Test Centre : _____

Roll No. : _____

Name of the Candidate : _____

S A U

Entrance Test for M.Sc. (Computer Science) 2018

[PROGRAMME CODE : 30004]

Question Paper Series Code : A

QUESTION PAPER

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, Roll Number and Name of the Test Centre in the space provided for the purpose on the top of this Question Paper and on the OMR Sheet.

(ii) This Question Paper has Two Parts : Part—A and Part—B.

(iii) Part—A (objective-type) has **40** questions of **1** mark each. All questions are compulsory.

(iv) Part—B (objective-type) has **60** questions of **1** mark each. All questions are compulsory.

(v) **A wrong answer will lead to the deduction of one-fourth (¼) of the marks assigned to that question.**

(vi) *Symbols have their usual meanings.*

(vii) **Please darken the appropriate circle of 'Question Paper Series Code' and 'Programme Code' on the OMR Sheet in the space provided.**

(viii) All questions should be answered on the OMR Sheet.

(ix) Answers written inside the Question Paper will **NOT** be evaluated.

(x) Calculators and Log Tables may be used. **Mobile Phones are not allowed.**

(xi) Pages at the end of the Question Paper have been provided for Rough Work.

(xii) **Return the Question Paper and the OMR Sheet** to the Invigilator at the end of the Entrance Test.

(xiii) **DO NOT FOLD THE OMR SHEET.**

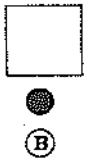
INSTRUCTIONS FOR MARKING ANSWERS ON THE 'OMR SHEET'

Use BLUE/BLACK Ballpoint Pen Only

1. **Please ensure that you have darkened the appropriate circle of 'Question Paper Series Code' and 'Programme Code' on the OMR Sheet in the space provided.**

   Question Paper Series Code

   Write Question Paper Series Code **A** or **B** in the box and darken the appropriate circle.

   A or **B**

   ● Ⓑ

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	Wrong	Wrong	Wrong	Correct
● ⓑ ⓒ ●	Ⓐ ⓑ ⓒ ⓓ	Ⓐ ⓑ ⓒ Ⓓ	◉ ⓑ ⓒ ●	ⓐ ⓑ ⓒ ●

5. Once marked, no change in the answer is possible.
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. **A wrong answer will lead to the deduction of one-fourth of the marks assigned to that question.**
10. Write your seven-digit Roll Number in small boxes provided for the purpose; and also darken the appropriate circle corresponding to respective digits of your Roll Number as shown in the example below.

    Example :

    ROLL NUMBER

1	3	5	7	2	0	2
●	①	①	①	①	①	①
②	②	②	②	●	②	●
③	●	③	③	③	③	③
④	④	④	④	④	④	④
⑤	⑤	●	⑤	⑤	⑤	⑤
⑥	⑥	⑥	⑥	⑥	⑥	⑥
⑦	⑦	⑦	●	⑦	⑦	⑦
⑧	⑧	⑧	⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨	⑨	⑨	⑨
⓪	⓪	⓪	⓪	⓪	●	⓪

PART—A

1. If $A = \{(x, y) : x^2 + y^2 \leq 1, x, y \in R\}$ and $B = \{(x, y) : x^2 + y^2 \leq 4, x, y \in R\}$, then

   a. $A - B = A$

   b. $B - A = B$

   c. $A - B = \varnothing$

   d. $B - A = \varnothing$

2. If R is a relation on the set W of non-negative integers given by $aRa \Rightarrow a = 2^k b$ for some non-negative integers k, then R is

