M Sc (IT)
Sample Question Paper

C Programming

C Programming: Basic Data Types, Language Control Structures, Arrays, Functions, Pointers, Dynamic Allocation of Memory, Structs, Recursion, Parameter passing and Scope.

1. What will the result be when the following code executes?
```
double fn(int x, double y) {
    return x + y;
}
int main() {
    printf("%f", fn(10, 20));
}
```
a) Compiler error
b) Runtime error
c) 30
d) 30.0
e) None of the above

2. What will the result be when the following code executes?
```
void main() {
  float x=6.7, *fptr=&x;
  double pi=3.14, *dptr=&pi;
  printf("%d", (sizeof(fptr) == sizeof(dptr)) );
}
```
a) true
b) false
c) 1
d) 0
e) None of the above

3. What will the result be when the following code executes?
```
void main() {
  double a[5] = {1.5,2.5,3.5,4.5,6.5}, *ptr=a;
  printf("%f %f", *(ptr+4), a[4] );
}
```
a) 4 6.5
b) 6.5 6.5
c) Compiler error
d) Runtime error
e) None of the above

4. What will the result be when the following code executes?
```
void fn(int *x, int y) {
    *x = 15;
    y = 20;
}
```

```
int main()
{
    int a = 5, b=10;
    fn(&a, b);
    printf("%d %d",a, b);
}
```
a) 5 10
b) 5 20
c) 15 20
d) 15 10
e) None of the above

5. **What will the result be when the following code executes?**
```
void main()
{
    struct student
    {
        int id;
    } student1, student2;
    student1 = student2;
    if (student1 == student2)
        printf("equal");
    else
        printf("not equal");
}
```
a) Compiler error
b) Runtime error
c) equal
d) not equal
e) None of the above

6. **Which statements A and/or B are valid from the code below?**
```
void main()
{
    struct complex_number
    {
        float real;
        float img;
    };
    struct complex_number *cn1;
    cn1->real = 3.1;            // statement A
    cn1.real=3.1;              // statement B
}
```
a) Statement A
b) Statement B
c) Both are valid
```

d) Both are invalid
e) None of the above

## 7. What will the result be when the below is executed?
```
int fn(int i) { i++; return i;}
void main()
{
    int i;
    for(i=0; i<fn(i); i++)
        printf("loop");
}
```
a) Prints "loop" infinite number of times
f) Does not print anything
g) Compiler error
h) Runtime error
i) None of the above

## 8. What will the result be when the following code executes?
```
void main() {
    int x=6, *iptr=&x;
    double y=1.5, *dptr=&y;
    printf("%d", (sizeof(*iptr) == sizeof(*dptr)));
}
```
a) True
b) False
c) 1
d) 0
e) None of the above

## 9. What will be the output from the code below?
```
int fn1(int n)
{
    static int sum = 0;
    printf("%d ", sum);
    sum = sum + n;
    if (n==1)
        return sum;
    else
        return fn1(n/2);
}
int main()
{
    fn1(20);
}
```
a) 20 10 5 2 0

b) 0 2 5 10 20
c) 37 35 30 20 0
d) 0 20 30 35 37
e) None of the above


**10. How many times will the "for" loop condition be checked?**
**for (i=10; i>0; i=i-2)**
   **printf("Looping");**
a) 10
b) 5
c) 6
d) 11
e) None of the above


**11. Consider the following program in C language:**
**int main()**
**{**
   **int *x = NULL;**
   **int *y = 0;**
   **if (x)**
      **printf("x ");**
   **else**
      **printf("nullx ");**
   **if (y)**
      **printf("y");**
   **else**
      **printf("nully");**
**}**
**What will be the output of this program?**
a) x y
b) x nully
c) nullx y
d) nullx nully
e) None of the above


**12. Consider the following c function:**
**void fn(int *px, int *py)**
**{**
   **int i;**
   **for (i=0; i<5; i++)**
      **py[i] = *px + py[i];**
**}**
**main()**
**{**
   **int i, x=20, y[5]={0,1,2,3,4};**

