D 92956 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER (CBCSS—UG) DEGREE EXAMINATION
NOVEMBER 2020

Information Technology

BIT 3C 06—FUNDAMENTALS OF DIGITAL ELECTRONICS

Time : Two Hours Maximum : 60 Marks

Section A

Answer at least eight questions.
Each question carries 3 marks.
All questions can be attended.
Overall Ceiling 24.

1. What are BCD codes ?
2. Define Hamming code. What is its use ?
3. Write notes on octal numbers. Also convert the octal number $(46)_8$ to hexadecimal.
4. Define Boolean algebra.
5. What are logic gates ? How they are classified ?
6. What are the applications of DeMorgan's theorem ?
7. Explain, how Boolean functions are simplified using K-map ?
8. What are standard forms ? Explain with example.
9. What is a full adder ? Explain.
10. What are demultiplexers ?
11. Differentiate combinational and sequential circuits ?
12. Compare synchronous and asynchronous counters.

CHMK LIBRARY UNIVERSITY OF CALICUT

Section B

Answer at least five questions.
Each question carries 5 marks.
All questions can be attended.
Overall Ceiling 25.

13. Write notes on various types of number systems.
14. What are error detection and correction codes ? Explain.
15. What are canonical forms ? Explain with examples ?
16. With the help of logic diagram and function tables, explain a 4-input multiplexer.
17. Explain the working of BCD to 7-segment decoder.
18. What are flipflops ? Explain how they are classified.
19. Write notes on up/down counters.

(5 × 5 = 25 marks)

Section C

Answer any one question.
Each question carries 11 marks.

20. What are shift registers ? Explain a four bit serial in - parallel out shift register with suitable diagram.
21. What are A/D converters ? How they are classified ? Explain any *two* types.

(1 × 11 = 11 marks)

CHMK LIBRARY UNIVERSITY OF CALICUT

D 92955 (Pages : 2) Name_____

Reg. No_____

THIRD SEMESTER (CBCSS–UG) DEGREE EXAMINATION, NOVEMBER 2020

Information Technology

BIT 3C 05—DISCRETE MATHEMATICS

Time : Two Hours Maximum : 60 Marks

Section A

Answer at least eight questions.
Each question carries 3 marks.
All questions can be attended.
Overall Ceiling 24.

1. Define simple and composite proposition with examples.
2. Show that $(p \wedge q) \rightarrow (p \vee q)$ is a tautology.
3. What is the power set of the set $\{0,1,2\}$?
4. Define Cartesian product of two sets.
5. What is a null set ? Give an example of a null set.
6. Is the 'divides' relation on the set of positive integers reflexive ?
7. What is the truth value of the quantification $\exists x\, p(x)$, where $p(x) = x > 3$ and the domain consist of all real numbers ?
8. Write the distributive law of Boolean algebra.
9. Find the value of the Boolean function represented by $F(x,y,z) = xy + \bar{z}$.
10. Define a directed graph. Give an example of a directed graph.
11. Define the chromatic number of a graph.
12. Define an m-ary rooted tree.

(8 × 3 = 24 marks)

CHMK LIBRARY UNIVERSITY OF CALICUT

16. Explain the difference between strong and weak entity sets with examples.

17. What is the difference between composite and multi-valued attributes ?

18. Briefly explain the ACID properties.

19. What are views ? Explain its advantages with an example.

(5 × 5 = 25 marks)

Section C

Answer any one question.
The question carries 11 *marks.*

20. Explain the advantages of database management system over file based system.

21. What is normalization ? Distinguish between 3NF and BCNF with examples.

(1 × 11 = 11 marks)

CHMK LIBRARY UNIVERSITY OF CALICUT

D 92953 (Pages : 2) Name_____

Reg. No_____

THIRD SEMESTER (CBCSS—UG) DEGREE EXAMINATION, NOVEMBER 2020

Information Technology

BIT 3B 04—DATABASE DESIGN AND RDBMS

Time : Two Hours Maximum : 60 Marks

Section A

Answer at least eight questions.
Each question carries 3 marks.
All questions can be attended.
Overall Ceiling 24.

1. What is meant by information ?
2. What is data independence ?
3. What is DDL and DML ?
4. What is data dictionary ?
5. What is a foreign key ? Explain with example.
6. Explain E-R model with an example.
7. What is meant by derived attribute ?
8. What is DBA ?
9. What is meant by triggers ?
10. Distinguish grant and revoke commands.
11. Define the term cursor.
12. Discuss the CREATE statement in SQL.

(8 × 3 = 24 marks)

Section B

Answer at least five questions.
Each question carries 5 marks.
All questions can be attended.
Overall Ceiling 25.

CHMK LIBRARY UNIVERSITY OF CALICUT

15. Show that the relation $R = \{(a,b) / a \equiv b (\text{mod } m)\}$ is an equivalence relation on the set of positive integers.
16. Show that Demorgan's first and second laws are logically equivalent.
17. Prove the absorption law $x(x + y) = x$ using the other identities of Boolean algebra.
18. Define planar graphs. Show that $K_{3,3}$ is non-planar.
19. Show that if A and B are sets with $A \subseteq B$, then (a) $A \cup B = B$; (b) $A \cap B = A$.

(5 × 5 = 25 marks)

Section C

Answer any **one** *question.*
The question carries **11** *marks.*

20. Explain Kongsberg seven bridge problem and its importance in the history of graph theory.
21. (a) Define partial ordering relations.

    (b) Draw the Hasse diagram for $(\{1,2,3,4\}, \leq)$.

(1 × 11 = 11 marks)

CHMK LIBRARY UNIVERSITY OF CALICUT

Section A

Answer at least eight questions.
Each question carries 3 marks.
All questions can be attended.
Overall Ceiling 24.

1. What is the purpose of using Array ?
2. Why stack is called a LIFO list ?
3. What is a Sparse array ?
4. What is an Abstract data type ?
5. What is a priority queue ?
6. What do you mean by Circular linked list ?
7. Write post fix notation of A - B /(C * D ^ E).
8. What is the depth of a binary tree ?
9. What is Graph ?
10. What is Recursion ?
11. What is hash function ?
12. Write two limitations of Linear queue ?

CHMK LIBRARY UNIVERSITY OF CALICUT

Part A (Objective Type)

Answer all ten questions.
Each question carries 1 mark.

1. Determine the power set of the set $\{\{a\}\}$.
2. Write the negation of the statement "2 is an even integer and 6 is an odd integer".
3. The sum of degrees of vertices of a graph with n vertices is ————.
4. By Euler's formula $v - e + r =$ ————.
5. What is the chromatic number of K_n ?
6. Compute $A \oplus B$, if $A = \{1, 2, 4, 6\}$ and $B = \{2, 4, 5\}$.
7. Give an example of a poset.
8. Define Eulerian graph.
9. Number of edges in a tree with n vertices is ————.
10. Give an example of a planar graph.

(10 × 1 = 10 marks)

Part B (Short Answer Type)

Answer all five questions.
Each question carries 2 marks.

11. Check the truth value of the statements, if the domain consists of all the integers :

    (i) $\forall x\, \exists y : x + y = 0$.

    (ii) $\exists x : x = x + 1$.

12. For any a, b in a lattice $(A, \leq)$, prove that $a \leq a \vee b$.

CHMK LIBRARY UNIVERSITY OF CALICUT

Section B

Answer at least five questions.
Each question carries 5 marks.
All questions can be attended.
Overall Ceiling 25.

13. Explain the working of Selection sort.
14. What are different operations that can be performed on different data structures.
15. Explain concept of linked list with its basic operations.
16. Explain extended binary tree with example.
17. What is hashing ? Explain hash table and hash functions.
18. Define stack. Discuss its applications.
19. Explain any *two* collision resolution techniques.

