Answer key
SUBJECT : COMPUTER SCIENCE

Time : 3 hour 15 min   Max. marks : 70

I.   Answer **ALL** the questions   10 x 1= 10
  1. Expand the term DDRRAM.
      Double Data Rate Random Access Memory
  2. Write the standard symbol for two input NOR gate.

  3. Give and example for non-primitive data structure.
      Stack, Queue, Tree, Linked list or Graph
  4. What is meant by data encapsulation?
      Wrapping of data and functions related to it in a single unit called class, is called data encapsulation.
  5. Which symbol is used as address operator in C++?
      &
  6. Define tuple.
      A row of in a table is called tuple
  7. What is Wide Area Network?
      WAN is a computer network that covers a broad area.
  8. What is ring topology?
      A ring topology is a network configuration in which device connection creates a circular data path.
  9. Mention any one type of e-commerce.
      Business to Business, Business to customer, Customer to customer or Customer to Business
  10. What is free hosting?
      Free hosting is a free of cost web hosting service.

II.   Answer any **TEN** questions   10 x 2 = 20
  11. Prove that $X . \overline{X} = 0$.

      If $X = 0$, then $\overline{X} = 1$ LHS $= X . \overline{X}$
                                                    $= 0 . 1$
                                                    $= 0 = RHS$ Hence $X . \overline{X} = 0$
      If $X = 1$, then $\overline{X} = 0$ LHS $= X . \overline{X}$
                                                    $= 1 . 0$
                                                    $= 0 = RHS$ Hence $X . \overline{X} = 0$

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12. Prove X.(X+Y) =X algebraically.

LHS $= X(X+Y)$ $= XX + XY$

$= X+XY$ $(\therefore X.X = X)$

$= X(1+Y)$

$= X.1$ $(\therefore 1+Y = 1)$

$= X$ $= RHS$

13. Give any two applications of OOP.

a) Computer animation:

Animation software use object oriented programming techniques.

b) User interface design such as windows:

Object oriented programs are used to design user interface such as windows.

c) Relational data base

Object oriented programs are used to access relational data base.

d) Administrative tools and system tools

It is used to develop administrative tools and system tools

(Any two)

14. What is destructor? What is the symbol used for destructor.

Destructor is a special function that automatically executed when an object is destroyed.

~ is the symbol used with its name

15. Mention any two ofstream functions.

put(), write()

16. Define Primary Key and Candidate Key.

A Primary key is a set of one or more columns that uniquely identify each row within a table.

A column or a set of columns inside a relation that can serve as primary key are called as candidate keys.

17. Differentiate between DELETE and DROP commands in SQL.

DELETE command is used to delete records from a table.

DROP command is used to delete the table itself.

18. Briefly explain circuit switching technique.

Circuit switch is a connection technique that directly connects the sender and the receiver in an unbroken path.

It is much the same as in the telephone system

III.   Answer any **FIVE** questions   5 x 3 = 15

19. What is the purpose of UPS? Mention different types of UPS.

UPS(Uninterruptible Power Supply):
➢   An UPS is a power supply that includes a battery to regulate the power supply and to maintain power in the event of a power failure.
➢   There are two types of UPS. Online UPS and Standby UPS.

20. Explain the working of two input logic NAND gate with logic symbol and truth table.

NAND gate is an inverted AND gate.
Truth table

A	B	$F = \overline{A.B}$
0	0	1
0	1	1
1	0	1
1	1	0

Symbol:

21. Give the memory representation of two dimensional array using column major ordering.
Consider the bellow given integer array of order 2x3.

(0,0)	(0,1)	(0,2)
22	32	18
(1,0)	(1,1)	(1,2)
45	56	23

Column-major order (Column-major representation)

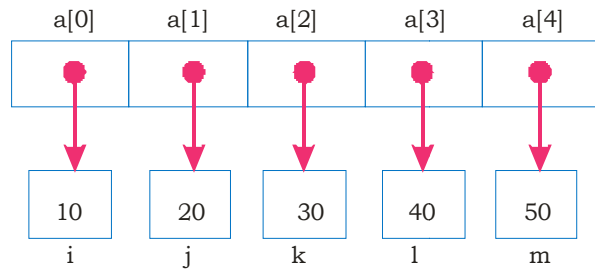If we use Column-major representation, it will be written in the memory as follows:

22. Define an array of pointers. Give example.

Array of pointer is collection of addresses of same data type.

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The example below shows the array of pointers.

```
int     *iptr[5];
int     i, j, k, l, m;
iptr[0] = &i;          *iptr[0] = 10;
iptr[1] = &j;          *iptr[1] = 20;
iptr[2] = &k;          *iptr[2] = 30;
iptr[2] = &l;          *iptr[3] = 40;
iptr[4] = &m;          *iptr[4] = 50;
```

a[0]	a[1]	a[2]	a[3]	a[4]
10	20	30	40	50
i	j	k	l	m

23. What is data file? Differentiate between text file and binary file in C++.

A data file is a computer file stores data to be used by a computer application or system.