```
    fn(_____, _____);
    for (i=0; i<5; i++)
        printf("%d ", y[i]);
}
```
How should function fn(_____, _____) be called from the main?
a)  fn(&x, y);
b)  fn(&x, &y);
c)  fn(x, &y)
d)  fn(&x, *y)
e)  None of the above


13.  Consider the following c function:
```
void fn(int a, int b[5])
{
    int i;
    for(i=0; i<5; i++)
        b[i] = b[i] + a;
}
main()
{
    int a=20, b[5]={10,15,20,25,30};
    fn(a, b);
}
```
How are the parameters passed to function fn?
a)  Both a and b are passed by value
b)  a is passed by value and b is passed by reference
c)  a is passed by reference and b is passed by value
d)  Both a and b are passed by reference
e)  None of the above


14.  What will be the output from the code below?
```
void main()
{
    int val=10;
    while(val>0)
    {
        val--;
        if (val%2 == 0)
            continue;
        printf("%d ",val);
    }
}
```
a)  10 8 6 4 2
b)  2 4 6 8 10
c)  1 3 5 7 9
d)  9 7 5 3 1
```

e) None of the above

15. Review the code below:
```
struct abc
{
    int x;
};
struct abc abc1={10}, abc2;
char str1[10]="Test", str2[10];
void  main()
{
    abc2 = abc1;   // Statement A
    str2 = str1;   // Statement B
}
```
Which of the statements A and/or B are valid?
a) Statement A
b) Statement B
c) Both are valid
d) Both are invalid
e) None of the above

16. What will be printed as the value of i when the code below is executed?
```
void  main()
{
    int i=0;
    char str[100];
    fgets(str, sizeof(str), stdin);
    while(str[i] != 0)
        i++;
    printf("%d", i);
}
```
a) All index values of a character array
b) All characters of a string
c) Total number of characters in a character array
d) Length of the string
e) None of the above

17. What will be printed as the value of j when the code below is executed?
```
void  main()
{
    int i=0, j=0;
    char str[100], c='t';
    fgets(str, sizeof(str), stdin);
    while(str[i] != 0) {
        if (str[i] == c)
```

```
        j++;
      i++;
   }
   printf("%d", j);
}
```
a) Number of times T appears in a string
b) Number of times t appears in a string
c) Number of times t and T appears in a string
d) Length of the string
e) None of the above

18. What is the malloc function performing in the code below?
void main()
{
   int *iptr = (int *)malloc(sizeof(int)*12);
}
a) Allocating 12 bytes to store 3 integers
b) Allocating 48 bytes to store 12 integers of 4 bytes each
c) Freeing 12 bytes to store 3 integers
d) Freeing 48 bytes to store 12 integers of 4 bytes each
e) None of the above

Answer the first six questions with reference to the passage given below.

It is like any other small southern town sweltering in the plain, but here the hot, brick-kiln blast of midday is always dissipated by the breeze which comes in from the sea in the afternoon. Just down the lane, past the thatched shed where Mr. Ragavan mends broken-down auto-rickshaws, is a yellow-painted concrete water-tower. From here you can see the whole place laid out before you, from the golden roof to Nataraja's shrine over the temple gardens and out to the green and white minarets of the mosque on the Cuddalore road, where the town abruptly ends and the paddies begin.

It is a warren of thatched and tiled houses, shaded by palms and dotted with little exuberantly painted shrines. It has three mosques, a couple of churches and three big cinemas. There are tea stalls on almost every corner. The one I used to haunt is in East Car Street. It is run by an unlikely couple, a big albino man and his wiry little assistant. The small one does the mixing and pouring; like a conjuror playing to his audience, he throws his tea in a great arc from jug to cup and back again, never losing a drop.

Outside the albino's tea stall, beyond the shadow of his awning, a little lane runs up to the temple gate. Mala comes this way every day: it is full of people from dawn till midnight, walking to and from the temple, stopping to shop or to talk to friends. Here is Raja the priest's house, and Ravi the tour guide; there is the woman who sells pilgrim souvenirs, painted plaster geegaws of gods and pottery busts of movie stars. Further on is the lugubrious seller of almanacs and astrological texts who squats impassively under his sunshade. By the gate, next to the man who does door-to-door ironing, is the boy who looks after your shoes for a few paise when you go into the shrine.

