

2022

COMPUTER SCIENCE

Total marks : 70

Time : 3 hours

General instructions:

- i) *Approximately 15 minutes is allotted to read the question paper and revise the answers.*
- ii) *The question paper consists of 29 questions. All questions are compulsory.*
- iii) *Marks are indicated against each question.*
- iv) *Internal and general choice have been provided in some questions.*

N.B: *Check to ensure that all pages of the question paper are complete as indicated on the top left side.*

- | | |
|---|---|
| 1. What is normal exit? | 1 |
| 2. Define Keyword. | 1 |
| 3. What is the purpose of function prototype? | 1 |
| 4. Define abstraction. | 1 |
| 5. What is meant by stream? | 1 |
| 6. What is the meaning of “this” pointer? | 1 |
| 7. Why array is called static data structure? | 1 |
| 8. List two ways to implement stack. | 1 |
| 9. What is meant by cardinality? | 1 |
| 10. Define candidate key. | 1 |
| 11. What is a bridge? | 1 |
| 12. Define Unicode. | 1 |
| 13. What is copy constructor? What is meant by constructor overloading? | 2 |
| 14. Differentiate between multiple and multilevel inheritance. | 2 |
| 15. What are pointers? What are the two operators used with pointers? | 2 |
| 16. What is the output of the following program?
#include <iostream.h>
#include <conio.h> | 2 |

```
void main( )
{
    clrscr( );
    int x[10] = {10, 11, 12, 13, 14, 15, 16, 17, 18, 19};
    int i;
    for (i = 0; i < 10; i++)
    {
        cout <<" i = " << i << " x[i] = " << x[i]
            << " *(x + i) = " << *(x + i);
        cout << endl;
    }
}
```

- 17. Define insertion and merge sort. 2
- 18. What is meant by front and rear in queues? 2
- 19. How can one drop a column from a table? 2
- 20. Prove the following by truth table: 2
 $x + x'y = (x + x')(x + y)$
- 21. Prove the following algebraically. 2
 $x.(x + y) = x$
- 22. What is TCP/IP? 2
- 23. What is freeware and shareware? 2
- 24. a. What is Object Oriented Programming? How is it different from Procedural Programming? 2

Or 4

- b. What is operator overloading? Explain with example.
- 25. Answer **any three (3)** questions. 4
 - (a) Define a class employee with the following specifications: 4
 - Private members of class employee
 - empno integer
 - ename 20 characters
 - basic, hra, da float
 - netpay float
 - calculate() a function to calculate:
basic + hra + da with float return type
 - Public member function of class employee
 - havedata() function to accept values for empno.
sname, basic, hra, da and invoke calculate()
to calculate netpay.
 - dispdata() function to display all the data members on the screen.

- (b) Define data members, member function, private and public members with examples. 4
- (c) Write down some characteristics of destructors. 4
- (d) What is meant by visibility modes in class derivations? What are these modes? 4
- (e) Consider the following C++ declarations and answer the questions given below: 4

```
class ALPHA {
    int x, y;
protected:
    void putvalA( );
public:
    void getvalA( );
};
class BETA : private ALPHA {
    int m, n;
protected:
    void getvalB ( );
public:
    void putvalB( );
};
class GAMMA : protected BETA {
    int a;
public:
    void getdata( );
    void showdata( );
};
```

- (i) Write the names of member functions, which are accessible from the objects of class GAMMA.
 - (ii) Write names of data members, which are accessible from the member functions of class BETA.
 - (iii) Name the base class and derived class of class BETA.
 - (iv) Name the private member functions of class GAMMA.
- (f) Differentiate between fstream class and ifstream class. 4

26. Answer **any two (2)** questions.

- (a) Consider the following key set : 42, 29, 74, 11, 65, 58, use insertion sort to sort the data in ascending order and indicate the sequence of steps required. 4
- (b) X[1..16][1..10] is a two dimensional array. The first element of the array is stored at location 100. Each element of array occupies 6 bytes. Find the memory location of X[2][4] when (i) array is stored row wise and (ii) array is stored column wise. 4

- (c) Evaluate the following postfix expression using a stack and show the contents of stack after execution of each operation:
100, 40, 8, +, 20, 10, -, +, * 4
 - (d) Write down the steps used to convert infix expression into postfix form? 4
27. a. What is SQL? Explain the three features of SQL. 4

Or

- b. Write SQL commands for (i) to (vii) on the basis of the table SPORTS:

Student No.	Class	Name	Game1	Grade	Game2	Grade
10	7	Sameer	Cricket	B	Swimming	A
11	8	Sujit	Tennis	A	Skating	C
12	7	Kamal	Swimming	B	Football	B
13	7	Veena	Tennis	C	Tennis	A
14	9	Archana	Basketball	A	Cricket	A
15	10	Arpit	Cricket	A	Athletics	C

- (i) Display the names of the students who have grade ‘C’ in either Game1 or Game2 or both.
- (ii) Display the number of students getting grade ‘A’ in Cricket.
- (iii) Display the names of the students who have same game for both Game1 and Game2.
- (iv) Display the games taken up by the students, whose name starts with ‘A’.
- (v) Add a new column named “Marks”.
- (vi) Assign a value 200 for Marks for all those who are getting grade ‘B’ or grade ‘A’ in both Game1 and Game2.
- (vii) Arrange the whole table in the alphabetical order of Name.

28. a. Reduce the following Boolean expression using K-Map.
F(P, Q, R, S) = $\pi(0, 3, 5, 6, 7, 11, 12, 15)$ 4
- Or**
- b. State Demorgan’s laws. Verify one of the Laws using truth table.

29. a. Differentiate between packet switching and message switching technique in network communication. 4
- Or**
- b. What is the role of front end and back end in cloud computing architecture?