It is a collection of data stored in a named area in the secondary storage medium.

I.   **Text file**
➢ It is a file that stores information in ASCII characters.
➢ In text files, each line of text is terminated with a special character known as EOL (End- of-line) character or delimiter character.
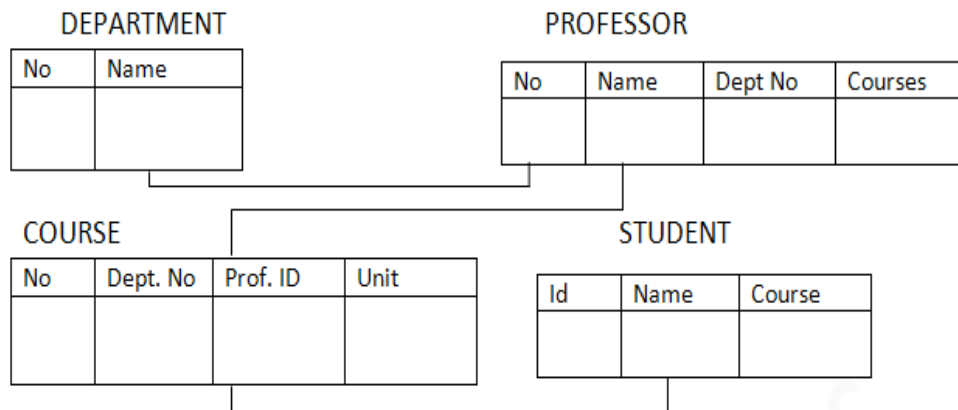➢ When this EOL character is read or written, certain internal translations take place.

II.   **Binary file**
➢ It is a file that contains information in the same format as it is held in memory.
➢ In binary files, no delimiters are used for a line and no translations occur here.

24. Mention different database models. Explain any one.

a. Hierarchical data model
b. Network Model
c. Relational data model.

In this model, data is organized in two-dimensional tables called relations. The tables or relations present in a database are related to each other.

DEPARTMENT

No	Name

PROFESSOR

No	Name	Dept No	Courses

COURSE

No	Dept. No	Prof. ID	Unit

STUDENT

Id	Name	Course

25. Write any three advantages of e-commerce.

a) Overcome Geographical Limitations:
People from any corner of the world can buy the products.

b) Gain New Customers With Search Engine Visibility:

Customers reach to you very easily with the help of search engine visibility.
c) <u>Lower Costs:</u>
As the business is direct without any inter mediatory the price comes down.
d) <u>Locate the Product Quicker:</u>
Customers locate the product quickly.
e) <u>Eliminate Travel Time and Cost:</u>
Customers need not have to travel which eliminate travel time and cost.
f) <u>Provide Comparison Shopping</u>
It provides a lot of choice for the consumers.
g) <u>Remain Open All the Time:</u>
As the net is available 24 hours, there is no time limit.
(Any three)
26. Explain any three text formatting tags in HTML.

\<B> \</B> - To make the text bold.

\<I> \</I> - To make the text italic.

\<U> \</U> - To underline the text.

Ex: \<B>\<I>\<U> My Text \</B>>\</I>\</U>

IV.   Answer any **SEVEN** questions   7 x 5 = 35
27. Simplify the following Boolean function using K-map
F(A, B, C, D) = $\sum$(0,1,2,3,4,6,8,10,12,14)

    Octet 1:   Reduced term $\overline{D}$
    Quad 1 :   Reduced term $\overline{A}\overline{B}$
Final reduced term $F(A,B,C,D) = \overline{D} + \overline{A}\overline{B}$

28. Write an algorithm to delete an element from a queue data structure.

Algorithm to delete one item from queue (Dequeue):

Step 1:	If FRONT = NULL Then
	PRINT "Underflow"
	Exit
	ENDIF
Step 2:	ITEM = QUEUE[FRONT]
Step 3:	If FRONT = REAR Then
	FRONT = NULL
	REAR = NULL
	Else
	FRONT = FRONT + 1
Step 3:	Return

29. What is primitive data structure? Explain different operations performed on primitive data structures.

Primitive data structures are those structures, which are readily available in a programming language.

Operations on primitive data structures:

The various operations that can be performed on primitive data structures are:

a) Create:

Create operation is used to create a storage representation for a particular data structure. For example, int a;

b) Destroy:

Destroy operation is used to destroy or remove the data structures from the memory space. When the program execution ends, the data structure is automatically destroyed.

c) Select:

This operation is used to access data within a data structure. This operation is normally performed using the name of the structure. For example,   cin>>a;

d) Update:

Update operation is used to change or modify the data in a data structures. An assignment operation is a good example for this.   a = 20;

30. Mention any five advantages of OOP over procedural Programming Languages.

a) Programs are modularized:

Programs are modularized based on the principle of classed and objects.

b) Sharing common code:

Related objects can share common code. It reduces code duplication.

c) Provides data security:

Data is encapsulated along with factions. This provides more data security.

d) Software complexity is minimized:

The software complexity is minimized through the concept of inheritance.

e) Error detection easy:

OOP provides a clean design.   It makes error detection easy.

