

**Group - B (1×15=15)**

1. Write a program to impliment binary search.
2. Write a program to remove duplicate elements from the array.
3. Write a program to implement Bubble sort.
4. Write a program to impliment Matrix multiplication.
5. Write a program to impliment call by value and call by reference.
6. Write a program to impliment array of pointer and pointer to an array.
7. Write a program to update student roll according to their Number.
8. Write a program to find the transpose of a given matrix.
9. Write a program to find the length of the string (without using strlen() ) and also find the reverse of a string.
10. Write a recursive program to find the factorial of an integer number.

--0--

**BCA First Semester Examination(ESE)- 2024****(CCFUP : NEP)****(4 Year UG-Programme)****BCA****Paper Code :- UG/I/BCA/4/SEC 01P****Paper Name : Problem Solving Technique Lab****Full Marks - 40****Time - 4 hours***(The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable)***Write one question from group A one question from Group-B****Group - A**

1. Write a program in C to find out Non fibonici numbers between the range 1 to N where N is given by user.
2. Write a program in C to find out Prime numbers between the range 1 to N where N is given by user.
3. Write a program in C to find out root of Quadrature Equation.
4. Write a program in C to find Armstrong number between the range 1 to N where N is given by user.
5. Write a program in C to implement a calculator using switch cases.
6. Write a program in C to impliment pascle triangle.
7. Write a program in C to find out Palindrome between the range 1 to N where N is given by user.
8. Write a program to generate Fibonacci series upto 150.
9. Write a program to compute prime factors of a positive integer number.
10. Write a program to find the sum of the following series:

$$S = x - \frac{x^3}{31} + \frac{x^5}{51} - \frac{x^7}{71} + \dots$$

12. Briefly describe different relational and logical operators used in C programming.

**Group - C**

**Answer any one question: (10×1=10)**

13. a) Explain the concepts of operator precedence and associativity in C with example. 3  
 b) Write Flow chart to check whether a given number is a prime or not. 5  
 c) How to declare and initialize a two-dimensional array? 2
14. a) Describe about these function.  
 Strlen()  
 Stract()  
 b) Give the example of infinite loop.  
 c) Write the algorithm to implement Bubble sort algorithm

--0--

**BCA First Semester Examination(ESE)- 2024**

**(CCFUP : NEP)**

**(4 Year UG-Programme)**

**BCA**

**Paper Code :- UG/I/BCA/4/SEC 01P**

**Paper Name : Problem Solving Technique Lab**

**Full Marks - 40**

**Time - 4 hours**

*(The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable)*

**Group - A**

**Answer any five questions:**

1. What is structured programming ?
2. Give one difference between ASCII and UNICODE.
3. Explain the purpose of the continue statement.
4. What is an else-if ladder
5. Explain the purpose of a function prototype.
6. List the steps involved in problem -solving.
7. Explain the differences between entry-controlled and exit controlled loops with an example.
8. What are the characteristics of an algorithm ?

**Group - B (1×15=15)**

**Answer any six questions:**

9. Write the algorithm to find out Armstrong number between the range 1 to N where N is given by user.
10. Describe recursion with an example and explain how it differs from iterative solutions.
11. Describe the process of binary search and how it differs from sequential search.

**Group - C****Answer any one question: (10×1=10)**

13. a) Discuss the levels of memory hierarchy, including main memory, cache memory and auxiliary storage, and explain how each level differs in speed, cost and size. Describe the role of each type in optimizing system performance. 5+5
- b) State and prove De Morgan's theorems with examples.
14. a) Calculate the Effective Access Time (EAT) for a memory system with a main memory access time of 100 ns and a cache access time of 10ns, assuming a cache hit rate of 90%.
- b) Explain different addressing modes in a CPU. Provide examples of each mode

--0--

**BCA First Semester Examination(ESE)- 2024****(CCFUP : NEP)****(4 Year UG-Programme)****BCA****Paper Code :- UG/I/BCA/4/CC102T****Paper Name : Computer Architecture****Full Marks - 30****Time - 2 hours***(The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable)***Group - A (5×2=10)****Answer any five questions:**

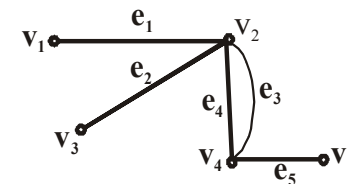
1. What is the Von-Neumann architecture ?
2. Define a 'don't care' condition in K-maps.
3. What is pipelining in computer architecture ?
4. List two advantages of using cache memory.
5. Define the instruction cycle.
6. What is the role of a program counter in a CPU ?
7. What is virtual memory ?
8. Differentiate between combinational and sequential circuits.

