GES/SBVC/BVL

DATE: 02/11/2023

CLASS: F.Y.B.Sc. (IT) –SEM I

SUBJECT: Programming Principles with C.

Sem End/EXAM/ Nov 2023

TIME: 11.00 am TO 1.30pm

MARKS: 75

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Note : (1) **All** questions are **compulsory.**
       (2) Make **Suitable assumptions** wherever necessary and **state the assumptions** made.
       (3) Answers to the **same question** must be **written together**.
       (4) Numbers to the **right** indicate **marks**.
       (5) Draw **neat labeled diagrams** wherever **necessary**.
       (6) Use of **Non-programmable** calculators is **allowed.**

Q.1   Attempt ANY THREE from following   15 Marks

       a. What is flowchart? Explain the symbols used in it.
       b. What are the instructions? Explain types of it.
       c. Explain the rules for constructing integer constants.
       d. Explain the desirable program characteristics.
       e. What are the data types used in C?
       f. Explain the structure of the C program.

Q.2   Attempt ANY THREE from following   15 Marks

       a. What is a loop? Explain different types of it.
       b. Explain switch- case statements with syntax and examples.
       c. What is a conditional operator? Why is it called a ternary operator?
       d. What are logical operators? Explain with an example for each.
       e. Write a program in C to check whether the entered number is even or odd.
       f. Distinguish between while and do-while loop.

Q.3   Attempt ANY THREE from following   15 Marks

       a. What is a function? Explain types of it.
       b. Distinguish between call by value and call by reference.
       c. What is Recursion? Explain it with any program.
       d. What are header files? Explain the uses of it.
       e. Explain return values used in function.
       f. Explain the difference between function declaration and definition.

P.T.O.

Q.4   Attempt ANY THREE from following   15 Marks

        a. What is an array? Explain types of it.
        b. What is a string? Explain any FIVE string functions.
        c. Explain advantages and disadvantages of arrays.
        d. What is a pointer? Explain it with an example.
        E. Explain pointer to function with program.
        f. Explain the operators used in the pointer.

Q.5   Attempt ANY THREE from following   15 Marks

        a. Distinguish between structure and union.
        b. What is structure? Explain the syntax of it.
        c. Explain arrays of structure variables.
        d. Explain nested structure with program examples.
        e. Write a program to accept a set of 10 numbers and print the numbers using a pointer.
        f. Distinguish between array and structure.

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Q.1   Attempt Any THREE from following: **15 M**

a) Convert:
    1. 25.45 decimal no to binary no   3 marks
    2. 3CD hexadecimal no to Decimal   2 marks

b) Explain Logic gates with symbol and truth tables.

c) Convert:
    1. 45 decimal to BCD   2 marks
    2. 123 decimal to excess -3   2 marks
    3. 1110 Binary to Gray   1 mark

d) Write rules for Binary addition and add the following binary numbers
    1000011 + 1110001

e) Write a short note on Alphanumeric codes.

f) Perform subtraction (9 - 6) using 4-digit binary number using 2's Complement.

Q.2   Attempt Any THREE from following: **15 M**

a) Explain and Prove De-Morgan's Theorems.

b) For the logic expression Y= AB' + A'B, obtain the truth table, name the gate and operation performed and symbol for it. Also realize this using AND, OR, NOT gates.

c) Explain Universality of NAND gate.

d) Prove that: 1) A+AB+A'B=A+B
               2) A+AB = A

e) Simplify Y=$\sum$m (2,3,6,7,8,10,11,12) + d (14,15) using K map reduction technique and implement it using gates.

f) Simplify Y=$\prod$M (0,4,6,7) using K map and draw circuit.

Q.3   Attempt Any THREE from following: 15 M

   a) Design a combinational circuit for three input where output is high when maximum input is Low.
   b) Design combinational logic circuit for Binary to Gray Code converter.
   c) Design and Implement Half adder using basic gates.
   d) Design a two-bit comparator with 2 two bit numbers as input and three outputs.
   e) What is Multiplexer? Design and Implement 2:1 Multiplexer.
   f) Design and implement full adder using 8:1 Mux.