31. Explain member function outside class definition. Give an example.

The member functions can be declared inside class and then it can be defined out side the class as follows:

Syntax for member function definition outside the class:

return_type classname :: memberfunction_name (arg1, arg2....argn)
{
        Function body;
}

Example:
class num
{   private:
                int a;
        public:
                void read();
};
void num :: read()
{
        cin >>a;
}

32. What is a friend function? Write the characteristics of a friend function.

A friend function is a non-member function of a class which gets access to private, protected and public data of a class.

Characteristics of a friend function:

1. A friend function can access all the members (private, protected and public) of the class.
2. A friend function cannot be invoked using object of that class. It is invoked as a normal function.
3. A friend declaration can be given any where inside the class (private, protected or public area) without affecting its meaning.
4. A friend function cannot access the class members directly. It has to use the object and dot operator to access any data or member functions.
5. A class may have any number of friend functions and a function can be friend to any number of classes.

33. Give the definition for a constructor and mention the rules for writing constructor function.

Constructors are member functions of a class which are used to initialize the data members of the class objects.

The following are the rules for writing a constructor.

a. The name of a constructor is same as that of class in which it is declared.
b. Constructors do not have any return type, not even void.
c. Constructors are always defined in the public section of the class.
d. It is not possible to refer to the address of a constructor.
e. Constructor is invoked automatically when the object is created.

34. What is inheritance? Briefly explain hierarchical and hybrid inheritance.

Inheritance is the capacity of one class to inherit properties from another class.
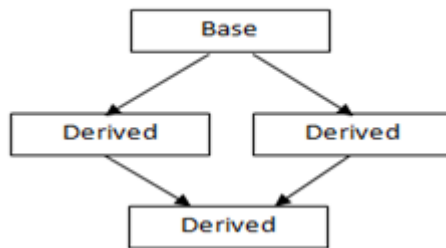1)   Hierarchical inheritance
If more than one classes are inherited from a base class, it is called as hierarchical inheritance.
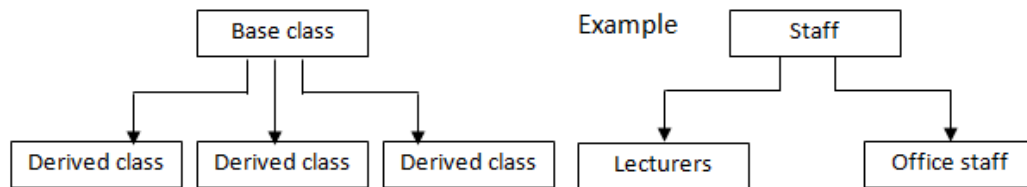
2) Hybrid inheritance
Combination of multiple and hierarchical inheritance is known as hybrid inheritance.
Examples:

35. Briefly explain the advantages of database system.

a) Centralized data management:

In the database approach, the data is stored at a central location and is shared among multiple users.   Thus main advantage of DBMS is centralized data management.

b) Controlled data redundancy:

Data redundancy means duplication of data item in different records and files. With the help of DBMS the data redundancy can be eliminated to a large extent.

c) Data sharing:

The data stored in the database can be shared among multiple users and multiple application programs if needed. Due to this feature the RDBMS is able to satisfy the entire data requirement of the organization.

d) Data security:

Since the data is stored centrally, enforcing data security is much easier. Only authorized access will be permitted. It has facility to ensure data security though user accounts and password.   Different users will have accessibility to only what is permitted to him.

e) <u>Multiple user interface:</u>

In order to meet the needs of various users having different technical knowledge, DBMS provides different types of interfaces.

36. Explain the five relational / comparison operators in SQL with suitable examples.

Operator	Description
<	left-hand operand is less than right-operand
<=	left-hand operand is less than or equal to right-hand operand
>	left-hand operand is greater than right-hand operand
>=	left-hand operand is greater than or equal to right-hand operand
=	left-hand operand is equal to right-hand operand
!=	left-hand operand is not equal to right-hand operand
<>	left-hand operand is not equal to right-hand operand

Examples:
SELECT ENAME
FROM EMP WHERE SAL = 5500;

SELECT ENAME
FROM EMP WHERE SAL <= 10000;

37. Define the following.
   a. SIM

      SIM-Subscriber Identity Module- is a chip card.
      A SIM is a tiny computer chip that gives a cellular device its unique phone number.
   b. SMS

      SMS (Short Message Service): SMS is the transmission of short text messages to and from a mobile phone, fax machine and or IP address.
   c. Wi-Fi

      •   **Wi-Fi (Wireless Fidelity):**
      It lets you to connect to the internet without a direct line from your PC to the ISP(internet service provider).
   d. Chatting

      Chatting is online textual conversation
   e. Video conference

      Video Conference: a two way videophone conversation among multiple participants is called video conferencing.