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(CBCS)

(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA–201

(Personality and Soft Skills Development)

Full Marks : 60

Time : 3 hours

The figures in the margin indicate full marks for the questions

1. Answer any *two* of the following : 10×2=20

(a) "Personality, unlike many believe, is not in-born and static. It can be consciously developed and changed." Elaborate.

(b) Write a note on Time Management and its importance.

(c) What are the techniques for writing effective e-mails?

(d) Discuss the role of communication skills in Personality Development.

2. Write short notes on any *two* of the following : 5×2=10

(a) Motivation

(b) Qualities of a leader

(c) Importance of goal setting

(d) Team building

3. *(a)* Draft an e-mail to the Mayor of the Aizawl Municipal Council about the importance of maintaining cleanliness within the city of Aizawl. Invent necessary details. 10

<div align="center">**OR**</div>

(b) Write a job application letter to the Director, Higher and Technical Education for the job of a Data Entry Operator. Provide your resume. 10

4. Answer any *two* of the following : 10×2=20

(a) As the proprietor of Bajaj Electrical Goods, draft a letter of acknowledgement to your supplier from Delhi.

(b) Write a letter to a firm of your choice ordering certain number of textbooks for students of First and Second Semester BCA.

(c) As the owner of Highland Computer House, write to a firm of your choice complaining about the quality of goods they have sent. Invent necessary details.

5. Oral Communication (15 Marks)

To be conducted in the College.

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2 0 1 8

(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper : BCA–201 (OC)

(Introduction to Programming Language through C)

(Old Course)

Full Marks : 75

Time : 3 hours

(PART : A—OBJECTIVE)

(*Marks* : 25)

The figures in the margin indicate full marks for the questions

SECTION—A

(*Marks* : 15)

1. Tick (✓) the correct answer in the brackets provided : 1×10=10

(a) Which of the following special symbol is allowed in a variable name?
(i) (Asterisk) ( ) *(ii)* | (Pipeline) ( )
(iii) - (Hyphen) ( ) *(iv)* _ (Underscore) ( )

(b) How would you round off a value from 1.66 to 2.0?
(i) ceil(1.66) ( ) *(ii)* floor(1.66) ( )
(iii) roundup(1.66) ( ) *(iv)* roundto(1.66) ( )

(c) What is the output of the following C code?

```
#include <stdio.h>
 int main( )
 {
    do
       printf("In while loop");
    while (0);
       printf("After loop\n");
 }
```

  (i) In while loop   (   )

  (ii) In while loop after loop   (   )

  (iii) After loop   (   )

  (iv) Infinite loop   (   )

(d) The minimum number of iteration for a do while loop is

  (i) −1   (   )   *(ii)* 0   (   )

  (iii) 1   (   )   *(iv)* 2   (   )

(e) Input/output function prototypes and macros are defined in which header file?

  (i) conio.h   (   )   *(ii)* stdlib.h   (   )

  (iii) stdio.h   (   )   *(iv)* dos.h   (   )

(f) Global variables are ___ variables.

  (i) internal   (   )

  (ii) external   (   )

  (iii) internal and external   (   )

  (iv) None of the above   (   )

(g) What does the following declaration mean?

          int (ptr)[10];

  (i) ptr is an array of pointers to 10 integers   (   )

  (ii) ptr is a pointer to an array of 10 integers   (   )

  (iii) ptr is an array of 10 integers   (   )

  (iv) ptr is a pointer to an array   (   )

(h) How will you print \n on the screen?

    (i) printf("\n");   (   )   *(ii)* echo "\\n";   (   )

    (iii) printf('\n');   (   )   *(iv)* printf("\\n");   (   )

(i) The correct syntax to use typedef for struct is

    (i) typedef struct temp

```
    {
      int a;
    }TEMP;                    (   )
```

    (ii)   typedef struct

```
    {
      int a;
    }TEMP;                    (   )
```

    (iii)   ) struct temp

```
    {
      int a;
    };
    typedef struct temp TEMP;        (   )
```

    (iv) All of the above   (   )

(j) What is the similarity among a structure, union and enumeration?

    (i) All of them let you define new values   (   )

    (ii) All of them let you define new data types   (   )

    (iii) All of them let you define new pointers   (   )

    (iv) All of them let you define new structures   (   )

2. State whether the following are *True* (*T*) or *False* (*F*) by putting Tick (✓) mark :   1×5=5

(a) The ++ operator increments the operand by 1, whereas the -- operator decrements it by 1.

                                              (T / F)

(b) Continue keyword skips one iteration of loop.

                                              (T / F)

(c) Functions cannot return more than one value at a time.

                                              (T / F)

(d) A pointer to a block of memory is effectively same as an array.

(T / F)

(e) A union cannot be nested in a structure.

