

5

QUESTION PAPER SERIES CODE
A

Centre of Examination : _____

Roll No. : _____

Name of Candidate : _____

S A U

Entrance Test for M.Sc. (Computer Science)

[2013]

Time : 3 hours

Maximum Marks : 100

INSTRUCTIONS FOR CANDIDATES

Candidates must carefully read the following instructions before attempting the Question Paper :

- (i) Write your Name and Roll Number in the space provided for the purpose on the top of this Question Paper and in the OMR/Answer Sheet.
- (ii) This Question Paper has Three Parts : Part—A, Part—B and Part—C.
- (iii) Part—A has 20 questions (Objective-type) of 1 mark each. All questions are compulsory.
- (iv) Part—B has 30 questions (Objective-type) of 1 mark each. All questions are compulsory.
- (v) Part—C has 50 questions (Objective-type) of 1 mark each. All questions are compulsory.
- (vi) Symbols have their usual meanings.
- (vii) **Please darken the appropriate Circle of 'Question Paper Series Code' on the OMR Sheet in the space provided.**
- (viii) Questions for all the three parts should be answered on OMR Sheet.
- (ix) Answers written by the candidates inside the Question Paper will **NOT** be evaluated.
- (x) Calculators and Log Tables may be used.
- (xi) Pages at the end have been provided for Rough Work.
- (xii) **Return the Question Paper and the OMR/Answer Sheet** to the Invigilator at the end of the Entrance Test.
- (xiii) **DO NOT FOLD THE OMR/ANSWER SHEET.**

/5-A

INSTRUCTIONS FOR MARKING ANSWERS IN THE 'OMR SHEET'

1. Please ensure that you have darkened the appropriate Circle of 'Question Paper Series Code' on the OMR Sheet in the space provided.
2. Use only Blue/Black Ballpoint Pen to darken the Circle. Do not use Pencil to darken the Circle for Final Answer.
3. Please darken the whole Circle.
4. Darken ONLY ONE CIRCLE for each question as shown below in the example.

Example :

Wrong ● (b) (c) ●	Wrong ⊗ (b) (c) (d)	Wrong ⊗ (b) (c) (d)	Wrong ⊙ (b) (c) ●	Correct (a) (b) (c) ●
----------------------	------------------------	------------------------	----------------------	--------------------------

5. Once marked, no change in the answer is allowed.
6. Please do not make any stray marks on the OMR Sheet.
7. Please do not do any rough work on the OMR Sheet.
8. Mark your answer only in the appropriate Circle against the number corresponding to the question.
9. There will be no negative marking in evaluation.

PART—A

1. Consider a cylinder of height x cm and radius $3/\pi$ cm. A string of width h cm, when wound around the cylinder without keeping any space between two turns, covers the lateral surface of the cylinder completely. What is the required length of the string?
 - (a) $6x/h$ cm
 - (b) $12x/h$ cm
 - (c) $36x/h$ cm
 - (d) $6x$ cm

2. If $(20)^2$ is subtracted from the square of a number, the answer so obtained is 4321. What is the number?
 - (a) 110
 - (b) 111
 - (c) 113
 - (d) None of the above

3. Given the following sentences :
 - I. Watch how quickly the material sinks as it — its way downward.
 - II. These delicious pastries just — in mouth.
 - III. The vision of the ship — away.
 - IV. My heart — when I heard about his selfless effort.The number of sentences in which word MELT fits correctly, is
 - (a) 1
 - (b) 2
 - (c) 3
 - (d) 4

4. The price of a product is reduced by 30%. By what percentage should it be increased to make it 100%?
 - (a) 42.875%
 - (b) 30%
 - (c) 70%
 - (d) 56.87%

