



INQUIZITIVE (COLLEGE) PRELIMS

Team Member 1 Name: _____ Contact No: _____ College: _____

Team Member 2 Name: _____ Contact No: _____ College: _____

Time: 45 mins

Please tick mark the correct answer

Correct Answer: +3

Incorrect Answer: -1

Unattempted: 0

1. Tom is going to a desert and wants to carry as much water as he can as long as it is not more than 15kg. He went to buy packaged water from a supermarket which has unlimited number of bottle of following sizes:

i. Tiny: 0.77 kg

ii. Small: 1.10 kg

iii. Medium: 3.4 kg

iv. Large: 7 kg

What is the maximum amount of water he can take?

(a) 14.94 Kg

(b) 14.98 Kg

(c) 15 Kg

(d) 14.96 Kg

2. What is the output of the following program?

```
void main() {
    static int var = 5;
    printf("%d ", var--);
    if(var)
        main();
}
```

(a) 5 4 3 2 1

(b) Infinite loop causing stack overflow

(c) 5 5 5 5 5

(d) Runtime error

3. What does the following function do?

```
void function(unsigned int x) {
    int i;
    for(i=(sizeof(int)*8)-1; i>=0; i--)
        (x&(1<<i)) ? putchar('1') : putchar('0');
}
```

(a) 2's complement representation of x

(b) No relation with x

(c) Bit representation of x

(d) Compilation Error

4. The worst case time complexity of QuickSort is same as the worst case of:

(a) HeapSort

(b) InsertionSort

(c) MergeSort

(d) None of these

5. If FIND is coded as URMW and ME is coded as NV, then how is FOOL coded as

(a) UFGD

(b) ULLO

(c) UMMO

(d) UDDW

6. What will be the output of the following program?

```
int main(){
    static char *x = "IISc";
    printf(" %d %d", printf(x), printf(x++));
    return 0;
}
```

- (a) IIScIISc 3 4 (b) IScIISc 3 4 (c) IIScIISc 4 4 (d) None of these

7. The traffic lights at three different intersections change after every 48 seconds, 72 seconds, and 108 seconds, respectively. If they change simultaneously at 9AM, then when is the next time that they change simultaneously?

- (a) 10:15:10AM (b) 09:05:12AM (c) 11:00:00AM (d) 09:07:12AM

8. Suppose we have an $O(n)$ time algorithm that finds the median of an unsorted array. Consider a Quicksort implementation where we first find median using the above algorithm and use this median as pivot. What is the worst case complexity of this modified Quicksort?

- (a) $O(n^2)$ (b) $O(n^2 \log n)$ (c) $O(n \log n)$ (d) $O(n \log \log n)$

9. In what base is $66+66=143$?

- (a) 7 (b) 8 (c) 9 (d) 10

10. What is the time complexity of the following function?

```
int func(int n){
    int count = 0;
    for (int i = n; i > 0; i /= 2)
        for (int j = 0; j < i; j++)
            count++;
    return 0;
}
```

- (a) $O(n^2)$ (b) $O(n \log n)$ (c) $O(n)$ (d) $O(\log n)$

11. In a stack S,

TIM is equivalent to S.PUSH(S.POP() * S.POP())

SUM is equivalent to S.PUSH(S.POP() + S.POP())

What is at the top of the stack after the following operations:

- (a) $29 = ((5+4)*3 + 2)*1$ (b) $19 = 1*2 + 3*4 + 5$
 (c) $27 = 5*4 + 3*2 + 1$ (d) $65 = ((1+2)*3 + 4)*5$

1	PUSH 1
2	PUSH 2
3	PUSH 3
4	PUSH 4
5	PUSH 5
6	SUM
7	TIM
8	SUM
9	TIM

12. In a convex hexagon, two diagonals are 2 distinct diagonals are chosen. What is the probability that they intersect?

- (a) $5/12$ (b) $1/2$ (c) $7/12$ (d) $2/5$

13. A primary school teacher has 30 pens and 45 pencils. She wants to divide all of these to her students. As the students are too young, a student will start crying if he sees anyone with more number of pens than himself. Also he will start crying if he sees anyone with more number of pencils. What is the maximum number of students that this teacher can have such that none cries?

- (a) 5 (b) 3 (c) 1 (d) 15

14. Karan and Vaijenath lie on specific days.

Karan lies on Fridays, Saturdays and Sundays, but he is honest on all other days

Vaijenath lies on Tuesdays, Wednesdays and Thursdays, but he tells the truth otherwise

On what day of the week would they both say "Tomorrow, I will lie."?

