Computer Science - 2017

Group-A
Multiple Choice Type Questions

Q.1. Choose the correct answer from the following:

(a) While loop checks the condition on
   (i) top   (ii) bottom
   (iii) middle   (iv) none of these.
Ans. (i) top

(b) A keyword is
   (i) an identifier
   (ii) in lower case alphabets
   (iii) reserved for instructions
   (iv) none of these.
Ans. (i) an identifier.

(c) If a class X inherits form class Y, then Y is called .... of X.
   (i) Super Class   (ii) Sub Class
   (iii) Abstract Class   (iv) none of these.
Ans. (iii) Abstract Class

(d) A set of Relational Operators are
   (i) $+, -, *, /, \%$ (ii) $>, <, >=, <=, ==, !=$
   (iii) $\&\&, ||, !$ (iv) $? :$
Ans. (iv) $? :$

(e) An inline function is
   (i) prefixed with keyword inline
   (ii) declared and defined inside the class
   (iii) prefixed with inline on the header and defined outside the class
   (iv) all of these.
Ans. (i) prefixed with keyword inline

(f) Constructors
   (i) are special function
   (ii) have the same name as that of the class
   (iii) have no return type
   (iv) all of these.
Ans. (ii) have the same name as that of the class

(g) In protected inheritance, a public data member of the base class will be treated in a derived class as
   (i) public   (ii) private
   (iii) protected   (iv) none of these.
Ans. (ii) private

(h) In a queue, insertion is done at
   (i) Rear   (ii) Front
   (iii) both (i) and (ii) (iv) none of these.
Ans. (i) Rear

(i) FIFO means
   (i) First In First OUT (ii) Fast In First Out
   (iii) Fast In Fast Out (iv) none of these.
Ans. (i) First In First OUT

(j) Arranging elements of an array in specific order is called
   (i) Arrays   (ii) Records
   (iii) Pointers   (iv) none of these.
Ans. (i) Arrays

(k) Number of tuples in a relation is called
   (i) Degree   (ii) Cardinality
   (iii) Attribute   (iv) None of these.
Ans. (ii) Cardinality

(l) The duplication of data is known as
   (i) data redundancy   (ii) data inconsistency
   (iii) data security   (iv) none of these.
Ans. (ii) data inconsistency

(m) How many gates would be required to implement the following Boolean expression after simplification?
   $XY + X(X + Z) + Y(X + Z)$
   (i) 1   (ii) 2
   (iii) 4   (iv) 5
Ans. (ii) 2

(n) The solution of $X, (X + Y)$ is equal to
   (i) X (ii) $\overline{X}$
   (iii) $X + Y$ (iv) none of these.
Ans. (i) X

(o) Which of the following layers is not in OSI model?
   (i) Physical layer   (ii) Internet layer
   (iii) Network layer   (iv) Transport layer.
Ans. (ii) Internet layer

(p) Web Browser is/are
   (i) Google Chrome   (ii) Firefox
   (iii) Internet Explorer (iv) All of these.
Ans. (iv) All of these.

Section-B
Very Short Answer Questions

Q.2. Differentiate between data hiding and Encapsulation.

Ans. Date Hiding has to do with restricting access to internal variables used by an object to perform its magic. Data hiding was proposed to protect these internal data items from being modified by users of an object. The private access modifier was introduced to provide that protection.
Encapsultation is simply combining the data members and functions into a single entity called an object. This may seem trivial to you, but when it was first proposed it was very hard to grasp. In the early days we had, within a program a data region and a code region, dedicated at compile time.

Q.3. What will be the sizes of following constants :
'\a', "A\a" and "JAC-2017/a"?

Ans. '\a' ⇒ size is 1 as there is 1 character and it is a character constant.
"A\a" ⇒ size is 3.
"JAC-2015\a" ⇒ size is 10.

Q.4. Evaluate the following C++ expressions where a, b, c are integers and d, f are floating point numbers. The values are $a = 4$, $b = 4$ and $d = 1.5$.

(a) $c = a + + + + + + b * + + d$
(b) $f = + + b * b + + - + + a$

Ans. (a) $C = a + + + + + + b * + + d$
   $= (4 + + + + + b) * + + d$
   $= 10 * + + 1.5$
   $= 11.5$

(b) $f = + + b * b + + - + + a$
   $= 5 * 5 + + - + + 4$
   $= 25 + + - + + 4$
   $= 29$

Q.5. What data types would you use to represent the following items?