5. A sum of money invested in a scheme with compound interest doubles itself in 3 years. In how many years will it become 8 times of itself?
- (a) 9
 - (b) 10
 - (c) 11
 - (d) 12
6. Two people were walking in the opposite direction. Both of them walked 6 miles forward, then took right and walked 8 miles. How far is each from starting positions?
- (a) 14 miles and 14 miles
 - (b) 6 miles and 6 miles
 - (c) 10 miles and 10 miles
 - (d) None of the above
7. A trader made a profit equal to the selling price of 75 articles when he sold 100 of the articles. What percentage profit did he make in the transaction?
- (a) 300%
 - (b) 75%
 - (c) 150%
 - (d) None of the above
8. The repetition of messages or the use of superfluous expressions is called
- (a) hyperbole
 - (b) redundancy
 - (c) alliteration
 - (d) None of the above
9. Rearrange the following sentence fragments (P, Q, R and S) to make meaningful sentences :
- A year or — foreign languages.
- P. I picked up a liking for learning
 - Q. the largest urban area and primary
 - R. so after leaving Bangkok
 - S. city of Thailand and a place of unique beauty
- (a) RPQS
 - (b) RQSP
 - (c) RSPQ
 - (d) None of the above

10. If a and b are negative, and c is positive, which of the following statement(s) is/are true?

I. $a - b < a - c$

II. If $a < b$, then $(a/d) < (b/d)$

III. $1/b < 1/c$

(a) I only

(b) II and III

(c) III only

(d) None of the above

11. Choose the correct option :

He took care of her — she was resorted to health.

(a) after

(b) before

(c) till

(d) None of the above

12. Which two sentences in the following convey the same idea? Choose from the combinations given below :

I. He is in a fool's paradise.

II. He can't see the wood for the trees.

III. He can't distinguish between reality and fancy.

IV. He is unable to separate unimportant details from really important ones.

(a) II, III

(b) I, III

(c) I, IV

(d) None of the above

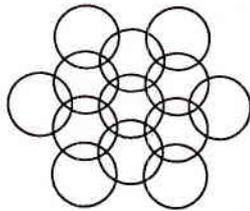
13. *P, Q, R, S* and *T* play a game of cards. *P* says to *Q*, "If you give me three cards, you will have as many as *T* has and if I give you three cards, you will have as many as *S* has". *P* and *Q* together had 10 cards more than what *S* and *T* together have. If *Q* has two cards more than what *R* has and the total number of cards be 133, how many cards does *Q* have?
- (a) 20
 - (b) 22
 - (c) 23
 - (d) None of the above
14. Village *K* is to the North of the village *R*. The village *S* is in the East of village *K*. The village *J* is to the left of the village *R*. In which direction is the village *J* with respect to village *S*?
- (a) North-East
 - (b) North-West
 - (c) South-East
 - (d) South-West
15. Seats for Computer Science, Mathematics and Biotechnology in an institute are in the ratio 5 : 7 : 8. There is a proposal to increase these seats by 40%, 50% and 75% respectively. What will be the ratio of increased seats?
- (a) 2 : 3 : 4
 - (b) 6 : 7 : 8
 - (c) 6 : 8 : 9
 - (d) None of the above
16. Select the pair which has the closest relationship
- MUNDANE : SPIRITUAL
- (a) common : ghostly
 - (b) worldly : unworldly
 - (c) routine : novel
 - (d) secular : clerical

17. You have to decide whether the data provided in the statements are sufficient to answer the given question. Read both the statements :

Question : What will be the total weight of 10 poles, each of the same weight?

Statements :

- I. One-fourth of the weight of each pole is 5 kg.
II. The total weight of three poles is 20 kilograms more than the total weight of two poles.
- (a) I alone is sufficient while II alone is not sufficient
(b) II alone is sufficient while I alone is not sufficient
(c) Either I or II is sufficient
(d) None of the above
18. How many circles are there in the following figure?