(From *The Smile of Murugan: A South Indian Journey* by Michael Wood)

(1)
The passage can best be classified as:
   a. Analytical
   b. Descriptive
   c. Organized
   d. Climactic
   e. None of the above

(2)
What can one say about towns in the plains in southern India?
   a. They are crowded.
   b. Breezes from the sea blow there.

   c. They're very hot.
   d. Temples form the nuclei of these towns.
   e. None of the above.

(3)

What/Who sits at one end of the town of Cuddalore?
   a. A Nataraja shrine
   b. An albino's tea stall
   c. The man who does door-to-door ironing
   d. A mosque
   e. None of the above

(4)

What can one claim about the town?
   a. It is a thickly populated town.
   b. People of the town are hardworking.
   c. The tea sellers of the town are also jugglers.
   d. There is religious diversity in the town.
   e. None of the above

(5)

Which of the following words from the passage means "sad"?
   a. Lugubrious
   b. Sweltering
   c. Exuberantly
   d. Albino
   e. None of the above

(6)

Which of the following claims can be made about the second paragraph of the passage?
   a. It moves from the political to the social.
   b. It moves from the personal to the impersonal.
   c. It moves from the border to the center.
   d. It moves from the general to the particular.
   e. None of the above.

(7)

This puzzle _____ seems to be as _____ as he thinks it is.
   A. Hard, hard

B. Hard, hardly
C. Hardly, hard
D. Hardly, hardly
E. None of the above

(8)
He _____ come to my shop earlier, but now he does not.
    A. Was
    B. Used to
    C. Regularly
    D. Use to
    E. None of the above

(9)
They left Delhi _____ 2pm _____ plane _____ Thursday.
    A. On, in, to
    B. In, on, of
    C. Around, on, at
    D. At, by, on
    E. None of the above

(10)
Studies show that urban trees _____ in better health outcomes for local communities, including improved cardiovascular function, more thermal comfort, and _____ anxiety.
    A. Cause, effect
    B. Result, reduced
    C. Lead, decrease
    D. Impact, less
    E. None of the above

(11)
Interest in basketball _____ as a result of television exposure, but with the advent of cable television, especially during the 1980s, the game's popularity exploded at all levels.
    A. Widespread
    B. Falls
    C. Decreased
    D. Increased
    E. None of the above

(12) Choose the option that best reflects the relationship between the two given words.

Lion: Roar

    A. Bell: Ring
    B. Rain: Thunder
    C. Man: Scream
    D. Trumpet: Loud
    E. None of the above

1. Let $A = \{2, 3, 4, 5\}$ and $B = \{4, 5, 6, 7, 8\}$, then the size of the power set of $A \cap B$ is

   (a) 2

   (b) 3

   (c) 4

   (d) 5

   (e) None of the above

   Ans: (c) 4

2. Let $E = \{n \in \mathbb{Z} | n$ is even$\}$ and let $O = \{n \in \mathbb{Z} | n$ is odd$\}$. Define a function $f : E \times O \to \mathbb{Z}$ by $f(x, y) = x + y$. Then which of the following options is true?

   (a) f is both one-to-one and onto

   (b) f is one-to-one but not onto

   (c) f is not one-to-one but onto

   (d) f is neither one-to-one nor onto

   (e) None of the above

   Ans: (d) f is neither one-to-one nor onto

3. A bag contains one marble which is either green or blue, with equal probabilities. A green marble is put in the bag (so there are 2 marbles now), and then a random marble is taken out. The marble taken out is green. What is the probability that the remaining marble is also green?

   (a) 1/8

   (b) 1/3

   (c) 2/3

   (d) 1/4

   (e) None of the above

   Ans: (c) 2/3

4. How many words, with or without meaning, can be formed using all the letters of the word EQUATION at a time so that the vowels and consonants occur together?