(T / F)

SECTION—B

(*Marks* : 10)

Answer the following questions :   2×5=10

1. Define recursion. Give example.

2. Define constant variable. How do we declare variable?

3. Differentiate between structure and union.

4. Define the functions printf( ) and scanf( ).

5. What is meant by infinite loop?

(PART : B—DESCRIPTIVE)

(*Marks* : 50)

The figures in the margin indicate full marks for the questions

1. *(a)* What is operator in C? Define the different types of operator in C.   7

  (b) What is the use of operator precedence in C? Give example.   3

OR

  (c) Define data types. List out and explain different data types in C.   7

  (d) Define the basic structure of C program with example.   3

2. *(a)* Write a simple program to demonstrate if...else statement.   5

  (b) Define enumeration. Write a simple program to illustrate enumeration.   5

OR

  (c) Write a simple program to demonstrate FOR loop.   5

  (d) Write a simple program to demonstrate Switch statement.   5

3. *(a)* Define arrays. Explain the different types of array.   6

(b) Define the scope and lifetime of a variable.   4

OR

(c) Explain insertion sort with example.   5

(d) What is the difference between call by value and call by reference?   5

4. *(a)* Write a C program for concatenation of two strings.   5

(b) Define pointers. How do you declare and initialize pointers in C?   5

OR

(c) Write a C program for comparing two strings.   5

(d) What are arrays of pointers? Write a simple program to illustrate arrays of pointers.   5

5. *(a)* What is file? Write a simple program to illustrate opening and closing of file.   4

(b) What are user-defined data types?   2

(c) Define array of structure with example.   4

OR

(d) Define structure. Write a simple example to demonstrate structure.   7

(e) Explain the different input and output operations in file.   3

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2 0 1 8

(CBCS)

(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA–202

[Mathematics—II (Discrete Mathematics)]

Full Marks : 75

Time : 3 hours

(PART : A—OBJECTIVE)

(*Marks* : 25)

The figures in the margin indicate full marks for the questions

SECTION—A

(*Marks* : 15)

1. Tick (✓) the correct answer in the brackets provided : 1×10=10

(a) A set A is a proper subset of a set B, if

   (i) $A \quad B$ ( ) (ii) $A \quad B$ ( )

   (iii) $A \quad B$ ( ) (iv) Both *(i)* and *(ii)* ( )

(b) In a distributive lattice, if $b \quad \bar{c} \quad 0$, then

   (i) $b \quad c$ ( ) (ii) $c \quad b$ ( )

   (iii) $c \quad b$ ( ) (iv) $b \quad c \quad 0$ ( )

(c) For any statement formula $P \quad Q$, the statement $P \quad Q$ is called its

   (i) inverse ( ) (ii) converse ( )

   (iii) contrapositive ( ) (iv) transitive ( )

(d) If A and B are well-formed formulas, then

   (i) $A \quad B$ is not well-formed formula ( )

   (ii) $A \quad B$ is not well-formed formula ( )

   (iii) $A \rightleftharpoons B$ is not well-formed formula ( )

   (iv) $A \quad B$ is well-formed formula ( )

(e) The number of different messages than can be represented by sequences of 3 dashes and 2 dots is

   (i) 7   (   )   *(ii)* 8   (   )

   (iii) 6   (   )   *(iv)* 10   (   )

(f) The third term in the expansion of $(2x \; 3y)^5$ is

   (i) $720 \, x^3 y^2$ (   )   *(ii)* $720 \, x^2 y^3$ (   )

   (iii) $670 \, x^3 y^2$ (   )   *(iv)* $670 \, x^2 y^3$ (   )

(g) Any subgroup of a cyclic group

   (i) is non-Abelian   (   )   *(ii)* has order 5   (   )

   (iii) is cyclic   (   )   *(iv)* is non-cyclic   (   )

(h) In the group $\{2, 4, 6, 8\}$ under multiplication modulo 10, the identity element is

   (i) 4   (   )   *(ii)* 6   (   )

   (iii) 2   (   )   *(iv)* 8   (   )

(i) An edge of a graph that is not self-loop is called a/an

   (i) loop   (   )   *(ii)* empty   (   )

   (iii) proper edge   (   )   *(iv)* regular edge   (   )

(j) A graph without multiple edges and loops is called

   (i) digraph   (   )   *(ii)* tree   (   )

   (iii) branch   (   )   *(iv)* simple graph   (   )

2. Tick (✓) whether the following statements are True (*T*) or False (*F*) :   1×5=5

(a) A closed walk that does not contain a repeated edge is called a loop.

                                                              (*T* / *F*)

(b) Every finite group is isomorphic to a permutation group.

                                                             (*T* / *F*)

(c) A sequence of *n* distinct elements of a finite set *A* with *n* elements is called a permutation.

                                                             (*T* / *F*)

(d) A product of the variables and their negations in a formula is called elementary sum.

                                                             (*T* / *F*)

(e) A set *A* is said to be uncountable if *A* is finite or countable.

                                                             (*T* / *F*)

SECTION—B

(*Marks* : 10)

Answer the following questions :   2×5=10

1. Compute the total number of students in a class if 50 students take Mathematics and 6 students take Computer Science but 30 students are taking both the courses.

2. Write the truth table for $(P \lor Q) \land P$.

3. Show that $C(k, 1) + 6C(k, 2) + 6C(k, 3) = k^3$.

4. If $a^2 = e \ \forall \ a \in G$, then show that G is Abelian.

5. Define a subgraph and a tree.

(PART : B—DESCRIPTIVE)

(*Marks* : 50)

The figures in the margin indicate full marks for the questions

1. *(a)* Define a Boolean algebra and write its basic properties.   5

    (b) Let $n = p_1 p_2 \ldots p_k$, where p_i are distinct primes known as set of atoms. Show that the poset D_n is a Boolean algebra.   5

OR

    (c) If A, B and C are sets, prove that $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$.   5