- (a) 12
(b) 11
(c) 14
(d) 13
19. A train passes a station platform in 36 seconds and a man standing on the platform in 20 seconds. If the speed of the train is 54 km/hour, what is the length of the platform?
- (a) 120 m
(b) 240 m
(c) 300 m
(d) None of the above
20. Flow : River :: Stagnant : ?
- (a) Rain
(b) Stream
(c) Pool
(d) Canal

PART—B

21. If $C \subseteq B \subseteq A$ and $|C| = |A|$, then
- (a) $C = A$
 - (b) $|A| = |B|$
 - (c) $|A| \neq |B|$
 - (d) $C = B$
22. Let Z be the set of all integers. Consider the subset R of $Z \times Z$ defined by $R = \{(x, y) \mid x - y \text{ is divisible by } 3\}$, then
- (a) R is reflexive and symmetric but not transitive
 - (b) R is reflexive and transitive but not symmetric
 - (c) R is an equivalence relation
 - (d) R is reflexive but not transitive and symmetric
23. If $f(x) = \sqrt{x}$ and $g(x) = x + 1$, the domain of the composite function $f \circ g$ is
- (a) $[0, \infty)$
 - (b) $[-1, \infty)$
 - (c) $(-\infty, \infty)$
 - (d) $(-\infty, -1)$
24. The system of equations
- $$\begin{aligned} 2x_1 + 2x_2 - 2x_3 &= 5 \\ 7x_1 + 7x_2 + x_3 &= 10 \\ 5x_1 + 5x_2 - x_3 &= 5 \end{aligned}$$
- has
- (a) no solution
 - (b) infinite solution
 - (c) one solution
 - (d) None of the above

25. $\det \begin{pmatrix} 1 & 1 & 1 \\ a & b & c \\ a^2 & b^2 & c^2 \end{pmatrix}$ is equal to

- (a) 0
- (b) abc
- (c) $(a-1)(b-1)(c-1)$
- (d) $(b-a)(c-a)(c-b)$

26. If A is a 3×3 matrix and $\det(A) = -7$, then $\det(3A)$ is equal to

- (a) 21
- (b) -21
- (c) -189
- (d) 189

27. $P(n, r)$ is equal to

- (a) $n(n-1)(n-2) \dots (n-r+1)$
- (b) $\frac{r!}{(n-r)!}$
- (c) $\frac{n!}{(n-r+1)!}$
- (d) $n!$

28. How many different ways can you arrange five different markers?

- (a) 625
- (b) 25
- (c) 125
- (d) 120

29. How many 3-digit numbers can be formed from the digits 2, 3, 5, 6, 7 and 9 which are divisible by 5 and none of the digits is repeated?

- (a) 17
- (b) 20
- (c) 15
- (d) 14

30. In how many ways can a group of 5 men and 2 women be made out of a total of 7 men and 3 women?
- (a) 60
 - (b) 63
 - (c) 45
 - (d) 55
31. For $n \geq 1$, $\sum_{r=0}^n \binom{n}{r} (-1)^r =$
- (a) $\frac{n!}{(n-r+1)!}$
 - (b) $\frac{n!}{(n-r)!}$
 - (c) 0
 - (d) 1
32. If four dice are thrown together, then the probability that the sum of numbers appearing on them is 13, is given by
- (a) $\frac{35}{324}$
 - (b) $\frac{5}{216}$
 - (c) $\frac{11}{216}$
 - (d) $\frac{11}{432}$
33. A student obtained 33, 35 and 42 marks respectively in three monthly examinations and 45 in the final examination in Computer Science. The three monthly examinations are of equal weightage whereas the final examination is weighted twice as much as a monthly examination. The mean mark of Computer Science is
- (a) 41
 - (b) 42
 - (c) 40
 - (d) 38.75