(5 × 5 = 25 marks)

Section C

Answer any one question.
Each question carries 11 marks.

20. What is a queue ? Write a program to implement queue using array.
21. Write algorithms for Bubble sort and Quick sort and explain each with example.

(1 × 11 = 11 marks)

CHMK LIBRARY UNIVERSITY OF CALICUT

D 91748 (Pages : 4) Name.....

Reg. No.....

THIRD SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION
NOVEMBER 2020

Information Technology

BIT 3C 06—FUNDAMENTALS OF DIGITAL ELECTRONICS

(2014 Admissions)

Time : Three Hours Maximum : 80 Marks

Part A

Answer all questions.
Each question carries 1 mark.

1. Each digit in BCD number is expressed as ———.
   (a) Bit. (b) Nibble.
   (c) Byte. (d) All of these above.
2. The two's complement in binary number system is useful for expressing :
   (a) Positive Number. (b) Negative Number
   (c) Both (a) and (b). (d) All of the above.
3. The NAND logic gate is a combination of the——— and ——— logic gate.
   (a) NOT and AND. (b) AND and NOT.
   (c) AND and OR. (d) OR and AND.
4. Which of the following Boolean expressions is in the SOP form ?
   (a) (A + B) (C + D). (b) AB + CD.
   (c) AB (CD). (d) A (B) CD.
5. A full adder logic circuit will have ———.
   (a) Two inputs and one output.
   (b) Three inputs and three outputs.
   (c) Two inputs and two outputs.
   (d) Three inputs and two outputs.

CHMK LIBRARY UNIVERSITY OF CALICUT

CHMK LIBRARY UNIVERSITY OF CALICUT

Part C (Short Essay Type)

Answer any **five** *questions.*
Each question carries 4 *marks.*

16. Let $(L, \leq)$ be a lattice. Then $\forall a, b \in L$, prove that $a \vee b = b \Leftrightarrow a \leq b$.
17. Prove that in a graph the number of vertices of odd degrees is even.
18. Prove that in a tree every vertex of degree greater than one is cut vertex.
19. Prove that the graphs K_5, $K_{3,3}$ are non-planar.
20. Let $|A| = 6$, $|B| = 8$, $|C| = 6$, $|A \cup B \cup C| = 11$, $|A \cap B| = 3$, $|A \cap C| = 2$, $|B \cap C| = 5$. Find $|A \cap B \cap C|$.
21. Draw the truth table of the disjunction of two propositions p, q.
22. If a graph G has more than two vertices of odd degree, then there can be no Euler path in G.
23. In a distributive lattice $(L, \leq)$, prove that $b \wedge c = 0 \Rightarrow b \leq c$.

(5 × 4 = 20 marks)

Part D (Essay Type)

Answer any **five** *questions.*
Each question carries 8 *marks.*

24. Show that $(p \to r) \vee (q \to r)$ and $(p \wedge q) \to r$ are logically equivalent.
25. (a) Determine whether the relation on the set of all integers defined by $xRy \Leftrightarrow x \mid y$ is an equivalence relation.
    (b) Give an example of a partially ordered relation.
26. (a) Define a cut set.
    (b) Show that every circuit has an even number of edges in common with every cut set.
27. Explain travelling salesperson problem.
28. Determine the following sets :
    (a) $\{\phi\} \cup \{a, \phi, \{\phi\}\}$.
    (b) $\{\phi\} \cap \{a, \phi, \{\phi\}\}$.

CHMK LIBRARY UNIVERSITY OF CALICUT

Part B

Answer **all** *questions.*
Each question carries **2** *marks.*

11. What is BCD code ?

12. Implement $Y = \overline{AB} + A + \overline{(B + C)}$ using NAND gate only.

13. What are decoders ?

14. Explain the function of SR flip-flop with its truth table.

15. What is Weighted-Register D/A converter ?

(5 × 2 = 10 marks)

Part C

Answer any **five** *questions.*
Each question carries **4** *marks.*

16. What is Hamming Code ? Construct Hamming code for data 11110011 with even parity.

17. What is the difference between BCD and Binary Code ? Give the BCD and Binary Equivalent for $(15)_{10}$.

18. What is multiplexer ? Draw the circuit for a 4 to 1 multiplexer and explain its working.

19. Explain the standard forms of Boolean expressions.

20. Explain the function of encoder with example.

21. Explain the different modes of shift register.

22. What do you mean by modulus of counter ? Explain.

23. Distinguish between combinational logic circuits and sequential logic circuits.

(5 × 4 = 20 marks)

Part D

Answer any **five** *questions.*
Each question carries **8** *marks.*

24. (a) Given two binary numbers X = 1010100 and Y= 1000011, perform the subtraction

    (i) X – Y using 2's complement.

    (ii) Y – X using 2's complement.

CHMK LIBRARY UNIVERSITY OF CALICUT

6. A logic circuit that changes a code into a set of signals is called ———.

   (a) Encoder.
   (b) Decoder.
   (c) Multiplexer.
   (d) Demultiplexer.

7. 4-to-1 MUX would have ——— outputs.

   (a) 4.
   (b) 3.
   (c) 2.
   (d) 1.

8. The output of latches will remain in set/reset until ———.

   (a) The trigger pulse is given to change the state.
   (b) Any pulse given to go into previous state.
   (c) They don't get any pulse more.
   (d) The pulse is edge-triggered.

9. A serial in/parallel out, 4-bit shift register initially contains all 1s. The data nibble 0111 is waiting to enter. After four clock pulses, the register contains ———.

   (a) 0000.
   (b) 1111.
   (c) 0111.
   (d) 1000.

10. What is the major advantage of the R/2R ladder digital-to-analog (DAC), as compared to a binary-weighted digital-to-analog DAC converter ?

   (a) It only uses two different resistor values.
   (b) It has fewer parts for the same number of inputs.
   (c) Its operation is much easier to analyze.
   (d) The virtual ground is eliminated and the circuit is therefore easier to understand and troubleshoot.

(10 × 1 = 10 Marks)

CHMK LIBRARY UNIVERSITY OF CALICUT

Part C (Short essay)

Answer any five questions.
Each question carries 4 marks.

16. Define a boolean algebra.
17. Show that $[(p \vee q) \Rightarrow r] \wedge (\sim p) \Rightarrow (q \Rightarrow r)$ is a tautology without using truth tables.
18. An edge $e = xyof$ a connected graph G is cut edge of G if and only if e belongs to no cycle of G.
19. Prove that a simple graph is a tree if and only if any two distinct vertices are connected by a unique path.
20. Let G be a graph in which the degree of every vertex is at least 2. Then show that G contains a circuit.
21. Find the power set of each of these sets :

    (a) ϕ. (b) $\{\phi\}$. (c) $\{\phi, \{\phi\}\}$. (d) $\{a, b\}$.
22. Show that in any group of two or more people there are always two with same number of friends in the group.
23. Prove that a tree with at least two vertices contains at least two pendant vertices.

(5 × 4 = 20 marks)

Part D

Answer any five questions.
Each question carries 8 marks.

24. (a) Write the disjunctive normal form of :

    $p \Rightarrow ((p \Rightarrow q) \wedge \sim (\sim q \vee \sim p))$.

    (b) Write the conjunctive normal form of :

    $(q \vee (p \wedge r)) \wedge \sim ((p \vee r) \wedge q)$.
25. Give a short note on traveling salesman problem.
26. Prove that a connected graph G with at least two vertices contains at least two vertices that are not cut-vertices.
27. Show that a graph has a dual if and only if it is planar.
28. Show that G is Euler if and only if every vertex of G is even.
29. Write short notes on (a) network ; (b) Max-flow min-cut theorem.
30. Prove that a graph is bipartite if and only if it contains no odd cycles.
31. State and prove necessary sufficient conditions for a connected graph G to be Eulerian.