   a. an equivalence relation

   b. reflexive but not symmetric

   c. reflexive and transitive but not symmetric

   d. reflexive and symmetric but not transitive

3. Let $f : [2, \infty) \to X$ is defined by $f(x) = 4x - x^2$, then f is invertible, if X lies in the interval

   a. $[2, \infty)$

   b. $(-\infty, 2]$

   c. $(-\infty, 4]$

   d. $[4, \infty)$

4. Two points P and Q in a plane are related if $OP = OQ$, where O is a fixed point. This relation is

   a. a partially ordered relation

   b. an equivalence relation

   c. reflexive but not symmetric

   d. reflexive but not transitive

5. If the set of rational numbers $Q-\{1\}$ forms a group under binary operation $a \circ b = a+b+ab$, where $a, b \in Q-\{1\}$, then the inverse of 2 is

a. $-\frac{1}{2}$

b. $-\frac{2}{3}$

c. -1

d. $-\frac{1}{3}$

6. A self-complemented distributive lattice is called

a. Boolean algebra

b. modular lattice

c. complete lattice

d. self-dual lattice

7. Consider the following simultaneous equations using the Boolean variables x, y, z and w :

$$x+y+z=1$$
$$xy=0$$
$$xz+w=1$$
$$xy+(zw)'=0$$

Which one of the following is the solution for x, y, z and w, respectively?

a. 0, 1, 0, 0

b. 1, 1, 0, 1

c. 1, 0, 1, 1

d. 1, 0, 0, 0

8. Let f be an injective map with domain $\{x, y, z\}$ and range $\{1, 2, 3\}$ such that only one of the following statements is correct and the remaining are false.

$$f(x)=1, \quad f(y)\neq 1, \quad f(z)\neq 2$$

The value of $f^{-1}(1)$ is

a. x

b. y

c. z

d. Does not exist

9. The total number of onto functions from the set {1, 2, 3, 4} to the set {3, 4, 7} is

a. 18

b. 36

c. 64

d. 84

10. If a binary relation is defined on a set of ordered pairs of real numbers as $(a, b)*(c, d) = (ad + bc, bd)$ and it is associative, then $(1, 2)*(3, 5)*(3, 4)$ is

a. (74, 40)

b. (32, 40)

c. (23, 11)

d. (7, 11)

11. If matrix A satisfies the equation $x^3 - 5x^2 + 4x + \lambda = 0$, then A^{-1} exists, if

a. $\lambda \neq 1$

b. $\lambda \neq 2$

c. $\lambda \neq -1$

d. $\lambda \neq 0$

12. If $A = \begin{bmatrix} \alpha & 0 \\ 1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 \\ 5 & 1 \end{bmatrix}$, then the value of α for which $A^2 = B$ is

a. 1

b. -1

c. 4

d. No real values

13. The system of equations $x+y+z=5$, $x+2y+3z=9$ and $x+3y+\lambda z=\mu$ has a unique solution, if

a. $\lambda=5,\ \mu=13$

b. $\lambda\neq 5$

c. $\lambda=5,\ \mu\neq 13$

d. $\mu\neq 13$

14. If A is a square matrix such that $AA^T = I$ and determinant of $A = 1$, then determinant of $A-I$, i.e., $|A-I|$ is equal to

a. 0

b. 1

c. -1

d. 2

15. Consider the following system of equations in x, y, z :

$$x\sin 3\theta - y + z = 0$$
$$x\cos 2\theta + 4y + 3z = 0$$
$$2x + 7y + 7z = 0$$

If this system has non-trivial solution, then for any integer n, the values of θ are given by

a. $\left(n+\frac{(-1)^n}{3}\right)\pi$

b. $\left(n+\frac{(-1)^n}{4}\right)\pi$

c. $\left(n+\frac{(-1)^n}{6}\right)\pi$

d. $\frac{n\pi}{2}$

16. The number of four-letter words that can be formed using the letters of the word 'FAILURE', so that F is included in each word, is

a. ${}^6C_4 \times 4!$

b. ${}^6C_3 \times 4!$

c. ${}^6C_4$

d. ${}^6C_4 \times 3!$

17. The number of divisors of the form $4n+2$ $(n \geq 0)$ of the integer 240 is

a. 4

b. 8

c. 10

d. 3

18. Everybody in a room shakes hands with everybody else. If the total number of hand-shakes is 66, then the total number of persons present in the room is