34. The standard deviation of a data is 6, when each observation is increased by 1, then the standard deviation of new data is
- (a) 5
 - (b) 6
 - (c) 7
 - (d) 8
35. The mode and median of observations 5, 4, 4, 3, 5, 3, 3, 4, 3, 5, 4, 3, 5 are
- (a) mode = 3, median = 5
 - (b) mode = 3, median = 3
 - (c) mode = 4, median = 3
 - (d) mode = 3, median = 4
36. The value of $\lim_{x \rightarrow 0} \sin \frac{1}{x}$
- (a) converges to 1
 - (b) diverges to ∞
 - (c) converges to -1
 - (d) oscillates infinitely between 1 and -1
37. The function defined by $f(x) = \operatorname{cosec} x$ is
- (a) continuous everywhere
 - (b) not continuous at $x = \frac{\pi}{2}$
 - (c) continuous at $x \in (-\infty, \infty)$ except at $x = n\pi$, n is an integer
 - (d) None of the above
38. If $f'(x) = g'(x) \forall x \in I$, then
- I. there exists a constant C_1 such that $f(x) = g(x) + C_1 \forall x \in I$
 - II. - there exists a constant C_2 such that $g(x) = f(x) + C_2 \forall x \in I$
- (a) Both statements I and II are true
 - (b) I is true but II isn't true
 - (c) II is true but I isn't true
 - (d) None of the above

39. The function

$$f(x) = \begin{cases} x \sin \frac{1}{x}, & x \neq 0 \\ 0, & x \geq 0 \end{cases}$$

- (a) is not differentiable at $x = 0$
 - (b) is differentiable at $x = 0$
 - (c) is differentiable in $(-\infty, \infty)$
 - (d) is differentiable on $[0, \infty)$
40. The absolute extrema of the function $f(x) = x^{2/3}$ on $[-2, 3]$ is

- (a) 0 and $9^{1/3}$
- (b) 1 and $9^{1/3}$
- (c) 0 and $3^{1/3}$
- (d) 1 and 3

41. $\int \sin^2 x \, dx$ is

- (a) $\frac{1}{4}(x - \sin 2x) + C$
- (b) $\frac{x}{2} - \frac{\sin 2x}{4} + C$
- (c) $\frac{\sin^3 x}{3} \cos x + C$
- (d) 1

42. The order of the differential equation $\left(\frac{d^3 y}{dx^3}\right)^{2/3} = 1 + \frac{dy}{dx}$ is

- (a) 2
- (b) 3
- (c) $2/3$
- (d) 4

43. The solution of the differential equation $\frac{dy}{dx} = (e^{3x} + x^2)e^{-2y}$ is

(a) $3e^{2y} = 2(e^{4x} + x^4) + c$

(b) $3e^{2y} = 2(e^{2x} + x^2) + c$

(c) $3e^{2y} = 2(e^{3x} - x^3) + c$

(d) $3e^{2y} = 2(e^{3x} + x^3) + c$

44. Which of the following satisfies the differential equation $(x^2 - y^2) dx = 2xy dy$?

(a) $x(x^2 - 3y^2) = c$

(b) $x(x^2 + 3y^2) = c$

(c) $x(x^2 - 2y^2) = c$

(d) $x(x^2 - 3y) = c$

45. The integrating factor for the linear differential equation $x \log x \frac{dy}{dx} + y = 2 \log x$ is

(a) e^x

(b) $\log\left(\frac{1}{x}\right)$

(c) $\log x$

(d) x^2

46. If \hat{a} and \hat{b} are unit vectors such that $\hat{a} - 4\hat{b}$ is at right angles to $7\hat{a} - 2\hat{b}$, then the angle between \hat{a} and \hat{b} is

(a) $\frac{\pi}{2}$

(b) $\frac{\pi}{3}$

(c) $\frac{\pi}{6}$

(d) $\frac{\pi}{4}$

47. Two vectors \vec{a} and \vec{b} include an acute angle for
- (a) $\vec{a} \cdot \vec{b} = 0$
 - (b) $\vec{a} \cdot \vec{b} > 0$
 - (c) $\vec{a} \cdot \vec{b} < 0$
 - (d) None of the above
48. If \vec{a} and \vec{b} are any two vectors, then $(\vec{a} \times \vec{b})^2 + (\vec{a} \cdot \vec{b})^2$ is equal to
- (a) $|\vec{a}|^2 |\vec{b}|^2$
 - (b) $|\vec{a}|^2 |\vec{b}|^2$, where $\lambda < 1$
 - (c) $|\vec{a}|^2 + |\vec{b}|^2$
 - (d) None of the above
49. For what value of λ , vector $\vec{a} = 15\hat{i} - \lambda\hat{j} + 30\hat{k}$ is perpendicular to $\vec{b} = 16\hat{i} + 12\hat{j} - 2\hat{k}$?
- (a) 15
 - (b) -2
 - (c) 3
 - (d) 4
50. If in triangle PQR , the position vectors of points P , Q and R are $2\hat{i} - \hat{j} + \hat{k}$, $\hat{i} - 3\hat{j} - 5\hat{k}$ and $3\hat{i} - 4\hat{j} - 4\hat{k}$, then the triangle will be
- (a) isosceles
 - (b) equilateral
 - (c) right angled
 - (d) None of the above