    (d) Draw Venn diagrams and show the sets $\sim B$, $\sim (A \cup B)$, $B \cap (\sim A)$, $\sim A \cup B$ and $\sim A \cap B$, where $A \subset B$ and $\sim$ denotes complement.   5

2. *(a)* Show that $(\sim P \land (\sim Q \land R)) \lor (Q \land R) \lor (P \land R) \Leftrightarrow R$.   5

    (b) Obtain disjunctive normal form of $(P \land Q) \rightleftharpoons (P \lor Q)$.   5

OR

    (c) Obtain the principal disjunctive normal form of

$$P \lor ((P \rightarrow Q) \land (\sim Q \rightarrow \sim P))$$ 5

    (d) Define tautologies. Explain them with an example.   5

3. *(a)* Find the number of distinguishable permutations of the letters in the word 'Mathematics'. What is a 'combination'?   4+1=5

(b) Find the term independent of x in the expansion of $\left(\dfrac{4x^2}{3} \quad \dfrac{3}{2x} \right)^9$.   5

OR

(c) A woman has 11 close friends and she wants to invite 5 of them to dinner. In how many ways can she invite them, if—

    (i) there is no restriction on the choice;

    (ii) two particular persons will not attend separately?   1+4=5

(d) Find the sum of the coefficients of even powers of x in the expansion of $(1 \quad x \quad x^2 \quad x^3)^5$.   5

4. *(a)* Prove that the set G of all non-zero complex numbers is a group under usual multiplication.   5

*(b)* State and prove Lagrange's theorem.   5

OR

(c) Let G be a group such that $(ab)^n \quad a^n b^n$ for 3 consecutive integers n for all $a, b \quad G$. Show that G is Abelian.   5

(d) Show that union of two subgroups is a subgroup if one of them is contained in the other.   5

5. *(a)* Prove that a tree with n vertices has $(n \quad 1)$ edges.   5

(b) Let G be a planar graph with v vertices, e edges and f faces. Then show that

$$v \quad e \quad f \quad 2 \qquad 5$$

OR

(c) Obtain a minimal spanning tree for the graph G :   10

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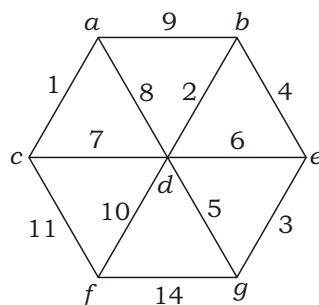
2 0 1 8

(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA–202 (OC)

[Mathematics—II (Numerical Analysis)]

(Old Course)

Full Marks : 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

1. *(a)* Find the real root of the equation $f(x) = x^3 - x - 1 = 0$ lying between 1 and 2 by bisection method.   8

(b) Find the real root of the equation $x^3 - 9x + 1 = 0$ by regula falsi method.   7

OR

(c) Solve the system of linear equations

$$8x + 7y + 10z = 15$$
$$2x + 3y + 8z = 7$$
$$4x + 5y + 2z = 9$$

using Cramer's rule.   8

(d) Solve

$$x + 3y + 2z = 17$$
$$x + 2y + 3z = 16$$
$$2x + y + 4z = 13$$

using Gauss-Jordan method.   7

2. *(a)* By the method of group averages, fit a curve of the form $y = ax^b + c$ from the data given below :   10

x	0·5	1	2	4	8	12
y	160	120	94	75	62	56

OR

(b) Using the method of least squares, fit a law of the type $y = ae^{bx}$ to the data given below : 10

x	0	1	2	3
y	1·05	2·10	3·85	8·30

3. (a) Apply Gauss' forward formula to obtain $f(x)$ at $x = 3·5$ from the table given below : 8

x	2	3	4	5
$f(x)$	2·626	3·454	4·784	6·986

(b) From the following table, find y when $x = 43$, using Newton's interpolation formula : 7

x	40	50	60	70	80
y	184	204	226	250	276

OR

(c) By means of Newton's divided difference formula, find the value of $f(8)$ from the table given below : 8

x	4	5	7	10	11	13
$f(x)$	48	100	294	900	1210	2028

(d) Find the value of y at $x = 10$ by using Lagrange's interpolation formula : 7

x	5	6	9	11
y	12	13	14	16

4. (a) Find $f'(1·5)$ and $f''(1·5)$ from the following table : 6

x	1·5	2·0	2·5	3·0	3·5	4·0
$f(x)$	3·375	7·000	13·625	24·000	38·875	59·000

(b) Evaluate $\int_{0}^{6} \dfrac{dx}{1+x^2}$ using, (i) trapezoidal rule, (ii) Simpson's one-third rule and (iii) Simpson's three-eigth rule. 9

5. *(a)* Solve any *two* of the following differential equations :   4×2=8

     (i) $\dfrac{dy}{dx} = \dfrac{x+1}{y+2}$

     (ii) $(x^3 + y^3)\,dy - x^2 y\,dx = 0$

     (iii) $x\dfrac{dy}{dx} + y = x^2$

   (b) Determine the degree and order of the equation

$$\left(\dfrac{d^2 y}{dx^2}\right)^3 + 2\left(\dfrac{dy}{dx}\right)^4 + 9 = \sin x$$

                                                                           2

6. *(a)* Solve $\dfrac{dy}{dx} = y + x^2$, given $y(0) = 1$. Obtain the values of $y(0\cdot 1)$ and $y(0\cdot 2)$ using Picard's method.   10