a. 11

b. 12

c. 13

d. 14

19. The coefficient of x^4 in the expansion $\left(\frac{x}{2}-\frac{3}{x^2}\right)^{10}$, is

a. $\frac{405}{256}$

b. $\frac{504}{259}$

c. $\frac{450}{263}$

d. $\frac{466}{291}$

20. The sum of n terms of the series $\left[1+2\left(1+\frac{1}{n}\right)+3\left(1-\frac{1}{n}\right)^2+\ldots\right]$ is given by

a. n^2

b. $n(n+1)$

c. $n\left(1+\frac{1}{n}\right)^2$

d. $n(n-1)$

21. Two integers are selected at random from integers 1 to 4. If the sum is even, then the probability that both the numbers are odd, is

a. $\frac{3}{5}$

b. $\frac{2}{5}$

c. $\frac{1}{5}$

d. $\frac{4}{5}$

22. A man is known to speak the truth 3 out of 4 times. He throws a die and reports that it is a six. The probability that it is actually a six is

a. $\frac{3}{4}$

b. $\frac{1}{5}$

c. $\frac{1}{8}$

d. $\frac{3}{8}$

23. There are four machines and it is known that exactly two of them are faulty. They are tested one by one in a random order till both the faulty machines are identified. Then the probability that only two tests are needed is

a. $\frac{1}{3}$

b. $\frac{1}{6}$

c. $\frac{1}{2}$

d. $\frac{1}{4}$

24. If the median of the data x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8 is α and $x_1 < x_2 < x_3 < x_4 < x_5 < x_6 < x_7 < x_8$, then the median of x_3, x_4, x_5, x_6 is

a. α

b. $\frac{\alpha}{2}$

c. $\frac{\alpha}{3}$

d. $\frac{\alpha}{4}$.

25. The most stable measure of central tendency is

a. the mean

b. the median

c. the mode

d. None of the above

26. If $f(x) = \begin{cases} \frac{\tan^{-1}(x+[x])}{[x]-2x} & , \quad [x] \neq 0 \\ 0 & , \quad [x] = 0 \end{cases}$, where $[x]$ denotes the greatest integer less than or equal to x, then $\lim_{x \to 0} f(x)$ is

a. $-\frac{1}{2}$

b. 1

c. $\frac{\pi}{4}$

d. non-existing

27. If $f(x)$ is continuous at $x = 0$ and $f(0) = 2$, then $\lim_{x \to 0} \frac{\int_0^x f(x)\,dx}{x}$ is

a. 0

b. 2

c. $f(2)$

d. $f(0)$

28. If $x + 4|y| = 6y$, then y as a function of x is

a. continuous at $x = 0$

b. derivable at $x = 0$

c. $\frac{dy}{dx} = \frac{1}{2} \ \forall x$

d. $\frac{dy}{dx} = 0 \ \forall x$

29. If $y=(1+x)(1+x^2)(1+x^4)\ldots(1+x^{2^n})$, then $\frac{dy}{dx}$ at $x=0$ is

a. 1

b. -1

c. 0

d. 2

30. If the curves $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ and $\frac{x^2}{c^2}+\frac{y^2}{d^2}=1$ intersect orthogonally, then

a. $a^2-b^2=c^2-d^2$

b. $a^2-c^2=b^2-d^2$

c. $a^2b^2=c^2d^2$

d. $\frac{1}{a^2}+\frac{1}{b^2}=\frac{1}{c^2}+\frac{1}{d^2}$

31. The distance moved by a particle in time t is given by $x=t^3-nt^2+6t+8$. At the instant when its acceleration is zero, the velocity is