(a) The registration letter of a car
(b) The population of a city
(c) The average marks in a class
(d) The number of students in the class.

Ans. (a) Char string   (b) long int
(c) float   (d) int

Q.6. Describe the similarities and differences between queues and stacks.

Ans. Similarities

(i) Both queues and stacks are special cases of linear lists.
(ii) Both can be implemented as arrays or linked tests.

Differences

(i) A stack is a LIFO list, a queue is a FIFO list.
(ii) There is no variation of stack, a queue however may be circular or deque.

Q.7. Write an algorithm to search for an ITEM in linked list L.

Ans. (i) $ptr = start$, $count = 0$

(ii) while $ptr <>$ Null do steps (iii) and (v)

(iii) if $ptr ->$ info = ITEM then

(iv) Count = Count + 1

(v) $ptr = ptr ->$ link

(vi) print "No. of occurence(s) is/are", count

Q.8. Define second and third normal forms.

Ans. A relation R is in second normal form (2NF) if and only if it is in 1NF and every nokey attribute is fully dependent on the primary key.

A relation R is in second normal form (2NF) if and only if it is in 1NF and every nonkey attribute is fully dependent on the primary key.

A relation R is said to be in third normal form (3NF) if and only if it is in 2NF and every nonkey attribute is non-transitively dependent upon the primary key.

Q.9. Prepare a truth table for $XY + Y\bar{Z} + \overline{XZ}$.

Ans.

X	Y	Z	$\bar{X}$	$\bar{Z}$	XY	$Y\bar{Z}$	$\overline{XZ}$
1	0	0	0	1	0	0	0
1	0	1	0	0	0	0	0
0	1	0	1	1	0	1	1
0	1	1	1	0	0	0	0

Q.10. What is a modem? What is its function?

Ans. A modem is a computer peripheral that connects a workstation to then workstations via telephone lines and facilities communication. It is short form for Modulation/Demodulation.

Modem converts digital signals to A/F (Audio Frequency) tones which are in the frequency range that the telephone lines can transmit and also it can convert transmitted tones back to digital information.

Section-C

Long Answer Questions :

Q.11. What is polymorphism? Give an example to show its implementation in C++.

Ans. Polymorphism is the ability for a message or data to be processed in more than one form. It is the property by which the same message can be sent to objects of several classes.

Polymorphism is implemented in C++ through virtual functions and overloading and operator overloading.

Q.12. Write the output of the following program :

```
#include <iostream.h>
#include <conio.h>
void main ()
```

```
{
    clrscr ();
    int r ;
    for (int i = 1 ; i < 5; i++)
    {
        r = pow (i, i) ;
        cout <<"\n"<<i<<"\t"<<r ;
    }
    getch ();
}
```

Ans. 1
4
9
16

Q.13. Write a program in C++ to find the sum of following series using constructor and destructor member functions :

$S = x + x^3 + x^5 + ... +$ up to n^{th} term.

Ans.
```
#Include <iostrecom.h>
#Include <conio.h>
Void Main ()
{
    int n;
    float x, sum,
    Sum = 0
    count {"Enter total no. of terms."}
    cin >> n.
    Count <<"Enter Value of x";
    cin >> x;
    for (i = 1; i < n; i = i + 2)
    {
        Sum = Sum + POW (x, i);
    {
    Count <<"sum = " << Sum;
    getch ();
    Sum = 0
    Sum = Sum + POW (x, 1)
}
```

Q.14. What are the advantages offered by inheritance?

Ans. The major advantage offered by inheritance are :

(i) Its capability to express the inheritance relationship which makes it ensure the closeness with the real-world models.

(ii) Inheritance supports reusability of code. It allows the addition of additional features to an existing class without modifying it;

(iii) It is transitive in nature i.e., α class γ will automatically inheritances the properties of X.

Q.15. An electricity board charges according to following rates:

For the first 100 units - Rs. 4 per unit
For the next 200 units - Rs. 5 per unit
Beyond 300 units - Rs. 6 per unit

All users are charged meter charge also, which is Rs. 70. Write a program in C++ to read the number of units consumed and print out the charges.