(5 × 8 = 40 marks)

CHMK LIBRARY UNIVERSITY OF CALICUT

(b) Express the following numbers in decimal :

(i) $(ABCD)_{16}$.

(ii) $(26.24)_8$.

25. Explain basic logic gates with logic diagram and truth table.

26. Simplify using K-Map:

Y = F (A, B, C, D) = (0, 2, 5, 7, 8, 10, 13, 15).

27. Explain how a full adder circuit can be converted to a full subtractor with the addition of one inverter circuit.

28. Explain the working of BCD to 7-segment decoder.

29. Explain Clocked R-S flip-flop using proper logic diagrams and truth tables.

30. What do you mean by shift register ? Explain the Serial-In-Serial-Out shift register.

31. Give an account on R-2R Ladder D/A converter.

(5 × 8 = 40 marks)

CHMK LIBRARY UNIVERSITY OF CALICUT

(5 × 2 = 10 marks)

Section C

Answer any five *questions (short essay type) out of eight questions.*
Each question carries 4 marks.

16. Write an algorithm to calculate the roots of a quadratic equation. List the various operations that can be performed on different Data Structures ?

17. Explain two-dimensional array. How two dimensional arrays can be represented in memory ?

18. Define the terms node, address, null pointer and next pointer for linked list. Explain with example.

19. What is Tree ? Explain. What are the different applications of queue and graph.

20. Write an algorithm to convert an infix expression into postfix expression.

21. What are the differences between sequential and binary search ? Write an algorithm to search an element using Binary search with suitable example.

22. Write algorithm for insertion and deletion operation on a linked queue.

23. Create a binary tree using inorder and postorder traversal :

    (a) Inorder : D B H E A I F J C G

    (b) Postorder : D H E B I J F G C A

(5 × 4 = 20 marks)

Section D

Answer any five *questions (essay type) out of eight questions.*
Each question carries 8 marks.

24. (a) What are the different ways to find the efficiency of an algorithm ? Explain with example.

    (b) Write an algorithm to find Armstrong numbers from a list of numbers using array.

25. (a) Define sparse matrix, write a program to convert ordinary sparse matrix to spare representation form.

    (b) Write a program to multiply two matrixes. Using user defined functions and pass arguments.

CHMK LIBRARY UNIVERSITY OF CALICUT

26. Write a program to implementation stack using linked list and user defined functions.

27. (a) What are the different operations on graph ? Explain.

    (b) Write an algorithm to insert an element into a circular queue.

28. What are the different applications of queue ? Explain different operation on binary tree with example

29. (a) Define quick sort. Explain with example.

    (b) Sort the following list of keys using heap :

        8, 20, 9, 4, 15, 10, 7, 22, 3, 12. Explain each step used.

30. How to represent circular double linked list ? Explain with example. Write an algorithm to delete different elements from a double linked list.

31. Explain the following :

    (a) Merge sort.

    (b) Bucketing.

    (c) Primitive data structures.

(5 × 8 = 40 marks)

CHMK LIBRARY UNIVERSITY OF CALICUT

Information Technology

BIT 3B 04—DATA STRUCTURES USING C++

(2017 Admissions)

Time : Three Hours Maximum : 80 Marks

Section A

Answer all *the questions.*
Each question carries 1 *mark.*

1. Data structures are classified as ———— and———— data structure.
2. ADT stands for ————.
3. The postfix form of the expression ( ) ( ) /G EFCDAB –***+ is ————.
4. A complete binary tree with n leaves contains————
5. An insertion operation is called as ————.
6. ———— matrix is a matrix with zero as the dominating elements.
7. A ———— data structure is linear list in which all insertion are made at the rear end of list and deletion are made at the front of end of list.
8. In linked list linked field are also referred as ————.
9. Left, root, right traversal known as ———— traversal.
10. The complexity of linear search algorithm is ————.

(10 × 1 = 10 marks)

Section B

Answer all *the questions.*
Each question carries 2 *marks.*

11. Explain different characteristics of an algorithm.
12. What is a pointer ?

CHMK LIBRARY UNIVERSITY OF CALICUT

Part C (Short Essay Questions)

Answer any five *questions.*
Each question carries 4 *marks.*

16. What is the difference between composite and multi-valued attributes ?
17. What is the use of 'having' clause in SQL ?
18. What do you meant by triggers ?
19. What is meant by referential integrity ?
20. What is stored procedure ?
21. What is a view ? Explain its advantages.
22. Explain with example the conditional control statement in PL/SQL.
23. What is a query language ? Explain the difference between procedural and nonprocedural query language.

(5 × 4 = 20 marks)

Part D (Essay Questions)

Answer any five *questions.*
Each question carries 8 *marks.*

24. Explain the three level architecture of Database Management System.
25. Explain the FOR LOOP in PL/SQL with an example.
26. Write a PL/SQL block of code for inverting a number 5639 to 9365.
27. Explain in detail the advantages and disadvantages of Database Management Systems over File Based Systems.
28. Explain the roles and responsibilities of Database Administrator (DBA).
29. Consider the following Edu_Schema :

    DEPT_MSTR (dept #, dept_name)

    FACULTY (faculty #, faculty_name, dept #)

    COURSE (course #, course_name, dept #)

    STUDENT (student #, student_name, course #, fee_paid)

CHMK LIBRARY UNIVERSITY OF CALICUT

Information Technology

BIT 3B 03—DATABASE DESIGN AND RDBMS

(2017 Admissions)

Time : Three Hours Maximum : 60 Marks

Part A (One Word Questions)

Answer all *questions.*
Each question carries 1 *mark.*

1. All tasks related to database handling is known as ————.
2. A ———— query is the most common type used for extracting specific information from the database.
3. ———— is a collection of related data items stored in organized manner.
4. An attribute in one table that references a unique record in another table is called a ————.
5. ———— is the oldest model in Data model.
6. The evolution of ———— database model is considered as one of the major breakthrough in the history of database management.
7. ———— are the three different levels of DBMS Architecture.
8. The command used to change the contents of a table, within the database is ————.
9. In SQL, the AVG() is an example for ————.
10. DISTINCT keyword is used for ————.

(10 × 1 = 10 marks)

Part B (Short Answer Questions)

Answer all *questions.*
Each question carries 2 *marks.*

11. What is a domain ?
12. What do you meant by normalization ?
13. Briefly explain query language and its types.
14. Distinguish between data and information.
15. What is DDL ? Explain with examples.

CHMK LIBRARY UNIVERSITY OF CALICUT

Information Technology

BIT 3B 03—DATABASE DESIGN AND RDBMS

(2014 Admissions)

Time : Three Hours Maximum : 80 Marks

Part A

Answer **all** *questions.*
Each question carries 1 *mark.*

1. DCL stands for ————.
2. In E-R diagram an entity set is defined by ———— symbol.
3. ———— statement in SQL allows to change the definition of a table.
4. A set of possible data values is known as ————.
5. Parent-Child relationship between the tables are maintained by the primary key and ———— key.
6. The SQL command to eliminate a table from a database is :
   A) REMOVE TABLE. B) DELETE TABLE.
   C) DROP TABLE. D) UPDATE TABLE.
7. A file manipulation command that extracts some of the records from a file is called :
   A) SELECT. B) PROJECT.
   C) JOIN. D) PRODUCT.
8. The result of a SQL SELECT statement is a(n) ————.
   A) Table. B) Form.
   C) Report. D) File.
9. Say true *or* false : Count function in SQL returns the number of distinct values in a relation.
10. Say true *or* false : Foreign key is used to represent the relationship between tables.

(10 × 1 = 10 marks)

Turn over

CHMK LIBRARY UNIVERSITY OF CALICUT

Write the following queries in SQL :

i) Obtain the list of faculty belongs to "COMPUTER" department.

ii) Obtain a list which shows the student name along with his/her course and department.

iii) Obtain a list shows the department name and the number courses offered by that department.