PART—C

51. If $L = \{(x, y) | y = e^x, x \in R\}$ and $M = \{(x, y) | y = x, x \in R\}$, then
- (a) $M \subseteq L$
 - (b) $L \subseteq M$
 - (c) $L \cup M = L$
 - (d) $L \cap M = \phi$
52. If $S = \{\phi, \{\phi\}\}$, then the power set of S is
- (a) S
 - (b) $\{\phi, \{\phi\}, S\}$
 - (c) $\{\phi, \{\phi\}, \{\{\phi\}\}, S\}$
 - (d) None of the above
53. If R is a relation from a finite set M having m elements to a finite set N having n elements, then the number of relation from M to N is
- (a) 2^{mn}
 - (b) $2^{mn} - 1$
 - (c) $2mn$
 - (d) m^n
54. Let $P = \{(x, y) | x^2 + y^2 = 1, x, y \in R\}$. Then P is
- (a) reflexive
 - (b) symmetric
 - (c) transitive
 - (d) anti-symmetric
55. Let $f : R \rightarrow R$ be defined by $f(x) = 3x - 4$. Then $f^{-1}(x)$ is
- (a) $\frac{x+4}{3}$
 - (b) $\frac{x}{3} - 4$
 - (c) $3x + 4$
 - (d) None of the above

56. The number of bijective functions from set S to itself, when S contains 106 elements is
- 106
 - $(106)^2$
 - 106!
 - 2^{106}
57. $p \rightarrow q$ is logically equivalent to
- $\sim q \rightarrow p$
 - $\sim p \rightarrow q$
 - $\sim p \wedge q$
 - $\sim p \vee q$
58. Let p be "He is tall" and let q be "He is handsome". Then the statement "It is false that he is short or handsome" is
- $p \wedge q$
 - $\sim(\sim p \vee q)$
 - $p \vee \sim q$
 - $\sim p \wedge q$
59. Which of the following statements is the negation of the statement "4 is even or - 5 is negative"?
- 4 is odd and - 5 is not negative
 - 4 is even or - 5 is not negative
 - 4 is odd or - 5 is not negative
 - 4 is even and - 5 is not negative
60. Simplification of the Boolean expression $AB + ABC + ABCD + ABCDE + ABCDEF$ yields which of the following results?
- $ABCDEF$
 - AB
 - $AB + CD + EF$
 - $A + B + C + D + E + F$

61. What is the output of the program?

```
#include <stdio.h>
void main()
{
    int i,j,k;
    i=2;
    j=4;
    k=i++>j & 2;
    if(++k && ++i<--j || i++)
    {
        j=++k;
    }
    printf("%d %d %d", i,j--,k);
    getchar()
}
```

(a) 4 -3 2

(b) 5 -3 2

(c) 4 -2 2

(d) 5 -2 2

62. What is the output of the program?

```
#include <stdio.h>
void main()
{
    int i=0;
    for (i=0; i<20; i++)
    {
        switch(i)
        {
            case 0 :
                i+=5;
            case 1 :
                i+=2;
            case 5 :
                i+=5;
            default :
                i+=4;
                break;
        }
        printf("%d", i);
    }
    getchar();
}
```