<div align="center">OR</div>

   (b) Apply the fourth-order Runge-Kutta method to find $y(0\cdot 2)$, given that $y' = x + y$, $y(0) = 1$.   10

<div align="center">★ ★ ★</div>

2 0 1 8

(CBCS)

(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. BCA–203

(Data Structure using C)

Full Marks : 75

Time : 3 hours

(PART : A—OBJECTIVE)

(*Marks* : 25)

The figures in the margin indicate full marks for the questions

SECTION—I

(*Marks* : 15)

1. Tick (✓) the correct answer in the brackets provided :   1×10=10

   (a) The amount of memory used by an algorithm until it completes its execution of a program is

      (i) time complexity   (   )

      (ii) space complexity   (   )

      (iii) dynamic programming   (   )

      (iv) complexity of algorithm   (   )

(b) All the automatic variables or local variables are stored in

   (i) stack   (   )

   (ii) heap   (   )

   (iii) permanent storage area   (   )

   (iv) ROM   (   )

(c) A pointer to a function is declared as

   (i) type *funptr()   (   )

   (ii) type (funptr)()   (   )

   (iii) type (*funptr)()   (   )

   (iv) type *funptr   (   )

(d) Which of the following sorting techniques is inefficient when there are more elements?

   (i) Bubble sort   (   )

   (ii) Selection sort   (   )

   (iii) Insertion sort   (   )

   (iv) Quicksort   (   )

(e) The time complexity of quicksort algorithm is

   (i) $O(n^2)$ (   )

   (ii) $O(\log n)$ (   )

   (iii) $O(n)$ (   )

   (iv) $O(n \log n)$ (   )

(f) The postfix notation is also called

   (i) suffix notation   (   )

   (ii) reverse Polish notation   (   )

   (iii) Both *(i)* and *(ii)*   (   )

   (iv) Polish notation   (   )

(g) The queue which provides a means to insert and remove items at both ends of the queue is

   (i) linear queue   (   )

   (ii) circular queue   (   )

   (iii) priority queue   (   )

   (iv) deque   (   )

(h) The linked list which has no null pointers, hence all pointers contain valid address is

   (i) single-linked list   (   )

   (ii) circular-linked list   (   )

   (iii) double-linked list   (   )

   (iv) All of the above   (   )

(i) The number of edges for a tree with n vertices is

   (i) n 1   (   )

   (ii) n (   )

   (iii) n 1   (   )

   (iv) $(n$ 1$)/2$ (   )

(j) The number of edges for a complete graph with n nodes is

   (i) n 1   (   )

   (ii) $n/2$ (   )

   (iii) $n(n$ 1$)/2$ (   )

   (iv) $n(n$ 1$)/2$ (   )

2. Tick (✓) whether the following statements are *True* (*T*) or *False* (*F*) : 1×5=5

(a) A void pointer is a generic pointer that can represent any pointer type.

(*T* / *F*)

(b) In binary search technique, elements are eliminated by half in each pass.

(*T* / *F*)

(c) Input-restricted deque allows insertion at both ends but allows deletion at one end.

(*T* / *F*)

(d) The data items in the linked list are in consecutive memory location.

(*T* / *F*)

(e) BFS traversal algorithm uses a stack to keep track of vertices which need to be processed.

(*T* / *F*)

(*Marks* : 10)

Answer the following questions :   2×5=10

1. Define an abstract data type (ADT). Give one example.

2. Show how bubble sort processes the inputs
     9, 8, 3, 1, 4, 2

3. Transform the following infix expression to prefix expression :
     $(Z \quad (((X \quad 1) * 2) \quad 5) / Y)$

4. Define a linked list. What is the disadvantage of linked lists?

5. Write the properties of binary search tree.

(PART : B—DESCRIPTIVE)

(*Marks* : 50)

The figures in the margin indicate full marks for the questions

1. Answer the following questions :

   (a) What is dynamic memory allocation? Explain the dynamic memory
        allocation functions.   1+4

   (b) Define a data structure. Explain the concept for 'arrys of pointers' with
        an example.   1+4

OR

(c) Define an algorithm. What is space and time complexity of an algorithm? 1+3

(d) What is a pointer? Explain the concept for 'pointer and function' with an example. 1+5

2. *(a)* Write the function code for implementation of linear search technique. 4

(b) Write a C program for sorting a list of numbers in an array using quicksort. 6

OR

(c) Write a C program for implementation of binary search technique. 6

(b) Write a C program for sorting a list of numbers in an array using selection sort. 4

3. *(a)* Write the functions code of push() and pop() operations in a stack using an array. 5

(b) Evaluate the given postfix expression 5

6 5 2 3 8 * 3 *

using stack.