Ans.
```
#include <iostream.h>
#include <conio.h>
class electricity
{
    char name [20];
    int unit;
    float Rs. ;
public :
    void get ()
    {
```

```cpp
count <<"\n Enter the Name & Units of Electricity user:\n";
cin >> name >> unit ;
}
void check ( )
{
if (unit < = 100)
{
Rs = unit * 4.00;
Rs. = Rs + 70;
}
else if (unit < = 200|| unit > 100)
{
Rs. = unit * 5.00;
Rs. = Rs + 70'
}
else if (unit < = 300 || unit > 200)
{
Rs. = unit*6.00;
Rs. = Rs + 70;
}
void main ||
{
int n, i ;
electricity e [10]
clrscr ( );
cout << "|nHow many electricity Uses : \n";
cin >> n
}
cout <<|n Electricity user's :\n";
cout << "|n Name \t Total cost (Rs.) \ n";
}
getch ( );
}
```

Q.16. Evaluate the following postfix expression using a stack and show the contents of stack after execution of each operation:
120, 45, 20, + , 25, 15, - , + , *

Ans.

Element	Stack	Intermediate Calculate
120	120	
45	120, 45	
20	120, 45, 20	
+	120, 65	$45 + 20 = 65$
25	120, 65, 25	
15	120, 65, 25, 15	
-	120, 65, 10	$25 - 15 = 10$
+	120, 75	$65 + 10 = 75$
-	16000 Result	$120 - 75$

Q.17. Transform each of the following expressions to infix form :
(a) + - ABC
(b) + (A - B)C
(c) + - / AC * D ↑ EFG.

Ans. (a) + - ABC
$$= +(-AB)C$$
$$= +(A - B)C$$
$$(A - B) + C$$

(b) $+A - BC$
$$= +A(-BC)$$
$$= +A(B - C)$$
$$= A + (B - C)$$

(c) $+ - / AC * D ↑ EFG$

Q.18. Write an algorithm for Quick sort procedure.

Ans. (i) If $n < = 1$, then return.

(ii) Pick any element V in $a[\ ]$. This is called the pivot.

(iii) Rearrange elements of the array by moving all elements $xi > V$ right of V and all elements $xi \leq V$ left of V. If the place of the V after re-arrangement is j, all elements with value less then V, appear in $a[0]$, $a[1]$.....$a[i - 1]$ and all those with value greater than V appear in $a[j + 1]$.....$a[n - 1]$.

(iv) Apply quick sort recursively to $a[0]$.....$a[j - 1]$ and to $a[j + 1]$....$a[n - 1]$.

Q.19. Write SQL commands for (a) to (d) on the basis of STUDENT relation given below :

Sl. No.	Name	Age	Department	Date of adm.	Charges	Sex
1.	Amit	22	Computer	10/01/98	320	M
2.	Neha	23	History	24/03/99	400	F
3.	Karan	22	Hindi	12/12/97	500	M
4.	Khushboo	21	History	01/07/99	600	F
5.	Aman	22	Hindi	05/09/98	350	M
6.	Vikash	21	History	27/06/99	400	M
7.	Asit	23	Computer	25/02/98	310	M
8.	Anubhuti	23	Hindi	31/07/98	300	F

(a) To show all information about the students of Hindi department.
(b) To list the names of female students who are in History department.
(c) To list the names of all students with their date of admission in descending order.
(d) To count the number of students with age > 22.

Ans. (a) Select Name from student
Whose Department = "Hindi"
(b) Select Name from Student
Whose Sex = "F" and department = "History"
(c) Select Name from student
Date of adm. (order)
(d) Select from students
Whose age = "22"

Q.20. Obtain a simplified form for the following Boolean Expression using Karnaugh Map :
$$F(A,B,C,D) = \Sigma(0,1,2,3,4,5,6,7,8,9,10,11)$$

Ans

AB \	CD	$\overline{C}D$	$\overline{C}\overline{D}$	$C\overline{D}$
$\overline{A}\overline{B}$	I_0	I_1	I_3	I_2
$\overline{A}B$	I_4	I_5	I_2	I_6
AB	I_2	I_3	I_5	I_4
$A\overline{B}$	I_4	I_9	I_{11}	I_{10}

Q.21. What are the components required for networking?
Ans. (a) Hubs (b) Switches
(c) Bridges (d) Routers
(e) Gatways (f) CSU / DSU
(g) Networking interference cards (NICs), ISDN adapters, and system area network cards.
(h) Wireless access points (WAPs)
(i) Modem.