Q.4   Attempt Any THREE from following: 15 M

   a) Write a short note on clocked SR Flip-flop using four NAND gates.
   b) Draw and explain logic circuit diagram of D flip flop and advantages of D flip flop.
   c) Explain working of JK Flip Flop.
   d) Convert S-R Flip Flop to J-K Flip Flop.
   e) Discuss the design mod-3 ripple counter.
   f) What is a register? Explain different types of shift registers.

Q.5   Attempt Any THREE from following: 15 M

   a) Explain the role of ALU as a part of the computer system.
   b) Explain the working of Carry look ahead generator and its advantages.
   c) Explain with example Binary Multiplication Algorithm.
   d) Draw and explain the flowchart of binary division algorithm.
   e) Write a short note on Booth's Multiplication Algorithm.
   f) Using Binary Multiplication Algorithm multiply the following:
       a. Multiplicand = 13
       b. Multiplier = 11

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      (5) Draw **neat labeled diagrams** wherever **necessary.**

      (6) Use of **Non-programmable** calculators is **allowed.**

Q.1   Answer the following (any Three)   (15)

  (a)   Explain the concept of DBMS.

  (b)   Elaborate the characteristics of a Database Management System (DBMS).

  (c)   Explain the building blocks of the data model.

  (d)   What are the different types of keys in the database?

  (e)   Explain the difference between DBMS and RDBMS.

  (f)   Define a database and elucidate the architecture of a Database Management System (DBMS).

Q.2   Answer the following (any Three)   (15)

  (a)   What is an attribute? Explain the types of attributes.

  (b)   What are Constraints? Explain the types of Constraints.

  (c)   Describe an Entity-Relationship (ER) diagram and its constituent elements.

  (d)   Define the Relational Database Model and discuss its pros and cons.

  (e)   What is Database Design Methodology? Explain Different Phases of Design Methodology.

  (f)   Illustrate the concepts of generalization and specialization using appropriate examples.

Q.3   Answer the following (any Three)   (15)

  (a)   What is normalization? Explain the importance of normalization?

  (b)   What is decomposition? Explain types of it.

  (c)   Explain 2NF and 3NF in detail.

  (d)   Define normalization and explain its types?

  (e)   What is functional dependency? Explain it in detail..

  (f)   Explain database development life cycle in detail.

Q.4   **Answer the following (any Three)**   (15)

(a)   Define SQL (Structured Query Language) and elaborate on the rules and procedures governing its use.

(b)   Explain DML statements and its types.

(c)   Elaborate on Data Definition Language (DDL) commands and categorize them into different types.

(d)   Provide an explanation of Transaction Control Language (TCL) along with a practical example.

(e)   Explain Comparison Operator in SQL with an example.

(f)   Explain File organization with the help of a diagram.

Q.5   **Answer the following (any Three)**   (15)

(a)   What is a transaction? Explain different states of transaction.

(b)   Provide a comprehensive explanation of the ACID properties in database management.

(c)   Explain Timestamp ordering protocol.

(d)   What is a two phase locking protocol? Elaborate the types.

(e)   Define deadlock and outline the essential conditions required for a deadlock to occur.

(f)   Compose a brief overview of the database recovery system.

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GES/SBVC/BVL

SEMESTER END/EXAM/ Nov 2023

DATE: 06/11/2023

TIME: 11.00 am to 1.30 pm

PROGRAM: F.Y.B.Sc. (IT) –SEM I

MARKS:75

COURSE: Computational Logic and Discrete Structure

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Q.1 Attempt <u>any three</u> of the following questions. – [15 Marks]

A. If $A = \{1, 2, 3\}$ and $B = \{a, b\}$ then find $A \times B$, $B \times A$, $|A \times B|$.

B. Let $A = \{a, b, c, d\}, B = \{3, 4, 5, 6, 7\}, C = \{2, 3, 8, 9\}$ Then find

     1. $A - B$ 2. $B - A$ 3. $B \cap C$ 4. $A \cup B$ 5. $B - C$

C. In a school there are 20 teachers who teach mathematics or physics. Of these, 12 teach Mathematics and 4 teach both Mathematics and Physics. How many teach physics?