Obtain a list which gives the course name and total fees collected for that particular course.

30. Construct an E-R. diagram for a Car-Servicing Company that has a set of customers, each of whom owns one or more cars. Each car has associated with one to any number of recorded service history. Each service job will be under the supervision of a service engineer. Convert this into a set of tables also.

31. What are database triggers ? Write an UPDATE triggers on CLIENT_MASTER table, which keep track of the records that are being updated. The old values of the updated record are added in the AUDIT_TRAIL table. Use required attribute with appropriate data types.

(5 × 8 = 40 marks)

CHMK LIBRARY UNIVERSITY OF CALICUT

Part B

Answer **all** *questions.*
Each question carries 2 *marks.*

11. Distinguish between primary key and foreign key.
12. What is functional dependency ?
13. What is DML ? Give any one DML statement in SQL.
14. What is locking ?
15. Define query language.

(5 × 2 = 10 marks)

Part C

Answer any **five** *questions.*
Each question carries 4 *marks.*

16. Explain strong and weak entities with suitable examples.
17. Explain briefly the architecture of database systems.
18. List the ACID properties of a transaction.
19. Explain the function and syntax ALTER TABLE command in SQL.
20. Define the various privileges in SQL.
21. Give an account on different data types in SQL.
22. What is a cursor ? How it is implemented ?
23. What is a view ? Explain how will you remove a column from a view.

(5 × 4 = 20 marks)

Part D

Answer any **five** *questions.*
Each question carries 8 *marks.*

24. Who is a DBA ? Explain the responsibilities of DBA in designing a database.
25. Explain the 1NF,2NF, 3NF and BCNF with examples.
26. Explain the use of HAVING and GROUP BY clause in SQL with suitable example.
27. Give an account on different permission granting and revoking statements in SQL.
28. What is a trigger ? Explain the procedure for creating triggers in SQL.
29. What are stored procedures ? Explain how data are passed and returned to/from a stored procedure.

CHMK LIBRARY UNIVERSITY OF CALICUT

30. Give the appropriate SQL statement for defining following tables with suitable constraints :

    i) Student (Studet_id (Primary Key), Sname, major, GPA)

    ii) Faculty (Faculty_id (Primary Key), Fname, dept, designation, salary)

    iii) Course (Course_id (Primary Key), Cname, Faculty_id (Foreign key))

    iv) Enrol (Course_id (Foreign Key), Student_id (Foreign Key), grade)

31. Consider the following tables :

    Employee (Emp_no, Name, Emp_city)

    Company (Company_name, Emp_no, Salary)

    i) Write a SQL query to display employee name and company name in which the employee is working.

    ii) Write a SQL query to display employee name, employee city, company name and salary of all the employees whose salary is greater than 10000.

    iii) Write a query to display all the employees working in 'ABC' company.

    iv) Write a SQL query to display the name of the employee who draws highest salary in each company.

(5 × 8 = 40 marks)

CHMK LIBRARY UNIVERSITY OF CALICUT

D 11851 (Pages : 4) Name.....

Reg. No.....

THIRD SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION NOVEMBER 2021

Information Technology

BIT 3B 03—DATABASE DESIGN AND RDBMS

(2014—2016 Admissions)

Time : Three Hours Maximum : 80 Marks

Part A

Answer **all** *questions.*
Each question carries 1 *mark.*

1. Which of the following refers to the number of tuples in a relation ?

   (a) Entity. (b) Cardinality.

   (c) Column. (d) Row.

2. Which of the following provides the ability to query information from the database and insert tuples into, delete tuples from, and modify tuples in the database ?

   (a) DML (Data Manipulation Language)

   (b) DDL (Data Definition Language)

   (c) DCL (Data Control Language)

   (d) Relational Schema (RS)

3. The database management system can be considered as the collection of ——— that enables us to create and maintain the database.

   (a) Translators. (b) Programs.

   (c) Keys. (d) Language Activity.

4. A ——— is used to define overall design of the database.

   (a) Data Definition Language.

   (b) Application program.

   (c) Schema.

   (d) Code.

CHMK LIBRARY UNIVERSITY OF CALICUT

5. SQL stands for ———.

   (a) Sequential query language.

   (b) Standard query language.

   (c) Structured query language.

   (d) Server side query language.

6. Data integrity constraints are used to ———.

   (a) Control who is allowed access the data.

   (b) Ensure that duplicate records are not entered into the table.

   (c) Improve the quality of data entered for a specific property.

   (d) Prevent users from changing the values stored in the table.

7. What type of join is needed when you wish to include rows that do not have matching values ?

   (a) Equi-join. (b) Natural join.

   (c) Outer join. (d) All of the above.

8. What are the after triggers ?

   (a) Triggers generated after a particular operation

   (b) The triggers run after an insert, update or delete on a table

   (c) The triggers run after an insert, views, update or delete on a table

   (d) All of the above

9. Which of the following creates a virtual relation for storing the query ?

   (a) Function. (b) View.

   (c) Stored procedure. (d) None of the above.

10. Which of the following is a comparison operator in SQL ?

   (a) =. (b) LIKE.

   (c) BETWEEN. (d) All of the above.

(10 × 1 = 10 marks)

CHMK LIBRARY UNIVERSITY OF CALICUT

Part B

Answer **all** *questions.*
Each question carries 2 *marks.*

11. What is mapping cardinality ?
12. What is BCNF ?
13. What is DDL in SQL ? Give any *one* example.
14. List any *four* important datatypes in SQL.
15. What is locking ?

(5 × 2 = 10 marks)

Part C

Answer any **five** *questions.*
Each question carries 4 *marks.*

16. Explain strong and weak entities with examples.
17. Who is DBA ? List the functions of a DBA.
18. Give a short account on functional dependency.
19. Explain the function and syntax of ALTER TABLE statement in SQL.
20. Differentiate primary key and foreign key. Also explain the role of foreign key in join operation.
21. Explain any *two* DCL statements in SQL.
22. What do you mean by concurrent execution of a database transaction in a multi-user system ?
23. What is a cursor? Explain the procedure for creating a cursor.

(5 × 4 = 20 marks)

Part D

Answer any **five** *questions.*
Each question carries 8 *marks.*

24. Give a detailed account on different data models.
25. What do you mean by database normalization ? Explain 1NF, 2NF and 3NF with Examples.
26. Explain the ACID properties of transaction.
27. Explain the differences between DROP TABLE and ALTER TABLE statement in SQL with suitable examples.

CHMK LIBRARY UNIVERSITY OF CALICUT

28. What are views ? How it differs from relation ? Also explain how to rename a column of a view in SQL.

29. Explain the function and syntax of any *two* DCL statements is SQL with example.

30. What are stored procedures ? Explain its advantages in database programming.

31. Consider the following table :

    Employee (Emp_Name, Dept_Name, Salary).

    Write SQL statements for the following :

    (i) Find the name of the employee who is getting lowest salary.

    (ii) Find all the departments where more than 60 employees are working.

(5 × 8 = 40 marks)

CHMK LIBRARY UNIVERSITY OF CALICUT

D 11852 (Pages : 3) Name.....

Reg. No.....

THIRD SEMESTER (CUCBCSS–UG) DEGREE EXAMINATION NOVEMBER 2021

Information Technology

BIT 3C 05—DISCRETE MATHEMATICS

(2014—2016 Admissions)

Time : Three Hours Maximum : 80 Marks

Part A (Objective Type)

Answer **all** *ten questions.*

1. Which of the following is not a proposition ?
   (i) 15 is not divisible by 3.
   (ii) $x = 1$ is a solution of $x^2 = 1$
   (iii) $4 - x = 2$.
   (iv) $2 + 2 = 2$.
2. Negate the statement "Some people have no scooter".
3. Write the power set of the set {1, 2, 3}.
4. Draw the symbol for OR gate.
5. Write the complement of the Boolean expression : $a'b$.
6. Give an example of a complete graph.
7. Define a simple graph.
8. Draw a tree with six vertices.
9. Obtain spanning tree for K_3.
10. Which graph is called Kratowski's second graph ?