(a) 4 4

(b) 4 2

(c) 5 20

(d) 16 21

63. What is the output of the program?

```
#include <stdio.h>
#include <string.h>

void main()
{
char s1[10]="abcd";
char s2[10];
char s3[10]="efgh";
int i;
i=strcmp(strcat(s3, strcpy(s2,s1)), strcat(s3,"abcd"));
printf("%d",i);
getch();
}
```

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

64. How many times the pattern "South Asian University" will get printed?

```
void main()
{
int x;
for(x=-1; x<=10; x++)
{
if(x<5)
continue;
else
break;
printf("South Asian University");
}
}
```

- (a) infinite times
- (b) 0 time
- (c) 11 times
- (d) 6 times

65. Consider the following recursive function :

```
int fun (int n)
{
    If (n==4)
        return 2;
    else
        return 2 * fun (n+1);
}
```

What is the value returned by the function call fun (2)?

- (a) 2
 - (b) 4
 - (c) 6
 - (d) 8
66. Which of the following cannot be checked in a switch-case statement?
- (a) enum
 - (b) float
 - (c) int
 - (d) char
67. The memory address of the first element of an array is called
- (a) floor address
 - (b) foundation address
 - (c) first address
 - (d) base address
68. Which of the following is a non-linear data structure?
- (a) Array
 - (b) Linked list
 - (c) Stack
 - (d) Hash table

69. Given an empty stack after performing the operations :
push (1), push (2), pop, push (3), push (4), pop, pop, push (5), pop;
What is the value of the top of the stack?
- (a) 4
 - (b) 3
 - (c) 2
 - (d) 1
70. The minimum number of comparisons required to determine if an integer appears more than $n/2$ times in a sorted array of n integers is
- (a) $\theta(n)$
 - (b) $\theta(\log n)$
 - (c) $\theta(\log^* n)$
 - (d) $\theta(1)$
71. The average search time of hashing with linear probing will be less if the load factor
- (a) is less than one
 - (b) equals one
 - (c) is greater than one
 - (d) None of the above
72. Consider a linked list of n element which is pointed by an external pointer. What is the time taken to delete the element which is successor of the element pointed to by the given pointer?
- (a) $O(1)$
 - (b) $O(\log 2n)$
 - (c) $O(n)$
 - (d) $O(n \log 2n)$
73. Which of the following operations is performed more efficiently by doubly linked list than by linear linked list?
- (a) Deleting a node whose location is given
 - (b) Searching an unsorted list for a given item
 - (c) Inserting a node after the node with a given location
 - (d) None of the above

74. A full binary tree with n leaves contains
- (a) n nodes
 - (b) $\log 2n$ nodes
 - (c) $2n + 1$ nodes
 - (d) $2n - 1$ nodes
75. The number of nodes in a complete binary tree of level 5 is
- (a) 15
 - (b) 20
 - (c) 63
 - (d) 71
76. Number of 'ADD' and 'REMOVE' operations required to access $(n/2)$ th elements of a queue of n elements so that the original queue remain the same after the access is (take help of another queue)
- (a) $4 * n$
 - (b) $8 * n$
 - (c) $4 * n - 1$
 - (d) $8 * n - 1$
77. The initial configuration of a queue is a, b, c, d (a is in the front). To get the configuration d, c, b, a , one needs a minimum of
- (a) 2 deletions and 3 additions
 - (b) 3 deletions and 2 additions
 - (c) 3 deletions and 3 additions
 - (d) 3 deletions and 4 additions

78. The time complexity of the following C code

```
int fun(int n) {  
    if (n==0)  
        return 1;  
    else  
        return n*fun(n-1);  
}
```

is

- (a) n
- (b) n^2
- (c) $n \log n$
- (d) None of the above

79. Increasing order of asymptotic complexity of the following functions

$$f_1(n) = n^3 + \log n, f_2(n) = n + \log^3 n, f_3(n) = n \log n, f_4(n) = \binom{n}{2}$$

is

- (a) f_3, f_2, f_4, f_1
- (b) f_2, f_3, f_1, f_4
- (c) f_2, f_3, f_4, f_1
- (d) None of the above