**Group - B (2×5=10)****Answer any two questions:**

9. Explain the function of an SR flip-flop and its characteristic table. How does it differ from a D flip-flop. 4+1
10. Draw the working of a half adder and a full adder circuit. How do they differ in functionality ? 2+2+1
11. What is stack organization in computer architecture ? Describe its operations (PUSH and POP).
12. What is DMA ? Explain how it improves data transfer efficiency.

**BCA First Semester Examination(ESE)- 2024****(CCFUP : NEP)****(4 Year UG-Programme)****BCA****Paper Code :- UG/I/BCA/4/CC101T****Paper Name : Problem Solving Technique Lab****Full Marks - 70****Time - 4 hours***(The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable)***Group - A****1. Answer any five questions:**

- Define simple graph.
- Define rank of a matrix.
- Find the number of permutations of the letters in the word 'COMPUTER'.
- When a relation is said to be an equivalence relation?
- Define power set of a set. If a set S contains three elements, then find the number of elements of the power set of S.
- Find the degree of each vertex for the following graph



- Find the matrix X, where

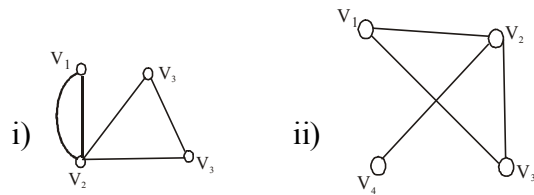
$$X + \begin{bmatrix} 4 & 6 \\ -3 & 8 \end{bmatrix} = \begin{bmatrix} 3 & -6 \\ 5 & -7 \end{bmatrix}$$

- If  $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$ , Show that  $A^2 - 5A + 7I = 0$ .

**Group - B (5×6=30)**

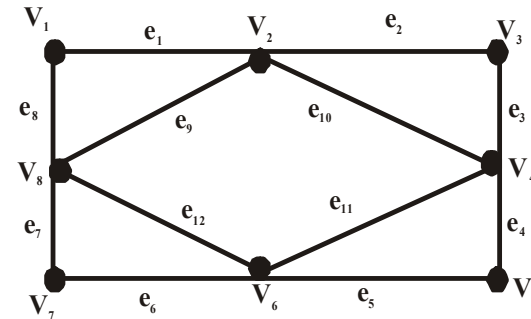
**2. Answer any six questions:**

- a) Show that an undirected graph has an even number of vertices of odd degree. 5
- b) Show that the mapping defined by is surjective but not injective. 5
- c) State which of the following graphs are simple.



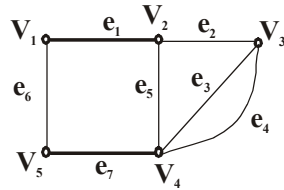
- d) Given  $A = \{1, 2, 3\}$ ,  $B = \{2, 4\}$ ,  $C = \{2, 3, 5\}$   
 Find i)  $A \cap B, A \cap C$  and  $(A \cap B) \cup (A \cap C)$   
 ii)  $B \cup C$  and  $A \cap (B \cup C)$   
 Hence verify the result  $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$
- e) If  $R$  be a relation in the Set of integers  $Z$  defined by  
 $R = \{(x, y) : x \in z, y \in z, (x - y) \text{ is divisible by } 6\}$   
 Then prove that  $R$  is an equivalence Relation.
- f) If  $f : R \rightarrow R$  is a function such that  $f(x) = 3x + 5$ . Prove that  $f$  is one-one onto. 5+5
- g) If  $f$  and  $g$  are functions defined from  $R$  to  $R$ , Find  $f \circ g, g \circ f, f \circ f$  and  $g \circ g$ .  
 $f(x) = x^2 + 2, g(x) = 3x$ .
- h) If  $A = \{0, 1\}$  and  $B = \{0, -1\}$ , find

- b) Determine whether the following graph has an Euler circuit.  
 Find an Euler circuit, if it exists

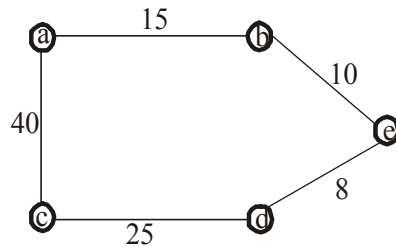


\_\_\_\_\_

[ 4 ]



- i)  $(v_1, e_1, v_2)$
  - ii)  $(v_2, e_2, v_3, e_3, v_4, e_4, v_3)$
  - iii)  $(v_2, e_2, v_3, e_3, v_4, e_4, v_3, e_2, v_2)$
  - iv)  $(v_4, e_7, v_5, e_6, v_1, e_1, v_2, e_2, v_3, e_3, v_4)$
  - v)  $(v_4, e_4, v_3, e_3, v_4, e_5, v_2, e_1, v_1, e_6, v_5, e_7, v_4)$
6. a) Define Euler Graph and Hamiltonian path and circuits. 5+5  
 b) Draw all spanning trees of the following weighted connected graph.