(10 × 1 = 10 marks)

Part B (Short Answer Type)

Answer all **five** *questions.*

11. Define a partially ordered set.
12. Simplify the Boolean product : $xyx'z$.

Turn over

CHMK LIBRARY UNIVERSITY OF CALICUT

13. Write the dual of the Boolean equations :

(i) $(x.1).(0 + x') = 0$; and (ii) $x + x'xy = x + y$.

14. Find the number of edges of the graph C_n.

15. Define a weighted graph. Give an example.

(5 × 2 = 10 marks)

Part C (Short Essay Type)

Answer any **five** *questions.*

16. Express the following statements in symbolic form :

(i) The hut will be destroyed if there is a cyclone.

(ii) Some new books will be purchased if and only if additional funding is available.

17. Symbolize the following expressions :

(i) Every cow is black.

(ii) Some fruits are yellow.

18. Prove the involution law in Boolean algebra.

19. Prove that the maximum number of edges in a simple graph with n vertices is $\frac{n(n-1)}{2}$.

20. (a) Define a path.

(b) Prove that in every graph having exactly two vertices of odd degree, there is a path joining these two vertices.

21. (a) Define a pendant vertex.

(b) Prove that in any tree with two or more vertices, there are atleast two pendant vertices.

22. Either draw a graph with the given specification or explain why no such graph exists :

(i) Tree with 6 vertices having degrees 1, 1, 1, 1, 3, 3.

(ii) Tree with all vertices of degree 2.

23. Define a cut vertex and a cut edge. Give one example for each.

(5 × 4 = 20 marks)

CHMK LIBRARY UNIVERSITY OF CALICUT

Part D (Essay Type)

Answer any **five** *questions.*

24. Show that the propositions $p \vee (q \wedge r)$ and $(p \vee q) \wedge (p \vee r)$ are logically equivalent.

25. Give *one* example with illustrations for each of the following :

    (i) A relation which is symmetric and antisymmetric.

    (ii) A relation which is symmetric but neither reflexive nor transitive.

    (iii) A relation which is symmetric and reflexive but not transitive.

26. Let D_{70} be the set {1, 2, 5, 7, 10, 14, 70} of divisors of 70. On D_{70}, define $+$, $\cdot$ and $'$ by $a + b = lcm\,(a, b)$, $a \cdot b = gcd\,(a, b)$ and $a' = \frac{70}{a}$. Prove that D_{70} is a Boolean algebra.

27. Prove that a nonempty connected graph G is Eulerian if and only if its vertices are all of even degree.

28. (a) Define a planar graph.

    (b) Let G be a connected simple planar graph with $n\,(\geq 3)$ vertices and e edges. Prove that $e \leq 3n - 6$.

    (c) Is K_3 planar ? Justify your answer.

29. Obtain the number of edges in a tree with n vertices.

30. Discuss how network problems can be formulated and solved using graphs.

31. (a) Define adjacency matrix of : (i) an undirected graph ; and (ii) a digraph.

    (b) Define incidence matrix of (i) an undirected graph ; and (ii) a digraph.

    (c) Draw the undirected graph represented by the adjacency matrix $\begin{bmatrix} 0 & 1 & 1 & 0 & 0 \\ 1 & 0 & 1 & 0 & 0 \\ 1 & 1 & 0 & 1 & 0 \\ 0 & 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 1 & 1 \end{bmatrix}$.

(5 × 8 = 40 marks)

CHMK LIBRARY UNIVERSITY OF CALICUT

D 11853 (Pages : 3) Name.....

Reg. No.....

THIRD SEMESTER (CUCBCSS-UG) DEGREE EXAMINATION NOVEMBER 2021

Information Technology

BIT 3C 06—FUNDAMENTALS OF DIGITAL ELECTRONICS

(2014—2016 Admissions)

Time : Three Hours Maximum : 80 Marks

Part A

Answer **all** *questions.*

Each question carries 1 *mark.*

1. The decimal equivalent of binary number 0.0111 is ————.

   (a) 4.375. (b) 43.75.

   (c) 0.4375. (d) 4375.

2. Find the octal equivalent of $(010111100)_2$:

   (a) 174_8. (b) 172_8.

   (c) 272_8. (d) 274_8.

3. Logic expression A.B + $\bar{}$(A.B) can be implemented by given inputs A and B to two inputs :

   (a) Exclusive-NOR gate. (b) NOR gate.

   (c) NAND gate. (d) Exclusive- OR gate.

4. Using Boolean Algebra, find the most simplified SOP form of the following expression : F = ABD + CD + ACD + ABC + ABCD :

   (a) F = CD + AD. (b) F = ABD + ABC + CD.

   (c) F = AC + AD. (d) F = BC + AB.

5. Which of the following logic gates are used for constructing Exclusive-OR (XOR) logic gate ?

   (a) OR gates only.

   (b) AND gates and NOT gates.

   (c) AND gates, OR gates, and NOT gates.

   (d) OR gates and NOT gates.

CHMK LIBRARY UNIVERSITY OF CALICUT

6. How many inputs are there in a half adder circuit ———— ?

   (a) 2. (b) 4.

   (c) 3. (d) 1.

7. 4-to-1 MUX would have ———— inputs.

   (a) 2. (b) 3.

   (c) 4. (d) 5.

8. How many valid entries are in the truth table of an S-R flip-flop ?

   (a) 1. (b) 2.

   (c) 3. (d) 4.

9. A decimal counter has ———— states.

   (a) 5. (b) 10.

   (c) 15. (d) 20.

10. What is the major advantage of the R/2R ladder digital-to-analog (DAC), as compared to a binary-weighted digital-to-analog DAC converter ?

    (a) It only uses two different resistor values.

    (b) It has fewer parts for the same number of inputs.

    (c) Its operation is much easier to analyze.

    (d) The virtual ground is eliminated and the circuit is therefore easier to understand and troubleshoot.

(10 × 1 = 10 marks)

Part B

Answer **all** *questions.*

Each question carries 2 *marks.*

11. How many universal gates ? List out them.

12. Explain DeMorgan's theorem.

13. Differentiate between half adder and full adder.

14. What is flip-flop ? Explain its use.

15. What is Analog-to-Digital converter ?

(5 × 2 = 10 marks)

CHMK LIBRARY UNIVERSITY OF CALICUT

Part C

Answer any **five** *questions.*
Each question carries 4 *marks.*

16. Explain any two error detection codes.
17. Convert the following numbers :
    (i) $(2544.23)_{10}$ to Binary.
    (ii) $(18FFC)_{16}$ to Octal.
18. Explain the laws of Boolean algebra.
19. Simplify using Boolean algebra : ABC + ABC + ABC + ABC + ABC = A + ABC.
20. Explain how will you convert decoder into a demultiplexer.
21. Explain how can a R-S flip-flop be constructed using NOR gate.
22. Draw the logic circuit of 3-bit asynchronous up-down counter.
23. What do you mean by serial shifting ? Explain.

(5 × 4 = 20 marks)

Part D

Answer any **five** *questions.*
Each question carries 8 *marks.*

24. What are the different digital codes ? Explain each one.
25. Define Universal Gate and realize OR and EX-OR gate using NAND gate.
26. Simplify the Boolean function $\int(A, B, C)$ in SOP with don't care condition :

    F = B + AC.
27. What is Encoder ? Derive logic circuit of Octal to Binary encoder.
28. Explain 3-to-8-line decoder in brief with necessary logic diagram.
29. What is a flip-flop ? Show the logic implementation of R-S flip-flop having active-High R and S inputs. Draw its truth table and mark the invalid entry.
30. What do you mean by shift register ? Explain the Serial-In-Serial-Out shift register.
31. Compare and contrast Asynchronous and Synchronous counter.
32. Give an account on R-2R Ladder Digital to Analog Converter.