- (a) Sunday (b) Friday (c) Thursday (d) Monday

15. Box P has 2 red and 3 blue balls, while box Q has 3 red and 1 blue ball. A ball is selected as follows:

i. Select box P with probability $\frac{1}{3}$ and box Q with probability $\frac{2}{3}$.

ii. Choose a ball from the selected box.

Given that the ball selected is red, what is the probability that it came from box P?

- (a) $4/19$ (b) $5/19$ (c) $2/9$ (d) $19/30$

16. We know that the following 3 statements are TRUE:-

I: Those who like paintings like flowers

II: Those who like running like music

III: Those who do not like music do not like flowers

Now consider the following statements-

1. Those who like running like flowers.
2. Those who like paintings like music.
3. Those who like flowers do not like running.
4. Those who like running do not like paintings.
5. Those who like paintings like running.

Which of these are TRUE?

- (a) 1, 3, 5 only (b) 4, 5, only (c) 2, 3 only (d) 1, 4 only (e) 2 only

17. In 1969, Denise Long became the first female to be drafted into the NBA. In the previous year, she led the Union-Whitten High School basketball team to the state title, averaging an impressive 62.8 points per game. The most points that she scored in a game that season was an astonishing 111. (This feat was only done once.) Given that there are 30 games in the season of 1968, what is the smallest possible number of points that she could have scored in her second best game? *Note: She scored a non-negative integer number of points in each game.*

- (a) 110 (b) 62 (c) 61 (d) 55

18. If $[-5 \ -5 \ -5]$ is an eigenvector of the given matrix, then the corresponding eigenvalue is:

$$\begin{bmatrix} 4 & -2 & 1 \\ 2 & 0 & 1 \\ 2 & -2 & 3 \end{bmatrix}$$

- (a) 5 (b) -5
(c) 3 (d) -3

19. Which one of the following options does not equal the following?

$$\begin{vmatrix} 1 & x & x^2 \\ 1 & y & y^2 \\ 1 & z & z^2 \end{vmatrix}$$

(A) $\begin{vmatrix} 1 & x(x+1) & x+1 \\ 1 & y(y+1) & y+1 \\ 1 & z(z+1) & z+1 \end{vmatrix}$

(B) $\begin{vmatrix} 1 & x+1 & x^2+1 \\ 1 & y+1 & y^2+1 \\ 1 & z+1 & z^2+1 \end{vmatrix}$

(C) $\begin{vmatrix} 0 & x-y & x^2-y^2 \\ 0 & y-z & y^2-z^2 \\ 1 & z & z^2 \end{vmatrix}$

(D) $\begin{vmatrix} 2 & x+y & x^2+y^2 \\ 2 & y+z & y^2+z^2 \\ 1 & z & z^2 \end{vmatrix}$

20. Aadirupa is an avid collector of stamps. She is trying to arrange her collection of stamps into neat rows of equal sizes. She found that when she tries to arrange them in row of 2, 3, 4, 5, 6 or 7, she always ends up 1 short. What is the minimum number of stamps that Aadirupa has?

- (a) 319 (b) 419 (c) 719 (d) 359

21. Which of the following prizes is not awarded in the field of Computer Science?

- (a) Knuth Prize (b) Turing Award (c) Abel Prize (d) Godel Prize

22. How many non-negative integer triplets (a, b, c) satisfy the following equation:

$$a^4 + b^4 = c^4, \text{ where } a, b, c > 0$$

- (a) 2 (b) 0 (c) 1 (d) infinite

23. If A is substituted by 4, B by 3, C by 2, D by 4, E by 3, F by 2 and so on, then what will be total of the numerical values of the letters of the word SICK?

- (a) 11 (b) 12 (c) 10 (d) 9

24. Answer the following two parts:

I: In a family with two children, what are the chances that both children are girls given that one of the children is a girl?

II: In a family with two children, what are the chances that both children are girls given that the elder child is a girl?

- (a) $(\frac{1}{2}, \frac{1}{3})$ (b) $(\frac{1}{2}, \frac{1}{2})$ (c) $(\frac{1}{3}, \frac{1}{3})$ (d) $(\frac{1}{3}, \frac{1}{2})$

25. The value of $\int_0^{\infty} e^{-x^2} dx =$ _____

(No neg points for incorrectly answering this question)