OR

(c) Convert the given infix expression

$A (B * C (D / E F) * G)$

into postfix expression using stack. 5

(d) Write the functions code of insert() and display() operation of an ordinary queue. 5

4. *(a)* Write the advantages of linked lists. 4

(b) Write the functions code for inserting, deleting nodes at the beginning of a single-linked list. 6

OR

(c) What is the disadvantage of ordinary queue? How can you overcome this disadvantage? 4

(d) Write the functions code for creating and displaying nodes of a circular linked list.   6

5. *(a)* Construct a binary tree from the given pre-order and in-order sequence :   5

Pre-order : $n1, n2, n3, n4, n5, n6, n7, n8, n9$
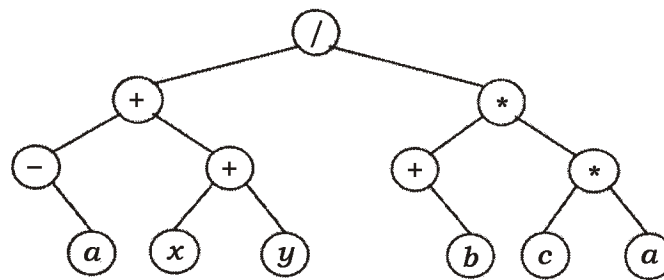In-order : $n6, n2, n1, n4, n3, n5, n9, n7, n8$

(b) What are depth-first search and breadth-first search of a graph? Explain with a diagram.   5
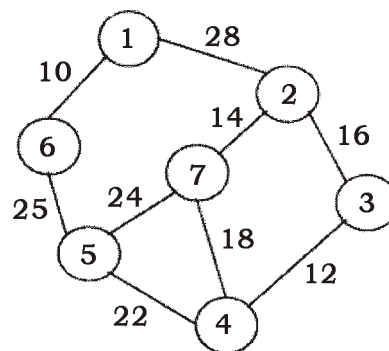
OR

(c) Traverse the following binary tree in pre-order, in-order, and post-order.   5

(d) Construct a minimal spanning tree (MST) for the graph shown below starting at vertex (1).   5

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(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper : BCA–203 (OC)

(Introduction to Computer Architecture and Organisation)

(Old Course)

Full Marks : 75

Time : 3 hours

(PART : A—OBJECTIVE)

(*Marks* : 25)

The figures in the margin indicate full marks for the questions

SECTION—A

(*Marks* : 15)

1. Tick (✓) the correct answer in the brackets provided :   1×10=10

(a) Half-adder can add
   (i) 1 bit   (   )
  (ii) 2 bits   (   )
 (iii) 3 bits   (   )
 (iv) 4 bits   (   )

(b) The collection of all status bit conditions in the CPU is called
   (i) Program Status Word   (   )
  (ii) Processor Status Word   (   )
 (iii) Program Stored Word   (   )
 (iv) Processor Stored Word   (   )

(c) Input or output devices attached to the computer are also called
  (i) truth table ( )
  (ii) peripheral devices ( )
  (iii) RAM ( )
  (iv) CPU ( )
(d) Which of the following memories is volatile?
  (i) RAM ( )
  (ii) Magnetic disk ( )
  (iii) Optical disk ( )
  (iv) Flash drive ( )
(e) Data are represented in the computer as
  (i) binary ( )
  (ii) unary ( )
  (iii) ternary ( )
  (iv) magnetic ( )
(f) The input symbolic program in the Assembler is called the
  (i) source program ( )
  (ii) object program ( )
  (iii) target program ( )
  (iv) code program ( )
(g) Internal interrupts are also called
  (i) external interrupt ( )
  (ii) trap ( )
  (iii) software interrupt ( )
  (iv) exception ( )
(h) A command issued to activate the peripheral and to inform it what to do is
  (i) data output command ( )
  (ii) status command ( )
  (iii) control command ( )
  (iv) data input command ( )
(i) Binary information is represented in digital computers by physical quantities is called
  (i) gate ( )
  (ii) interface ( )
  (iii) signal ( )
  (iv) logic unit ( )

(j) Which of the following can store data?
  (i) ALU ( )   *(ii)* EXE ( )
  (iii) Flip-flop ( )   *(iv)* Pipeline ( )

2. Tick (✓) whether the following statements are *True (T)* or *False (F)* :   1×5=5

(a) The NOR function is the complement of the OR function.

(T / F)

(b) The Arithmetic Logic Unit supervises the transfer of information among the registers.

(T / F)

(c) The transfers of data in magnetic disk is faster than the data transfer speed of CPU.

(T / F)

(d) Page fault signifies page referenced by the CPU is not in the main memory.

(T / F)

(e) The program that translates an assembly language program to binary is called Assembler.

(T / F)

SECTION—B

(*Marks* : 10)

Answer the following questions :   2×5=10

1. State De Morgan's theorem.

2. What is pipelining?

3. Write the advantage of using input-output processor.

4. What is a cache memory?

5. Distinguish between machine language and assembly language.

(PART : B—DESCRIPTIVE)

(*Marks* : 50)

The figures in the margin indicate full marks for the questions

1. *(a)* Write the graphic symbol and truth table for AND, OR, NOR and NOT gates.   5

(b) What is *J-K* flip-flop? Write its graphic symbol and characteristic table.   5

OR

(c) Simplify the following Boolean functions using Karnaugh mapping :   5
  (i) $F = x'z + y'z + yz' + xy'$
  (ii) $F(A, B, C, D) = \Sigma(5, 6, 7, 12, 13) + d(4, 9, 14, 15)$

(d) What is a full adder? Write its truth table and logic diagram.   5

2. (a) Explain the purpose of the following registers :   8
  (i) Program counter   (ii) Instruction register
  (iii) Memory buffer register   (iv) Accumulator

(b) Explain different phases of instruction cycle.   2

OR

(c) Differentiate between the addressing modes—implied mode and immediate mode.   4

(d) Differentiate between internal interrupts and external interrupts.   6

3. (a) Write a short note on Direct Memory Access (DMA).   6

(b) What are isolated I/O and Memory-Mapped I/O?   4

OR

(c) Explain the strobe control and handshaking mode of asynchronous data transfer.   6