(5 × 8 = 40 marks)

CHMK LIBRARY UNIVERSITY OF CALICUT

D 11854 (Pages : 4) Name.....

Reg. No.....

THIRD SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION NOVEMBER 2021

Information Technology

BIT 3B 03—DATABASE DESIGN AND RDBMS

(2017—2018 Admissions)

Time : Three Hours Maximum : 80 Marks

Part A

Answer **all** *questions.*
Each question carries 1 *mark.*

1. A ——— is a special mark inside a transaction that allows all commands that are executed after it was established to be rolled back.

   (a) Grant. (b) Revoke.

   (c) Savepoint. (d) Transaction.

2. ——— is the default type of join.

   (a) Left Outer Join. (b) Right Outer Join.

   (c) Inner Join. (d) Cross Join.

3. ——— is the operator which cannot be used with a subquery.

   (a) IN. (b) BETWEEN.

   (c) EXISTS. (d) ANY.

4. Which one is not a privilege ?

   (a) Create. (b) Select.

   (c) Delete. (d) Grant.

5. ——— is the term used to represent a missing value.

   (a) EMPTY. (b) NA.

   (c) NULL. (d) ZERO.

CHMK LIBRARY UNIVERSITY OF CALICUT

File up the blanks :

6. ——— clause is used to specify a condition while fetching the data from single table or joining with multiple tables.
7. While using ——— operator, complete condition will be assumed true when at least any of the conditions is true.
8. ——— and ——— are two wildcards used with LIKE operator.
9. ACID property stands for ———.
10. The ——— command is the transactional command used to undo transactions that have not already been saved to the database.

(10 × 1 = 10 marks)

Part B

Answer **all** *questions.*
Each question carries 2 *marks.*

11. Give an SQL query : (a) To illustrate the usage of LIKE operator ; and (b) SQL query to implement IN operator.
12. What is ALIAS ? Give an example.
13. What is the purpose of COMMIT command ?
14. Write an SQL command to illustrate the use of nested queries.
15. Write down the syntax of UNION ALL operator.

(5 × 2 = 10 marks)

Part C

Answer any **five** *questions.*
Each question carries 4 *marks.*

16. Explain CREATE TABLE and INSERT statements with syntax and examples.
17. Explain the three-schema architecture with a diagram.
18. Explain entity integrity and referential integrity with examples.
19. Explain aggregate functions with examples.
20. Explain weak entity types with an example.
21. Explain various transaction states.
22. Briefly explain shared or exclusive locks in concurrency control.
23. Explain the role of DBA.

(5 × 4 = 20 marks)

CHMK LIBRARY UNIVERSITY OF CALICUT

28. Explain 4NF and 5NF with examples.

29. Explain the concept of generalization and specialization in ER models with examples.

30. Write a PL/SQL function to find the maximum of 2 numbers.

31. Explain the concept of explicit cursors with example.

(5 × 8 = 40 marks)

CHMK LIBRARY UNIVERSITY OF CALICUT

Part D

Answer any **five** *questions.*

Each question carries 8 *marks.*

24. Explain the following with syntax and example.

    (a) Creation of Views.

    (b) Removing Views.

25. Explain the following with examples.

    (a) Primary Key constraint.

    (b) Foreign Key constraint.

    (c) Unique constraint.

    (d) Not Null constraint.

26. Explain the following clauses with syntax and examples.

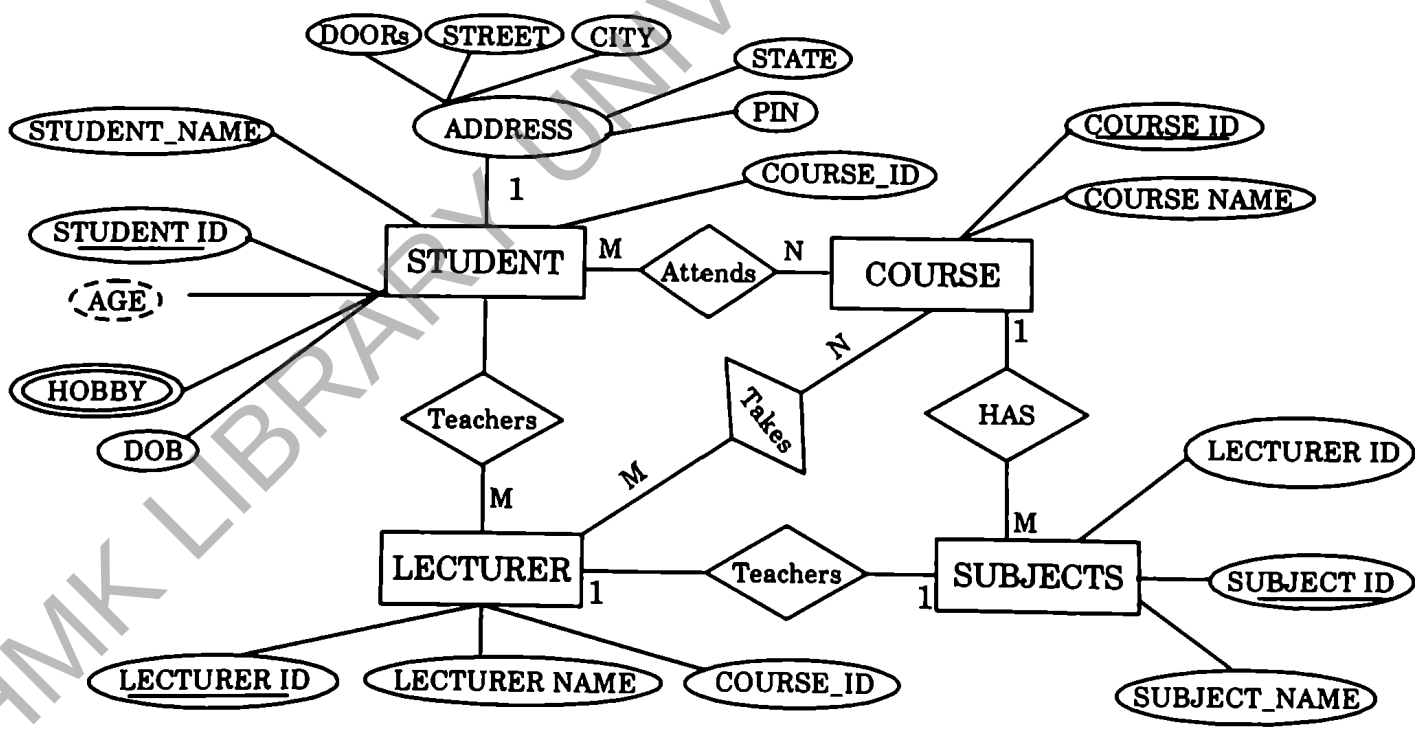
    (a) GROUP BY.

    (b) HAVING.

    (c) ORDER BY.

    (d) DISTINCT.