a. 42

b. -42

c. 48

d. -48

32. If percentage error in the edge of a cube is 1, then the error in its volume is

a. 1%

b. 2%

c. 3%

d. 4%

33. If $a+b+c=0$, then the equation $3ax^2+2bx+c=0$ has _____ in the interval (0, 1).

a. at least one root

b. at most one root

c. no root

d. at most two roots

34. For a given integer y, if $[y]$ is the greatest integer less than or equal to y, then the value of the integral $\int_{\pi/2}^{3\pi/2}(2\sin x)\,dx$ is

a. $-\pi$

b. 0

c. $\frac{-\pi}{2}$

d. $\frac{\pi}{2}$

35. The area of the region enclosed by the curves $y=x$, $x=e$, $y=\frac{1}{x}$, and the positive axis is

a. $\frac{1}{2}$

b. 1

c. $\frac{3}{2}$

d. $\frac{5}{2}$

36. The solution of the differential equation $\cos x \sin y\,dx+\sin x\cos y\,dy=0$ is

a. $\frac{\sin x}{\sin y}=c$

b. $\cos x+\cos y=c$

c. $\sin x+\sin y=c$

d. $\sin x\cdot\sin y=c$

37. The order and degree of the differential equation of all tangent lines to the parabola $x^2 = 4y$ are respectively

a. 1 and 2

b. 2 and 2

c. 3 and 1

d. 4 and 1

38. The differential equation $\frac{dy}{dx} = \frac{\sqrt{1-y^2}}{y}$ determines a family of circles with

a. variable radii and a fixed centre at (0, 1)

b. variable radii and a fixed centre at (0, – 1)

c. fixed radius 1 and variable centre along the x axis

d. fixed radius 1 and variable centre along the y axis

39. If $\vec{a}$, $\vec{b}$ and $\vec{c}$ are unit coplanar vectors, then the scalar triple product of $(2\vec{a} - \vec{b})$, $(2\vec{b} - \vec{c})$ and $(2\vec{c} - \vec{a})$ is

a. 0

b. 1

c. $-\sqrt{3}$

d. $\sqrt{3}$

40. If $[2\vec{a} + 4\vec{b}\,\vec{c}\,\vec{d}] = \lambda[\vec{a}\,\vec{c}\,\vec{d}] + \mu[\vec{b}\,\vec{c}\,\vec{d}]$, then the value of $\lambda + \mu$ is

a. 6

b. –6

c. 10

d. 8

PART—B

41. The hexadecimal notation of $(1011\ 0111\ 1010)_2$ is

a. $(B3A)_{16}$

b. $(B5B)_{16}$

c. $(B7A)_{16}$

d. $(A7B)_{16}$

42. A partial ordered relation is transitive, reflexive, and _____.

a. antisymmetric

b. bisymmetric

c. antireflexive

d. asymmetric

43. The complete graph with four vertices has _____ edges.

a. 3

b. 4

c. 5

d. 6

44. What is the contrapositive of the following conditional statement?

"The home team misses whenever it is drizzling."

a. If it is drizzling, then the home team misses

b. If the home team misses, then it is drizzling

c. If it is not drizzling, then the home team does not miss

d. If the home team wins, then it is not drizzling

45. The enumeration of the set $S = \{x | x$ is the square of an integer and $x < 100\}$ is

a. {0, 2, 4, 5, 9, 58, 49, 56, 99, 12}

b. {0, 1, 4, 9, 16, 25, 36, 49, 64, 81}

c. {1, 4, 11, 16, 25, 35, 64, 81, 85, 99}

d. {1, 4, 9, 16, 25, 36, 64, 81, 85, 99}

46. If $U = \{1, 2, 3, 4, 5, 6, 7, 8\}$ is the universal set, A' (i.e., complement of A) is {2, 5, 6, 7}, and $A \cap B$ is {1, 3, 4}, then the set B' will surely contain