7. a) Show that a simple graph G with n vertices is connected if G has at least  $(n-1)(n-2)/2$  vertices.

[ 3 ]

- i)  $(A \times B)$
  - ii)  $(B \times A)$
- Under what condition will  $A \times B = B \times A$

- i) Find x, y, z and t if  $2 \begin{bmatrix} x & z \\ y & t \end{bmatrix} + 3 \begin{bmatrix} 1 & -1 \\ 0 & 0 \end{bmatrix} = 3 \begin{bmatrix} 3 & 5 \\ 4 & 6 \end{bmatrix}$
- ii) If  $A = \begin{bmatrix} 2 & 5 \\ 3 & 1 \end{bmatrix}$ , then find  $A^2 - 3A - 13I$ .

**Group - C**

3. Answer any three questions: (10×3=30)

a) If  $A = \begin{bmatrix} 1 & -2 & 3 \\ -4 & 2 & 5 \end{bmatrix}$  and  $B = \begin{bmatrix} 4 & 5 \\ -2 & 1 \end{bmatrix}$

Find AB and BA and show that  $AB \neq BA$

- b) If A is a skew -symmetric matrix, then prove that  $A^2$  is symmetric. 5+5

4. a) If  $A = \begin{bmatrix} 3 & -1 & 2 \\ 4 & 0 & 5 \end{bmatrix}$  and  $B = \begin{bmatrix} -1 & 2 \\ 3 & -4 \\ 5 & 0 \end{bmatrix}$  Verify that  $(AB)' =$

$B'A'$ , where A' and B' denote the transpose matrix of A and B respectively.

- b) Solve the following system of equations by matrix method.  
 $5x + 7y = -2$   
 $4x + 6y = -3$

- 5. a) Prove that the maximum degree of any vertex in a simple graph with n vertices is  $n - 1$ .
- b) Determine whether the given walk in the following graph is  
 i) path      ii) a trail      iii) closed walk      iv) a cycle

2. What are the steps to install a printer trouble shooting?
3. What are the necessary steps to assemble a PC, from mounting the motherboard to final cable management and power-up ?
4. Configure BIOS settings-disable and enable USB and LAN.
5. What are the steps to safely install additional RAM into a computer, including precautions against static discharge?
6. Locate various ports : CPU, VGA port, PS/2 (keyboard, mouse), USB, LAN, Speaker, Audio and mark positions of SMPS, motherboard, FDD, HDD, CD, DVD and add on cards.
7. Locate a computer's name RAM capacity, processor type and system bit version (32-bit or 64-bit) on a Windows machine. Identify and troubleshoot the problems of RAM, SMPS and motherboard.
8. Configure LAN setup and Wi-Fi setup.
9. Design a student registration form using google form.
10. Create a on line meeting link using google meet with google calender.

--0--

**BCA First Semester Examination(ESE)- 2024**

**(CCFUP : NEP)**

**(4 Year UG-Programme)**

**BCA**

**Paper Code :- UG/I/BCA/4/CC102P**

**Paper Name : Computer Architecture Lab.**

**Full Marks - 30**

**Time - 4 hours**

*(The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable)*

**Group - A**

**Answer any one questions from the following: (15×1=15)**

**(on lottery basis)**

1. Implement and verify De-Morgan's theorem for 2 variables.
2. Implement a hardware circuit of an S-R flip-flop using NAND gate.
3. Implement a hardware circuit to convert BCD to Excess-3 code using NAND gate.
4. Implement of half Subtract or (3-bit) using basic logic gates.
5. Implementation of Full Adder (3-bit) using basic logic gates.
6. Design 2 to 4 decoder using universal logic gates.
7. Design and implement the 4 : 1 MUX using basic logic gates.
8. Design and implement a 8 bit parity generator.
9. Convert Binary to Grey Code and implement it.
10. Verify the truth table table of J-K Flip-Flop using NAND/NOR gate.

**Group - B (1×15=15)**

**Answer any one questions from the following:**

1. How do you install and configure windows OS ?