(d) What are synchronous and asynchronous data transfer? Explain.   4

4. (a) What are different hierarchies in memory? Explain its advantages.   5

(b) Explain associative mapping by giving a suitable example.   5

OR

(c) Explain the working of synchronous counter by giving a suitable diagram.   5

(d) Explain by giving a suitable diagram how addresses are mapped using paging.   5

5. (a) What are directives? Explain the different directives supported by 8086.   6

(b) Differentiate between linker and assembler.   4

OR

(c) What is an interrupt? Explain different types of interrupt in the 8086 microprocessor.   5

(d) Write an assembly language program to demonstrate data transfer.   5

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2 0 1 8

(CBCS)

(2nd Semester)

BACHELOR OF COMPUTER APPLICATION

Paper No. : BCA-203P

(Data Structure Using C)

(Practical)

Full Marks : 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

Answer *any* **two** questions from Section—A and *any* **one** question from Section—B

SECTION—A

1. Write a C program for sorting a list of numbers using insertion sort.   15

2. Write a C program to search any given number in an array using linear search.   15

3. Write a C program for sorting a list of numbers using merge sort.   15

SECTION—B

4. Write a C program for circular queue and perform the following operations : 20

(a) Inserting an element in the queue.

(b) Deleting an element from the queue.

5. Write a C program for reversing a list of given numbers in a linked list. 20

SECTION—C

6. Viva voce. 15

7. Record book. 10

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2 0 1 8

(CBCS)

(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. BCA–204

(System Analysis and Design)

Full Marks : 75

Time : 3 hours

(PART : A—OBJECTIVE)

(*Marks* : 25)

The figures in the margin indicate full marks for the questions

SECTION—A

(*Marks* : 15)

1. Tick (✓) the correct answer in the brackets provided : 1×10=10

   (a) SSAD stands for
   (i) System Structured Analytic of Design ( )
   (ii) Structured System Analysis and Design ( )
   (iii) Structured Software Analysis Design ( )
   (iv) Software Structured Analyst and Design ( )

   (b) Doing business is also a system with its components being
   (i) marketing ( )
   (ii) information system ( )
   (iii) organization ( )
   (iv) nervous system ( )

(c) Choose the odd one.
  (i) Design document ( )
  (ii) Program document ( )
  (iii) Operations document ( )
  (iv) Referential document ( )

(d) Minimodel of the proposed system is
  (i) information system ( )
  (ii) prototype ( )
  (iii) nervous system ( )
  (iv) design document ( )

(e) The trend in data processing systems is towards
  (i) remote processing ( )
  (ii) real-time processing ( )
  (iii) distributed processing ( )
  (iv) All of the above ( )

(f) Information is
  (i) collection of words ( )
  (ii) processed data ( )
  (iii) data ( )
  (iv) All of the above ( )

(g) _____ model is a two-dimensional chart depicting system elements and their linkages.
  (i) Dynamic system ( )
  (ii) Schematic ( )
  (iii) Flow system ( )
  (iv) Both *(ii)* and *(iii)* ( )

(h) The basic objective of system analysis is to
  (i) understand computer hardware by opening the system unit ( )
  (ii) train managers in mathematical analysis ( )
  (iii) run simulation programs ( )
  (iv) understand a complex system and modify it in some way ( )

(i) Cost-benefit analysis

   (i) compares the costs with the benefits of introducing a computer-based system   (   )

   (ii) estimates hardware and software costs   (   )

   (iii) evaluates the tangible and intangible factors   (   )

   (iv) All of the above   (   )

(j) If the requirement analysis phase of a software development project is not conducted properly, then the

   (i) resulting system would be delivered before time   (   )

   (ii) output reports would be indecipherable   (   )

   (iii) system might fail to address the real needs of users   (   )

   (iv) All of the above   (   )

2. Tick (✓) whether the following statements are True (*T*) or False (*F*) : 1×5=5

(a) Physical systems are tangible.

                                               (*T* / *F*)

(b) Business refers to industry and commerce.

                                               (*T* / *F*)

(c) Information means the same as data.

                                               (*T* / *F*)

(d) All systems are not predetermined objectives.

                                               (*T* / *F*)

(e) System analysts have to interact with users in the organization.

                                               (*T* / *F*)

SECTION—B

(*Marks* : 10)

Answer the following questions :   2×5=10

1. Define system.

2. Differentiate between open system and close system.

3. What is documentation?

4. Define prototype.

5. Explain process modeling.

(PART : B—DESCRIPTIVE)

(*Marks* : 50)

The figures in the margin indicate full marks for the questions

1. *(a)* Explain waterfall model. What are the advantages and disadvantages of waterfall model? Draw the diagram of waterfall model.   10

OR

(b) Explain the sub-systems of a business system.   5

(c) Discuss the basic principles of successful systems.   5

2. *(a)* Explain SDLC and various phases of SDLC.   10

OR

(b) Explain the uses of documentation.   5

(c) Discuss about enforcing documentation discipline in an organization.   5

3. *(a)* Write short notes on the following :   10

    (i) Interviews

    (ii) Group communication

    (iii) Presentations

    (iv) Site visits

OR

(b) What is feasibility study? Explain the importance of feasibility study.   5

(c) Explain about system selection plan and proposal.   5

4. *(a)* What is DFD? What are the characteristics of DFD? Discuss about the symbols used in DFDs.   10