a. 8

b. 7

c. 1

d. 3

47. The product of two negative real numbers is not negative, is given by which of the following statements?

a. $\exists x \, \forall y((x < 0) \wedge (y < 0) \rightarrow (xy > 0))$

b. $\exists x \, \exists y((x < 0) \wedge (y < 0) \wedge (xy > 0))$

c. $\forall x \, \exists y((x < 0) \wedge (y < 0) \wedge (xy > 0))$

d. $\forall x \, \forall y((x < 0) \wedge (y < 0) \rightarrow (xy > 0))$

48. The set $S = \{x : x$ is a real number between 1 and 2$\}$ is a/an

a. infinite set

b. finite set

c. countable set

d. countably finite set

49. If $C(x)$ is "x is a comedian", $F(x)$ is "x is funny", and the domain consists of all people, then which one of the following statements represents "every comedian is funny"?

a. $\exists x(C(x) \wedge F(x))$

b. $\forall x(C(x) \wedge F(x))$

c. $\exists x(C(x) \rightarrow F(x))$

d. $\forall x(C(x) \rightarrow F(x))$

50. A minimal spanning tree of a graph G is

a. a spanning subgraph

b. a tree

c. minimum weight

d. All of the above

51. Which one of the following functions, where $f : Z \times Z \rightarrow Z$, is ***not*** onto?

a. $f(a, b) = a + b$

b. $f(a, b) = a$

c. $f(a, b) = |b|$

d. $f(a, b) = a - b$

52. If R is a relation 'less than' from $A = \{1, 2, 3, 4\}$ to $B = \{1, 3, 5\}$, then $R \circ R^{-1}$ is

a. $\{(3, 3), (3, 4), (3, 5)\}$

b. $\{(3, 1), (5, 1), (3, 2), (5, 2), (5, 3), (5, 4)\}$

c. $\{(3, 3), (3, 5), (5, 3), (5, 5)\}$

d. $\{(1, 3), (1, 5), (2, 3), (2, 5), (3, 5), (4, 5)\}$

53. What is the cardinality of the power set of the set {0, 1, 2}?

a. 8

b. 6

c. 7

d. 9

54. The negation of the statement "either $-2 \leq x \leq -1$ or $1 \leq x \leq 2$" is

a. $x < -2$ or $2 < x$ or $-1 < x < 1$

b. $x < -2$ or $2 < x$

c. $-1 < x < 1$

d. $-2 < x < 2$

55. Primed or unprimed variable is

a. map

b. logic gate

c. literal

d. graph

56. Which one of the following is ***not*** a valid identifier in C?

a. Variable 1

b. 1 Variable

c. _Variable 1

d. _1 Variable

57. Which one of the following is ***not*** a valid data type in C language?

a. int

b. char

c. real

d. double

58. The arithmetic operators have _____ associativity.

a. right-to-left

b. top-to-bottom

c. left-to-right

d. bottom-to-top

59. What is the output of the following segment of C language codes?

```
int x = 8;
printf("%d", x-8/4-4);
```

a. 2

b. Division by zero error

c. 4

d. 6

60. By default, the local variables have _____ storage class.

a. auto

b. register

c. static

d. extern

61. What is the value of the following segment of C language codes?

```
int p = 9;
printf("%d", x-9?7:5);
```

a. 5

b. 7

c. 9

d. 0

62. Assuming the memory requirements of integer variables as 2 bytes, the spaces allocated to the following pointer variables

```
int *p; int **q;
```

are

a. p : 2 bytes, q : 2 bytes

b. p : 2 bytes, q : 4 bytes

c. p : 4 bytes, q : 2 bytes

d. p : 4 bytes, q : 4 bytes

63. Which one of the following C declarations is a 'pointer to array'?

a. int *p[10];

b. int p[int *];

c. int (*p)[10];

d. int **p[10];