27. Convert the ER diagram to tables with necessary explanations.



CHMK LIBRARY UNIVERSITY OF CALICUT

D 11855 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION NOVEMBER 2021

Information Technology

BIT 3B 04—DATA STRUCTURES USING C++

(2017—2018 Admissions)

Time : Three Hours Maximum : 80 Marks

Part A

Answer **all** *questions.*
Each question carries 1 *mark.*

1. ———— data structure is required to convert the infix to prefix notation.
2. If the elements '1', '2', '3' and '4' are inserted in a queue, the order for removal is ————.
3. In the linked list implementation of queue, the new element will be inserted at ————.
4. ———— principle is used if two elements in the priority queue have the same priority.
5. ———— is the maximum number of children that a node can have in a binary tree.
6. In ———— sort, digit by digit sorting is performed from the least significant digit to the most significant digit.
7. ———— sort is the generalization of insertion sort, which overcomes the drawbacks of insertion sort.
8. ———— linked list is a type of linked list in which a node contains a pointer to the previous as well as the next node in the sequence.
9. ———— is a hashing technique in which unique keys are generated.
10. The worst case time complexity of heap sort algorithm is ————.

(10 × 1 = 10 marks)

Part B

Answer **all** *questions.*
Each question carries 2 *marks.*

11. What is a non-linear data structure ? Give examples.
12. What is a weighted graph ?
13. What is depth first search ?
14. What is priority queue ?
15. What do you mean by collision in hashing ?

(5 × 2 = 10 marks)

Turn over

CHMK LIBRARY UNIVERSITY OF CALICUT

Part C

Answer any **five** *questions.*
Each question carries 4 *marks.*

16. How can you represent a sparse matrix using 2D array. Illustrate with an example.
17. How to implement queue as a linked list ?
18. Explain column major ordering in multidimensional arrays.
19. Explain the space complexity of an algorithm.
20. Write down the algorithm for linear search.
21. Explain the steps for searching in a binary search tree.
22. Explain some applications of linked list.
23. Write down the algorithm to delete an element from a queue.

(5 × 4 = 20 marks)

Part D

Answer any **five** *questions.*
Each question carries 8 *marks.*

24. Write a C++ program to implement push and pop operations on stack.
25. Explain the insertion and deletion operation in a singly linked list.
26. Write a C++ to implement bubble sort.
27. Write a C++ program to implement POSTORDER traversal in a binary tree.
28. Explain with an example, the adjacency matrix representation of : a) Directed graph ; b) Undirected graph
29. Write down the algorithm to insert and delete an element from a circular queue.
30. Illustrate the working of radix sort algorithm with an example.
31. Explain the concept of folding method in hashing with example.

(5 × 8 = 40 marks)

CHMK LIBRARY UNIVERSITY OF CALICUT

D 11856 (Pages : 3) Name.....

Reg. No.....

THIRD SEMESTER (CUCBCSS–UG) DEGREE EXAMINATION NOVEMBER 2021

Information Technology

BIT 3C 05—DISCRETE MATHEMATICS

(2017—2018 Admissions)

Time : Three Hours Maximum : 80 Marks

Part A (Objective Type)

Answer **all** *ten questions.*

1. Which of the following is a proposition ?
   (i) It rained yesterday.
   (ii) What time is it ?
   (iii) Please submit your report as soon as possible.
   (iv) Close the door.
2. What is a tautology ?
3. Let A = {1, 2, 3, 4, 5}, B = {3, 5, 6} and C = {x : x is an even integer}. Find $(A \cap B) \cup C$.
4. State the idempotent laws in Boolean algebra.
5. Write the dual of the Boolean expression : $1 + xy$.
6. How many vertices do the graph K_{10} have ?
7. Draw a simple graph.
8. Draw a tree.
9. Find the number of vertices in a full binary tree with four internal vertices.
10. State Kuratowski's characterization of planarity of a graph.

(10 × 1 = 10 marks)

Part B (Short Answer Type)

Answer all **five** *questions.*

11. Find the symmetric difference of the sets $\{a, b\}$ and $\{a, c\}$.
12. Prove the uniqueness of '0' in Boolean algebra.

Turn over

CHMK LIBRARY UNIVERSITY OF CALICUT

13. Construct the truth table for OR gate.

14. A graph with four vertices of degree 1, 1, 2 and 3 doesn't exist. Why ?

15. In tree, prove that there is one and only one path between every pair of vertices.

(5 × 2 = 10 marks)

Part C (Short Essay Type)

Answer any **five** *questions.*

16. Express the following statements in symbolic form :

    (i) The hut will be destroyed if there is a cyclone.

    (ii) A new computer will be acquired if and only if additional funding is available.

17. Symbolize the following expressions :

    (i) All dogs are animals.

    (ii) Some roses are red.

18. Prove the involution law in Boolean algebra.

19. Prove that there can not be a graph in which the number of odd degree vertices is odd.

20. Give an example of a graph which is Hamiltonian but not Eulerian.

21. Define center of a graph. Draw a tree with 6 vertices and find its center.

22. (a) Define a m-ary tree.

    (b) Prove that a full m-ary tree with i internal vertices has $n = mi + 1$ vertices.

23. A connected plane graph has 10 vertices each of degree 3. Into how many regions does a representation of this planar graph split the plane ?

(5 × 4 = 20 marks)

Part D (Essay Type)

Answer any **five** *questions.*

24. Using truth table, prove that $p \vee (q \wedge r) \equiv (p \vee q) \wedge (p \vee r)$.

25. Give one example with illustrations for each of the following :

    (i) A relation which is reflexive and transtive but not symmetric.

    (ii) A relation which is neither symmetric nor antisymmetric.

    (iii) An equivalence relation.

CHMK LIBRARY UNIVERSITY OF CALICUT

D 12027 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER (CBCSS–UG) DEGREE EXAMINATION NOVEMBER 2021

Information Technology

BIT 3B 04—DATABASE DESIGN AND RDBMS

(2019—2020 Admissions)

Time : Two Hours Maximum : 60 Marks

Section A

Answer atleast **eight** *questions.*
Each question carries 3 *marks.*
All questions can be attended.
Overall ceiling 24.

1. Distinguish between data and information.
2. What is meant by strong entity ?
3. What is the use of alter statement ?
4. Define the term entity with examples.
5. Differentiate composite and multi-valued attributes.
6. What is DCL ?
7. What is meant by the term cardinality ?
8. What is meant by candidate key ? Discuss with example.
9. How to modify the structure of a table ?
10. Discuss the use of views in SQL.
11. How can we do pattern matching in SQL ?
12. What is use of DROP statement ?

(8 × 3 = 24 marks)

Section B

Answer atleast **five** *questions.*
Each question carries 5 *marks.*
All questions can be attended.
Overall ceiling 25.

13. What is the use of group by clause in SQL ?
14. Briefly explain referential integrity constraints.

CHMK LIBRARY UNIVERSITY OF CALICUT

15. Explain with an example 3NF.
16. Explain the roles and responsibilities of DBA.
17. Explain integrity constraints in relational model.
18. What do you mean by triggers ?
19. What is the difference between physical and logical data independence ?

(5 × 5 = 25 marks)

Section C

Answer any **one** *questions.*
The question carries 11 *marks.*

20. Explain with examples how database is organized in different data models.
21. Explain the for loop in PL/SQL with an example.

(1 × 11 = 11 marks)

CHMK LIBRARY UNIVERSITY OF CALICUT

D 12028 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER (CBCSS—UG) DEGREE EXAMINATION NOVEMBER 2021

Information Technology

BIT 3B 05—DATA STRUCTURES USING C++

(2019—2020 Admissions)

Time : Two Hours Maximum : 60 Marks

Section A

Answer at least **eight** *questions.*
Each question carries 3 *marks.*
All questions can be attended.
Overall Ceiling 24.

1. What is ADT ?
2. What are the different types of analysing an algorithm ?
3. What do you mean by Linear search ?
4. What do you mean by Primitive data structure ? Give example.
5. What is Dequeue ?
6. What is space complexity ?
7. What do you mean by Double linked list ?
8. Define Graph.
9. Write post fix notation of $A - B / (C * D \wedge E)$.
10. What is the height of a Tree ?
11. What is Hashing ?
12. Write limitations of linear queue.