OR

(b) What are forms? Explain different types of form.   5

(c) What is user interface? Explain five features of a good user interface.   5

5. *(a)* Explain the system implementation and implementation techniques.   5

(b) Write about the conversion methods.   5

OR

(c) Explain system acceptance criteria.   5

(d) Define testing and validation.   5

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2 0 1 8

(CBCS)

(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper : BCA–205

(Accounting and Financial Management)

Full Marks : 75

Time : 3 hours

(PART : A—OBJECTIVE)

(*Marks* : 25)

The figures in the margin indicate full marks for the questions

SECTION—A

(*Marks* : 15)

1. Tick (✓) the correct answer in the brackets provided :   1×10=10

   (a) Companie's profit divided among shareholders is

   (i) interest   (   )

   (ii) reserve   (   )

   (iii) dividend   (   )

   (iv) surplus   (   )

   (b) Which financial statement is used to show what the firm owns?

   (i) Income statement   (   )

   (ii) Balance Sheet   (   )

   (iii) Statement of retained earnings   (   )

   (iv) Cash-flow statement   (   )

(c) According to accounting equation, assets are equal to

   (i) liabilities   (   )

   (ii) liabilities and equities   (   )

   (iii) equities   (   )

   (iv) All of the above   (   )

(d) Which of the following is not a current asset?

   (i) Accounts receivable   (   )

   (ii) Inventory of finished products   (   )

   (iii) Inventory of raw materials   (   )

   (iv) Land   (   )

(e) Which of the following describes a record of the transactions?

   (i) General Ledger   (   )

   (ii) Income Statement   (   )

   (iii) Balance Sheet   (   )

   (iv) Journal   (   )

(f) _____ is the art of recording, classifying and summarizing the transactions and events of a business and interpreting the results thereof.

   (i) Bookkeeping   (   )

   (ii) Accounting   (   )

   (iii) Management   (   )

   (iv) Auditing   (   )

(g) The long-term assets that have no physical existence but are rights that have value are known as

   (i) current assets   (   )

   (ii) fixed assets   (   )

   (iii) intangible assets   (   )

   (iv) investments   (   )

(h) The assets that can be converted into cash within a short period (i.e., 1 year or less) are known as

   (i) current assets

   (ii) fixed assets   (   )

   (iii) intangible assets   (   )

   (iv) investments   (   )

(i) Patents, copyrights and trademarks are

   (i) current assets   (   )

   (ii) fixed assets   (   )

   (iii) intangible assets   (   )

   (iv) investments   (   )

(j) The process of entering all transactions from the journal to ledger is called

   (i) posting   (   )

   (ii) entry   (   )

   (iii) accounting   (   )

   (iv) All of the above   (   )

2. State whether the following statements are True (*T*) or False (*F*) by putting a Tick (✓) mark in the brackets provided :   1×5=5

(a) Accounting Standards and Generally Accepted Accounting Principles are one and the same thing.   (T / F)

(b) Accounting is an information and measurement system that identifies records and communicates financial information to users.

     (T / F)

(c) Finished goods are always viewed at cost of production.

     (T / F)

(d) Inventory is more liquid than receivables.   (T / F)

(e) Debt-equity ratio is called leverage ratio.   (T / F)

(*Marks* : 10)

Answer the following questions :   2×5=10

1. What is overhead? Explain how they are allocated.

2. Differentiate between Financial Accounting and Management Accounting.

3. How does budget differ from forecast? Explain.

4. How is interest on capital treated as adjustment while preparing final accounts?

5. Explain the concept of zero-based budgeting.

(PART : B—DESCRIPTIVE)

(*Marks* : 50)

The figures in the margin indicate full marks for the questions

Answer Question No. **1** and *any* **three** from the rest

1. *(a)* From the following balances of Mr. Mawia, you are required to prepare a Trading and Profit & Loss Account for the year ended 31st December, 2017 and a Balance Sheet as on that date after making necessary adjustments :   15

Particulars	₹	Particulars	₹
Purchases	1,20,500	Capital	52,000
Stock as on 1.1.2017	21,500	Sales	1,86,000
Salaries	14,000	Sundry Creditors	10,900
Rent and Taxes	3,000		
Insurance	800		
General Expenses	3,100		
Wages	25,000		
Machinery	31,000		
Sundry Debtors	20,000		
Cash at Bank	3,000		
Drawings	7,000		
	2,48,900		2,48,900

Adjustments :

   (i) Salaries for the month of December still unpaid ₹ 1,600

   (ii) Insurance prepaid to the extent of ₹ 250

   (iii) Depreciation on machinery by 10%

   (iv) Closing stock was valued at ₹ 26,000

  (b) Explain the term 'bad debts' by using a suitable example.   5

2. Journalize the following transactions :   10

2017				₹
March	1	:	Mohan commenced business with cash	10,000
"	3	:	Bought goods for cash	5,000
"	6	:	Sold goods to Praveen	3,000
"	7	:	Sold goods for cash	5,750
"	10	:	Received cash from Praveen	1,000
"	12	:	Purchased furniture from Michael & Co.	10,000
"	18	:	Paid for office rent	500
"	24	:	Purchased goods from Balan	1,500
"	28	:	Cash paid to Balan	700
"	30	:	Received interest	240