D. Define following terms.

     1. Reflexive relation   2. Symmetric relation   3. Equivalence relation

E. Given the relation R on set A = $\{1, 2, 3, 4\}$, such that R = $\{(1, 2), (2, 4), (3, 4), (4, 1), (4, 3)\}$

     Draw arrow diagram of relation R.

F. Whether the following relation defined on set A = $\{1, 2, 3\}$ are reflexive, symmetric or transitive. R = $\{(1, 1), (1, 2), (1, 3), (3, 3)\}$

Q.2 Attempt <u>any three</u> of the following questions. [15 Marks]

A. Let $f: A \to B$, such that $f(a) = 1, f(b) = 2, f(c) = 3, f(d) = 3$

     a) Write domain of function f   c) Find image set of function   e) Is f one-one?

     b) Is f onto?   d) What is image of a under f

B. Determine the value of $(i)[3.5]$, $(ii) [-3.4]$, $(iii)[9.457]$ $(iv)35 \, Mod \, 7$ $(v)20 \, Mod9$

C. Show that function $f: R \to R$ such that $f(x) = 2x$ is one -one and onto.

D. A coin is tossed 12 times. What is the chance that getting exactly 7 heads?

E. A single card is drawn from pack of cards. What is probability that card drawn Is

     a) King of spade   b) Red card

F. For the following probability distribution, find the expected value of variable X, (E(x))

X	1	2	3	4	5
P(x)	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$

P. T. O.

Q.3 Attempt <u>any three</u> of the following questions.   [15 Marks]

A. In how many ways can person go to city A to city B via city C, if 4 routes are available from city A to city C and 3 from city C to city B?

B. Show that at a party of 20 people, there are two people who have the same number of friends.

C. Find the number of distinct permutations that can be formed from all the letters of each word:

   a) PRANK   b) MONDAY   c) CHANCE

D. In how many ways are there to select 6 question from 9 questions?

E. Find first six terms of the sequence defined by the following recurrence relation.
$$a_n = a_{n-1} + 3a_{n-2}, a_0 = 1, a_1 = 1$$

F. Solve $a_n - a_{n-2} = n - 2$.

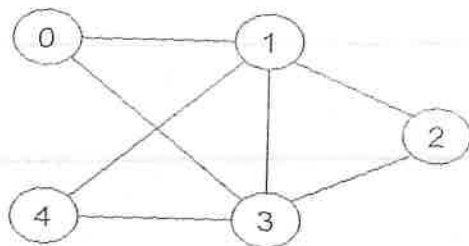**Q.4 Attempt <u>any three</u> of the following questions.**   [15 Marks]

A. How many nodes are necessary to construct a graph with exactly 6 edges in which each nodes is of degree 2.

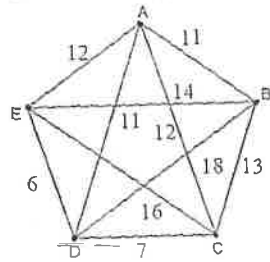B. For given graph, find degree of each vertex.
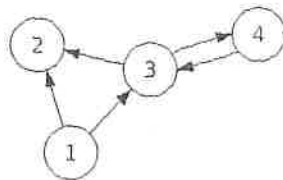
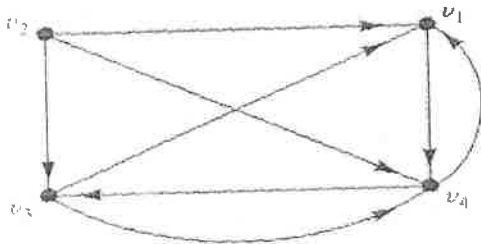

C. Show that following graphs are isomorphic.
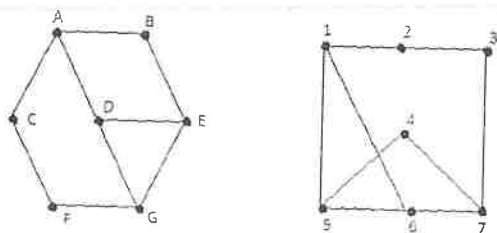
D. Check whether the given graph is Eulerian?