   (a) 1440
   (b) 720
   (c) 2880
   (d) 360
   (e) None of the above

   Ans: (a) 1440

5. Simplify the expression: $\log_a 36 + \frac{1}{2} \log_a 256 - 2 \log 48$

   (a) $2 \log 2$
   (b) $\log 16$
   (c) $\log_a 4$
   (d) $- \log_a 4$
   (e) None of the above

   Ans: (d) $- \log_a 4$

6. If $a, 4, b$ are in AP and $a, 2, b$ are in GP then $a, 1, b$ in

   (a) AP
   (b) GP
   (c) HP
   (d) All of the above
   (e) None of the above

   Ans: (c) HP

7. The number of terms in the expansion of $(a + b + c)^n$, where $n \in N$ is

   (a) $n(n + 1)$

   (b) $n + 2$

   (c) $\frac{(n+1)(n+2)}{2}$

   (d) $\frac{n(n+1)}{2}$

   (e) None of the above

   Ans: (c) $\frac{(n+1)(n+2)}{2}$

8. What is the value of $\lim_{z \to 4} \frac{\sqrt{z}-2}{z-4}$

   (a) limit does not exist.

   (b) $1/4$

   (c) $1/2$

   (d) $1/8$

   (e) None of the above

   Ans: (b) $1/4$

9. The equation of the tangent to the curve $f(x) = 2x^3 + x^2 - 2x - 2$ at the point $x = 1$ is

   (a) $y = 5x + 7$

   (b) $y = 2x + 4$

   (c) $y = 4x - 7$

   (d) $y = 6x - 7$

   (e) None of the above

   Ans: (d) $y = 6x - 7$

10. The function $f(x) = 2x^3 - 3x^2 - 12x + 4$ has

    (a) two points of local minimum

    (b) two points of local maximum

    (c) one minimum and one maximum

    (d) neither minimum nor maximum exists

    (e) None of the above

    Ans: (c) one minimum and one maximum

11. If the equation $x^2 + 4x + k = 0$ has real and distinct roots, then

    (a) $k < 4$

    (b) $k > 4$

    (c) $k \geq 4$

    (d) $k \leq 4$

    (e) None of the above

    Ans: (a) $k < 4$

12. A problem is given to three students whose chances of solving it are $1/2$, $1/3$, and $1/4$, respectively. What is the probability that the problem will be solved?

    (a) $1/4$

    (b) $1/2$

    (c) $3/4$

    (d) $7/12$

    (e) None of the above

    Ans: (c) $3/4$

13. The gradient at the point on the curve $y = 2x^2 - 4x - 1$, where $x = 2$

   (a) 2
   (b) 4
   (c) 8
   (d) 6
   (e) None of the above

   Ans: (b) 4

14. After a sports tournament, every player shakes hands with every other player once. If there are 36 handshakes in total, how many players are at the tournament?

   (a) 18
   (b) 8
   (c) 9
   (d) 10
   (e) None of the above

   Ans: (c) 9

15. The value of c for which the equations $cx - y = 2$ and $6x - 2y = 3$ have an unlimited number of solutions is

   (a) 3
   (b) -3
   (c) -12
   (d) no value
   (e) None of the above

   Ans: (d) no value

16. $\log_y x$ is equal to

   (a) $\dfrac{\log_z x}{\log_2 x}$

   (b) $\dfrac{\log_z x}{\log_x z}$

   (c) $\dfrac{\log_z x}{\log_z y}$

   (d) $\dfrac{\log_x z}{\log_y z}$

   (e) None of the above

   Ans: (c) $\dfrac{\log_z x}{\log_z y}$

17. If X and Y are two sets, then $X \cap \overline{(X \cup Y)}$ equals

   (a) X

   (b) Y

   (c) $\emptyset$

   (d) $X \cup Y$

   (e) None of the above

   Ans: (c) $\emptyset$

18. Let $f : X \to Y$ and $g : Y \to Z$. Let $h = g \circ f : X \to Z$. Suppose g is one-to-one and onto. Which of the following is false?

   (a) If f is one-to-one then h is one-to-one and onto.

   (b) If f is not onto then h is not onto.

   (c) If f is not one-to-one then h is not one-to-one.

   (d) If f is one-to-one then h is one-to-one.

   (e) None of the above

   Ans: (a) If f is one-to-one then h is one-to-one and onto.

6

1.

Person reaches his destination 40 minutes late if his speed is 3km/hr and reaches 30 minutes before time if his speed is 4km/hr. What is the distance of his destination from the starting point? (in km)

    A. 12
    B. 13
    C. 10
    D. 14
    E. None of these

2.