(8 × 3 = 24 marks)

Turn over

CHMK LIBRARY UNIVERSITY OF CALICUT

Section B

Answer at least **five** *questions.*
Each question carries 5 *marks.*
All questions can be attended.
Overall Ceiling 25.

13. Explain working of Bubble sort.

14. Explain the concept of stacks along with their implementation in memory.

15. What is circular queue ? Describe briefly the different operations can be performed on circular queues ?

16. Explain Binary searching with its algorithm and an example.

17. Briefly explain circular linked list ? Write an algorithm or program for inserting a new node into a circular linked list.

18. Explain complete binary tree with example.

19. Define Graph data structure. Explain its applications.

(5 × 5 = 25 marks)

Section C

Answer any **one** *question.*
The question carries 11 *marks.*

20. What is Stack ? Write a program to implement stack using array ?

21. What is Hashing ? Explain in detail about hash table and hashing function.

(1 × 11 = 11 marks)

CHMK LIBRARY UNIVERSITY OF CALICUT

D 12029 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER (CBCSS–UG) DEGREE EXAMINATION NOVEMBER 2021

Information Technology

BIT 3C 05—DISCRETE MATHEMATICS

(2019—2020 Admissions)

Time : Two Hours Maximum : 60 Marks

Section A

Answer atleast **eight** *questions.*
Each question carries 3 *marks.*
All questions can be attended.
Overall ceiling 24.

1. Define partial ordering relations
2. How many edges are there in a graph with 10 vertices each of degree six ?
3. Define complete graph with n vertices . Draw a complete graph with 5 vertices
4. Define Planar graphs . Show that K_4 is planar.
5. What is regular graphs ?
6. Show that the distributive law $x(y + z) = xy + xz$ is valid.
7. Define Boolean Algebra.
8. What is the Cartesian product A × B × C, where A = {0, 1}, B = {1, 2}, and C = {0, 1, 2} ?
9. Prove that $(A \cap B)^C = A^C \cup B^C$.
10. Define spanning tree.
11. Let P (x) be the statement "$x + 1 > x$". What is the truth value of the quantification $\forall x$ P (x), where the domain consists of all real numbers?
12. Define Chromatic number of a graph. What is the chromatic number of Kn ?

(8 × 3 = 24 marks)

Turn over

CHMK LIBRARY UNIVERSITY OF CALICUT

D 12030 (Pages : 2) Name.....

Reg. No.....

THIRD SEMESTER (CBCSS—UG) DEGREE EXAMINATION, NOVEMBER 2021

Information Technology

BIT 3C 06—FUNDAMENTALS OF DIGITAL ELECTRONICS

(2019—2020 Admissions)

Time : Two Hours Maximum : 60 Marks

Section A

Answer at least **eight** *questions.*
Each question carries 3 *marks.*
All questions can be attended.
Overall Ceiling 24.

1. Convert (110101.101010) to octal and hexadecimal.
2. Write notes on 2's complements.
3. State and prove commutative law.
4. Compare positive and negative logic.
5. Define ASCII code.
6. Describe EX-OR gate with logic diagram and truth table.
7. Explain full adder with logic diagram.
8. What are decoders ?
9. Write notes on SOP and POS forms.
10. What are parallel binary adders ?
11. What are sequential circuits ?
12. What do you mean by master slave flipflops ?

(8 × 3 = 24 marks)

Section B

Answer at least **five** *questions.*
Each question carries 5 *marks.*
All questions can be attended.
Overall Ceiling 25.

13. Explain the procedure for converting a decimal number to binary. Also Convert $(132)_{10}$ to binary.
14. Simplify the Boolean expression A'BC + AC using postulates of Boolean algebra.
15. Write notes on sign magnitude representation.

Turn over

CHMK LIBRARY UNIVERSITY OF CALICUT

16. Explain the working of a multiplexer with a suitable diagram.

17. What do you mean by triggering of flipflops ? Explain.

18. Explain the working principle of a three bit synchronous binary counter.

19. Write notes on A/D and D/A converters.

(5 × 5 = 25 marks)

Section C

Answer any **one** *question.*

The question carries 11 *marks.*

20. Simplify the Boolean expression : $f(w, x, y, z) = \sum (0, 2, 4, 6, 8, 10, 12, 14, 15)$ in both SOP and POS forms using Karnaugh map.

21. What are shift registers ? Explain any one category of shift registers.

(1 × 11 = 11 marks)

CHMK LIBRARY UNIVERSITY OF CALICUT

D 91706 (Pages : 3) Name.....

Reg. No.....

THIRD SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION NOVEMBER 2020

Information Technology

BIT 3B 04—DATA STRUCTURES USING C++

(2014 Admissions)

Time : Three Hours Maximum : 80 Marks

Part A

Answer **all** *questions.*
Each question carries 1 *mark.*

1. FIFO stands for ————————.
2. ADT means ————————.
3. The matrix with zeros as its dominating elements is called ————————.
4. A linked list is a ———————— type of data structure.
   A) Linear. B) Non-Linear.
   C) Hierarchical. D) None of the above.
5. A stack is implemented using an array and associated declaration of stack is as follows :

   ini stack[100];

   int stacktop = 0;

   Which of the following statements below performs a POP operation?
   A) stack[stacktop++] = value;
   B) stack[++stacktop] = value;
   C) stack[stacktop—] = value;
   D) stack[-stacktop] = value;
6. A binary tree whose every node has either zero or two children is called as ————————.
   A) Complete binary tree. B) Binary search tree.
   C) Extended binary tree. D) None of above.

CHMK LIBRARY UNIVERSITY OF CALICUT

7. The equivalent postfix expression corresponding to the infix expression (A – B) * (D/E) is :

   A) ABDE/*– B) AB – D*E/

   C) AB – DE/* D) ABD*–E/

8. The complexity of insertion sort algorithm is ————————.

   A) O(n). B) O(log n).

   C) O(n2). D) O(n log n).

9. Say True *or* False : Dynamic memory allocation is done at runtime.

10. Say True *or* False : Expressions having unary operator cannot be represented using prefix or postfix notation.

(10 × 1 = 10 marks)

Part B

Answer **all** *questions.*
Each question carries 2 *marks.*

11. What is big O notation ?

12. How will you declare and initialize one dimensional array in C++ ?

13. What is LIFO ?

14. What are the operations on queue ?

15. Explain the complexity of insertion sort algorithm.

(5 × 2 = 10 marks)

Part C

Answer any **five** *questions.*
Each question carries 4 *marks.*

16. Distinguish between top-down and bottom-up approaches in developing algorithms.

17. Explain how two-dimensional array elements are stored and retrieved from computer memory.

18. What is Recursion ? Explain how recursion is implemented using stack.

19. What is Graph ? Explain the application of graph structures.

20. Compare the time complexity of linear search and binary search algorithm.

21. What is priority queue ? Explain any *one* application.

CHMK LIBRARY UNIVERSITY OF CALICUT

22. Explain complete binary tree with an example.

23. Write an algorithm to delete a node in a doubly linked list.

(5 × 4 = 20 marks)

Part D

Answer any **five** *questions.*
Each question carries 8 *marks.*

24. Explain the different parameters used for evaluating the efficiency of an algorithm.

25. Give an account on different types of arrays. Also explain the various operations on arrays.

26. What is a Stack ? Explain the different operations supported by stack.

27. Explain Inorder, Preorder and Postorder Traversal operation on Binary tree with example.

28. Explain Heap sort algorithm with suitable example. Also specify its complexity.

29. Explain Depth First Search traversal of Graph using an example.

30. Write an algorithm for converting Parenthesized Infix expression into Postfix expression.

31. What is Doubly Linked List ? Write an algorithm to insert and delete a node in Doubly Linked List.

(5 × 8 = 40 marks)

CHMK LIBRARY UNIVERSITY OF CALICUT