80. Two main measures for the efficiency of an algorithm are

- (a) process and memory
- (b) complexity and capacity
- (c) time and space
- (d) data and space

81. Which of the following cases does not exist in complexity theory?

- (a) Best case
- (b) Worst case
- (c) Average case
- (d) Null case

82. Finding the location of the element with a given value is
- (a) traversal
 - (b) search
 - (c) sort
 - (d) None of the above
83. What is the worst case complexity of sorting each row of a two-dimensional array $A[n][n]$ containing integers using bubble sort?
- (a) $\theta(n \log n)$
 - (b) $\theta(n^2)$
 - (c) $\theta(n^3)$
 - (d) $\theta(n^2 \log n)$
84. The number of comparisons needed to search for a given element in a singly linked list of length n is
- (a) $\log n$
 - (b) $n/2$
 - (c) n
 - (d) None of the above
85. The sort in which the first element from the unsorted sublist is transferred to the sorted sublist at its sorted location is
- (a) selection sort
 - (b) insertion sort
 - (c) bubble sort
 - (d) None of the above

86. How many insertions does bubble sort require to sort the array

$A = \{22, 38, 91, 48, 57, 82, 63, 74\}$?

- (a) 4
- (b) 3
- (c) 2
- (d) 1

87. Any comparison-based sorting algorithm requires at least — comparisons to sort an input of n elements.

- (a) $O(n \log n)$
- (b) $\theta(n \log n)$
- (c) $\Omega(n \log n)$
- (d) None of the above

88. An algorithm lacks which of these features?

- (a) Computes a function
- (b) Is deterministic
- (c) May take an unreasonably long time
- (d) Non-termination

89. Average search time taken by binary search on sorted array of 16 items is

- (a) 16 units of time
- (b) 4 units of time
- (c) 2 units of time
- (d) None of the above

90. An algorithm consists of two modules X_1 and X_2 of order $f(n)$ and $g(n)$ respectively. The order of algorithm is

(a) $\max(f(n), g(n))$

(b) $\min(f(n), g(n))$

(c) $f(n) + g(n)$

(d) $f(n) * g(n)$

91. The truth table below represents which of the following Boolean functions?

X	Y	$f(X, Y)$
0	0	0
0	1	0
1	0	1
1	1	1

(a) X

(b) $X \text{ OR } Y$

(c) $X \text{ XOR } Y$

(d) Y

92. Minimum number of D flip-flops needed to design a mod-150 counter is

(a) 128

(b) 7

(c) 8

(d) 150

93. A typical modern computer uses
- (a) IC
 - (b) vacuum tubes
 - (c) valves
 - (d) All of the above
94. What will decimal equivalent of the hexadecimal number $1D7F_{16}$?
- (a) 8551_{10}
 - (b) 8771_{10}
 - (c) 5557_{10}
 - (d) None of the above
95. Cache memory in modern computer systems works on the following principle
- (a) Principle of time complexity
 - (b) Principle of speed
 - (c) Principle of locality of reference
 - (d) None of the above
96. What is the minimum number of address bits required to address 2000 words in a memory?
- (a) 9
 - (b) 10
 - (c) 11
 - (d) 12

97. What is the typical sequence of execution of sub-cycles in an instruction execution cycle?
- (a) Decode—Fetch—Execute—Write
 - (b) Fetch—Decode—Execute—Write
 - (c) Write—Fetch—Decode—Execute
 - (d) Execute—Fetch—Decode—Write
98. In comparison with static RAM, the dynamic RAM has
- (a) lower bit density and higher power consumption
 - (b) higher bit density and higher power consumption
 - (c) lower bit density and lower power consumption
 - (d) None of the above
99. Desirable characteristic(s) of a memory system is (are)
- (a) speed and reliability
 - (b) low power consumption
 - (c) durability and compactness
 - (d) All of the above
100. What is the correct sequence of time delays that happen during a data transfer from a disk to memory?
- (a) Seek time, access time, transfer time
 - (b) Seek time, latency time, transfer time
 - (c) Access time, latency time, transfer time
 - (d) None of the above