3. Explain the following ratios and give brief descriptions of their usefulness :   10

  (a) Current ratio

  (b) Stock turnover ratio

  (c) Debt-equity ratio

  (d) Debtors turnover ratio

4. "It is argued by some accountants that the full advantage of standard costing can be achieved only when the standards are perfect." In the light of the above statement, explain the objectives, advantages and limitations of standard costing.   10

5. Discuss the differences between fixed and flexible budgeting. Why are flexible budgets considered superior to fixed budgets? Explain.   10

6. What is a cost sheet? Give a specimen of cost sheet and explain the different items included in it.   10

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2 0 1 8

(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA–205 (OC)

(Programming Language through C)

(Practical)

(Old Course)

Full Marks : 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

SECTION—A

Answer *any* **two** questions

1. Write a C program to find the sum of digits of accepted numbers.   15

2. Write a C program to check whether the given number is prime or not.   15

3. Write a C program to find the factorial of a given number.   15

Answer *any* **one** question

4. Write a C program to arrange the accepted numbers in ascending order or descending order using bubble sort.   20

5. Write a C program to display the following format on screen :   20

<div align="center">

1

2 3

4 5 6

7 8 9 10

</div>

SECTION—C

6. Viva voce.   15

7. Record book.   10

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2 0 1 8

(CBCS)

(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA–205P

(Tally ER P–9.0)

(Practical)

Full Marks : 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

SECTION—A

Answer *any* **one** question

1. Using tally, journalize the following transactions and post them in the Ledger A/c :   20

2017				Amount ₹
January	1	Commenced business with a capital of		80,000
"	3	Purchased machinery		10,000
"	5	Withdrawn from bank for office use		10,000
"	7	Purchased goods from Siama on credit		9,000
"	8	Paid cash to Siama		8,800
		Discount received		200

2017			Amount ₹
January	11	Sold goods to Kima	5,000
"	16	Received cash from Kima	4,900
		Discount allowed	100
"	18	Purchased goods from Siama from cash	6,000
"	20	Paid wages	3,000
"	22	Rent received	5,000

2. Using tally, journalize the following transactions and post them in the Ledger A/c : 20

2017

March	1	Started business with cash—₹ 1,00,000
"	2	Deposited into bank—₹ 10,000
"	4	Paid salary—₹ 10,000
"	5	Purchased goods worth ₹ 70,000 on credit from Muana Enterprises
"	7	Credit sales of goods worth ₹ 80,000 to Liana Company
"	10	Return goods to Muana Enterprises—₹ 10,000
"	13	Received goods returned by Liana company—₹ 5,000
"	15	Purchased furniture ₹ 5,000 from Rini Enterprises for cash
"	17	Received commission—₹ 4,000
"	20	Withdrawn from bank—₹ 10,000

SECTION—B

Answer *any* **one** question

3. From the following Trial Balance, prepare Trading, Profit & Loss A/c and a Balance Sheet as on 31st March, 2015 : 30

Particulars	Debit ₹	Credit ₹
Machinery	80,000	
Furniture	15,000	
Opening Stock	45,000	
Wages	40,000	

Particulars	Debit ₹	Credit ₹
Purchases	1,10,000	
Return Inward	10,000	
Cash at Bank	10,000	
Cast in Hand	5,000	
Debtors	70,000	
Drawings	20,000	
Manufacturing Expenses	7,000	
Rent	10,000	
Income Tax	10,000	
Repairs	8,000	
Salaries	30,000	
Bad Debts	5,000	
Bills Receivable	12,000	
Carriage	9,000	
Capital		1,99,000
Bills Payable		20,000
Sales		2,20,000
Creditors		50,000
Return Outward		7,000
	4,96,000	4,96,000

Closing Stock was valued at ₹ 50,000.

4. From the following Trial Balance, prepare Trading, Profit & Loss A/c and a Balance Sheet as on 31st March, 2015 : 30

Particulars	Debit ₹	Credit ₹
Machinery	14,000	
Furniture	200	
Opening Stock	2,000	
Wages	5,000	
Purchases	10,500	
Return Inward	400	

Particulars	Debit ₹	Credit ₹
Cash at Bank	800	
Cash in Hand	200	
Debtors	2,400	
Drawings	1,000	
Manufacturing Expenses	800	
Rent	400	
Depreciation	420	
Sundry Expenses	400	
Repairs	50	
Travelling Expenses	100	
Bad Debts	150	
Printing and Stationery	50	
Carriage	130	
Capital		10,000
Sales		26,800
Creditors		1,700
Return Outward		500
	39,000	39,000

The value of Closing Stock was ₹ 11,355

SECTION—C

Viva voce.   15

Record book.   10

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(2nd Semester)

BACHELOR OF COMPUTER APPLICATIONS

Paper No. : BCA–206 (OC)

(Assembly Language)

(Practical)

(Old Course)

Full Marks : 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

SECTION—A

Answer *any* **two** questions

1. Write an assembly language program to find the smaller and the larger between two numbers.   10

2. Write an assembly language program to convert a 4-digit BCD number into its binary equivalent.   10

3. Write an assembly language program to check if string is a palindrome or not.   10

SECTION—B

Answer *any* **two** questions

4. Write an assembly language program to transpose a matrix. 15

5. Write an assembly language program to calculate linear equation ax b 0, the result is printed with floating point. 15

6. Write an assembly language program to convert all letters in a string to upper case letters. 15

SECTION—C

6. Record book. 10

7. Viva voce. 15

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