Pankaj takes twice as much time as Deepak or thrice as much time as Suresh to finish a piece of work. They can finish the work in 2 days if work together. How much time will Deepak take to do the work alone?
    A. 4 days.
    B. 5 days.
    C. 6 days.
    D. 7 days
    E. None of these

3.
Given two statements followed by two conclusions numbered I and II. You have to take the given two statements to be true even if they seem to be at variance from commonly known facts. Read the conclusion and then decide which of the given conclusions logically follows from the two given statements, disregarding commonly known facts.

       Statement 1: All mangoes are golden in colour.
       Statement 2: No golden-coloured things are cheap.

       Conclusion I: All mangoes are cheap.
       Conclusion II: Golden-coloured mangoes are not cheap.

    A. Only conclusion I follows
    B. Only conclusion II follows
    C. Either I or II follows
    D. Neither I nor II follows
    E. None of these

4.

Read the following information and use it to answer the given question.

- There are seven students sitting in a row - Anita, Bunty, Chitra, Dinesh, Easha, Foram and Gaurav.
- Gaurav is to the right of Dinesh and to the left of Bunty.
- Anita is on the right of Chitra.
- Anita and Dinesh have one student between them.
- Easha and Bunty have two students between them.
- Dinesh and Foram have two students between them.

Who is exactly on the right of one that is exactly in the middle?

A. Dinesh
B. Chitra
C. Anita
D. Gaurav
E. None of these

5.

Find the missing sequence of alphabets (?) in the given series

CEH, ?, OQT, UWZ

A. ACG
B. IKN
C. FGJ
D. KLM
E. None of these

6.

Six girls are sitting on a bench to be photographed. Meera is to the left of Rani and the right of Bindu. Seema is to the right of Rani. Reeta is between Rani and Mary.

Who are at the corners in the photograph?
   A. Rani and Bindu
   B. Seema and Mary
   C. Bindu and Seema
   D. Mary and Reeta
   E. None of these

7.

Naresh earns a certain amount per month. He keeps 55% for household expenses, 5% for his personal expenses, 20% for expenditure on his children and the rest he saves. What percentage does he have for savings?

   A. 10
   B. **20**
   C. 15
   D. 5
   E. None of these

8.

Father is five times the age of his daughter. If after 5 years, he would be four times of daughter's age, then further after 5 years, how many times he would be of his daughter's age?

   A. 1.5 times
   B. 2 times
   C. 2.5 times
   D. 4 times
   E. None of these

9.

City B is 4 miles due east of city A. City C is 3 miles due south of city B. City D is 4 miles due east of city C, and city E is 9 miles due north of city D. What is the distance between city A and city E?

   A. 10 miles

   B. 20 miles

   C. 24 miles

   D. 30 miles

   E. None of these

10.

In the question below is given a statement followed by two courses of action numbered I and II. You have to assume everything in the statement to be true and based on the information given in the statement, decide which of the suggested courses of action logically follow(s) for pursuing.

Statement - *Villages in Rajasthan have been severely damaged due to draught. This has caused a financial burden on State Government.*

Courses of Action

   i. People of the area should be shifted to other suitable places.

   ii. State Government should ask for more financial support from Central Government.

      A. Only I follows

      B. Only II follows

      C. Either I or II follows

      D. **Both I and II follow**

      E. **None of these**

11.

Eight friends, f1 , f2 , f3 , f4 , f5 , f6 , f7 and f8 are seated in a circular arrangement facing the centre

(i) f1f3, f4f7, f8f5 and f6f2 are seated adjacent to each other. f1 is also seated adjacent to f8

(ii) f2 is second to the right of f7

(iii) f5 is third to the right of f3

(iv) f6 is opposite to f5

Who is seated at 2nd left of f3 ?

A. f7
B. f2
C. f4
D. f5
E. None of these

12.

Consider travelling a distance between two points. Travel is done at two speeds, initially at a low speed and then the rest of the journey at the higher speed. Which of the following is the fastest travel method?

a) Travel half the distance at the lower speed and half the distance at higher speed
b) Travel half the total travel time at the lower speed and half the travel time at the higher speed.
c) Both the above options take the same amount of time.
d) None of the above