E. Use nearest neighbor method to find out Hamiltonian circuit for graph shown in Fig. starting vertex a. Also find minimum Hamiltonian circuit.
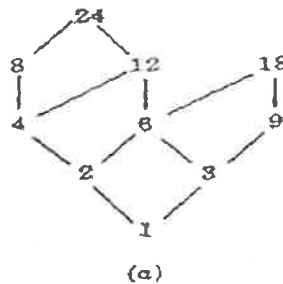

F. Find adjacency matrix of the given directed graph.

Q.5 Attempt **any three** of the following questions.   [15 Marks]

A. Draw diagram of complete tree T_{26}.

B. Let $A = \{1, 2, 3, 4, 6, 8, 9, 12, 18, 24\}$ be ordered by the relation 'x divides y'?

(a)

C. Define the following terms.
   a) Ordered Set
   b) Linearly ordered set
   d) Comparable element   c) Supremum
   e) Infimum

D. Let N = $\{1, 2, 3...\}$ be ordered by divisibility. State whether each of the following subsets of N are linearly (totally) ordered.
   (a) $\{24, 2, 6\}$ (b) N = $\{1, 2, 3 ...\}$ (c) $\{7\}$ (d) $\{3, 15, 5\}$ (e) $\{2, 8, 32, 4\}$

E. Show that if L be a bounded distributive lattice, then complements are unique if they exist.

F. Write the dual of each statement:
   $(a) (a \wedge b) \vee c = (b \wedge c) \vee (c \wedge a)$ $(b) (a \wedge b) \vee a = a \wedge (b \vee a)$

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       (5) Draw neat labeled diagrams wherever necessary.
       (6) Use of Non-programmable calculators is allowed.

Q.1   Attempt ANY THREE from following   15M

   a) Explain with a Diagram the process of Communication .
   b) What are the five directions of organizational communication? Explain with a diagram .
   c) What are the barriers in communication ?
   d) What are the obstructions in effective verbal and non - verbal communication ?
   e) How does Charles Darwin understand non-verbal communication ?
   f) Explain the terms: (i) Dress and Grooming
                      (ii) Body language
                      (iii) Silence
                      (iv) Communication tool.
                      (v) Eye Contact.

Q.2   Attempt ANY THREE from following   15M

   a) Elaborate on 7 C's of Effective Communication .
   b) What are the 5 W's in Effective Communication?
   c) What is group discussion? What are its benefits ?
   d) What is an e-mail? What are its etiquettes ?
   e) What is teleconferencing? What are the most common three types of teleconferencing ?
   f) What are the parameters to be kept before scheduling a meeting ?

Q.3   Attempt ANY THREE from following   15M

a) What points should be considered when preparing for a professional presentation ?
b) What is active and passive listening ?
c) What is an interview? What types of interviews are there ?
d) What is powerpoint presentation and state the importance of visual aids in it
e) How many types of Resumes are there and in What way one is different from the other ?
f) Explain Business communication Ethics upon well written letters . What are the types of business letters ?

Q.4   Attempt ANY THREE from following   15M

a) What is a Resume? State the importance of it .
b) Video Resumes are generally short but there are some tips to be followed. What are they?
c) Explain the advantages and disadvantages of online Recruitment.
d) What is career building ? Explain its benefits .
e) Explain the different parts of the memo .
f) What is MIS? What are its objectives ?

Q.5   Attempt ANY THREE from following   15M

a) Does ethics exist in Business Communication ? What are its key principles ?
b) Write about the ethical dilemmas faced by the manager .
c) Explain the visual aids along with the preparation of the visual aids .
d) Explain about the Teleological and Deontological approaches to the co-operates ethics .
e) What tips will you give to your junior to use the elements of financial communication ?
f) Explain the following terms :

        (i) Communication
        (ii) Business Letters
        (iii) Verbal and non - verbal communication .

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