5.8

Use one-way ANOVA with $\alpha = .01$ for the test. F critical value = 4.79.

(OR)

- b. Examine in detail about supervised machine learning algorithm. 12 4 1 1
29. a. Explain when to use ridge and larso regression with suitable example. 12 5 2 2

(OR)

- b. Find root mean square error for the following data sample using linear regression model. $y_1 = mx + c$, where, $m = 0.43$ and $c = 0.72$. 12 5 2 2

x	1	2	3	4	5
y	1	2	1.5	2.75	3.25

30. a. The following table gives the dataset about stolen vehicle. Using Naïve Bayes classifier classify the new data {Color = Red, Type = SUV, Origin = Domestic}, conclude the result. 12 4 3 3

Color	Type	Origin	Stolen
Red	Sports	Domestic	Yes
Red	Sports	Domestic	No
Red	Sports	Domestic	Yes
Yellow	Sports	Domestic	No
Yellow	Sports	Imported	Yes
Yellow	SUV	Imported	No
Yellow	SUV	Imported	Yes
Yellow	SUV	Domestic	No
Red	SUV	Imported	No
Red	Sports	Imported	Yes

(OR)

- b.i. Explain K-nearest neighbour algorithm with an example. 10 4 3 3
- ii. List out the disadvantages of K-NN. 2 4 3 3

31. a. Define support vector machine. Explain different kernal function with an example. 12 5 4 4

- b. Construct and explain with neat diagram of artificial neural network. 12 3 4 4

32. a. Discuss the concepts of clustering approaches. How it differ from classification? 12 4 5 5

(OR)

- b. Consider the two dimensional patterns (2, 1), (3, 5), (4, 3), (5, 6), (6, 7), (7, 8). Compute the principal component using PCA algorithm. 12 3 5 5

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