64. Assuming the memory requirement of char variable as one byte, the size of the array declared below

```
char SAU[ ] = "Entrance Test 2018";
```

is

a. 18 bytes

b. 19 bytes

c. 20 bytes

d. 28 bytes

65. Which of the following is ***not*** a valid "for" loop in C language?

a. for (0; 0; 0);

b. for (1; 0; 1);

c. for (;;);

d. for (1; 1);

66. Which one of the following statements is false?

a. Structures can store different types of data

b. Like structures, unions can also store different types of data

c. All members of a union share the same memory location

d. Array of structures cannot be defined

67. The value of the following segment of C program is

```
int x = 2;
printf("%d", 16/4 - 4/2 + x);
```

a. division by zero error

b. 4

c. 5.33

d. 0

68. Which one of the following statements is true?

a. External is a storage class in C

b. Arithmetic operators have both left-to-right and right-to-left associativities

c. C supports both functions and procedures

d. Four-dimensional vectors can be declared in C

69. Which one of the following is ***not*** a valid keyword in C language?

a. enum

b. struct

c. void

d. root

70. If *p* is an integer variable containing 256, then the value of *q* after executing the following C expression

```
q = p>>1;
```

will be

a. 128

b. 512

c. 256

d. 1024

71. How many queues are needed to implement a stack?

a. 1

b. 2

c. 3

d. 4

72. A priority queue can be efficiently implemented using which one of the following data structures?

a. Array

b. Linked list

c. Binary search tree

d. Heap

73. A sorting technique is called stable, if

a. it takes $\theta(n \cdot \log n)$ time

b. it maintains the relative order of occurrence of non-distinct elements

c. it uses divide and conquer paradigm

d. it takes $O(n)$ space

74. Linear search is highly inefficient compared to binary search when dealing with

a. small, unsorted arrays

b. small, sorted arrays

c. large, unsorted arrays

d. large, sorted arrays

75. Consider the following linked list representation :

```
struct node {
    int data;
    struct node *next;
}start = NULL;

struct node *new_node;
```

Which one of the following statements is used to create a node?

a. new_node=(struct node *)malloc((struct node));

b. new_node=(struct *)malloc(sizeof(struct node));

c. new_node=(struct node)malloc(sizeof(struct node));

d. new_node=(struct node *)malloc(sizeof(struct node));

76. Is it possible to create a doubly linked list using only one pointer with every node?

a. Not possible

b. Yes, possible by storing XOR of addresses of previous and next nodes

c. Yes, possible by storing XOR of current node and next node

d. Yes, possible by storing XOR of current node and previous node

77. The minimum number of multiplications and additions required to evaluate the polynomial $P = 8x^3 + 7x^2 + 14x + 30$ is _____ and _____ respectively.

a. 6, 3

b. 4, 2

c. 3, 3

d. 8, 3

78. In a binary tree, the number of internal nodes of degree 1 is 5, and the number of internal nodes of degree 2 is 10. The number of leaf nodes in the binary tree is

a. 10

b. 11

c. 12

d. 15

79. What is the worst case time complexity of insertion sort where position of the data to be inserted is calculated, using binary search?

a. N

b. $N \log N$

c. N^2

d. $N(\log N)^2$

80. The time complexity of the binary search algorithm can be expressed as

a. $T(n) = T(n/2) + O(1)$

b. $T(n) = T(n/2) + O(n)$

c. $T(n) = 2 \cdot T(n/2) + O(1)$

d. $T(n) = 2 \cdot T(n/2) + O(n)$

81. Given two vertices in a graph, which of the two traversals (BFS and DFS) can be used to find, if there is a path between them or not?

a. Only BFS

b. Only DFS

c. Neither BFS nor DFS

d. Both BFS and DFS

82. The height of a tree is the length of the longest root-to-leaf path in it. The maximum and minimum numbers of nodes in a binary tree of height 5 are _____ and _____, respectively.

a. 63, 6

b. 64, 5

c. 32, 6

d. 31, 5

83. What is the running time of depth-first search, as a function of $|V|$ and $|E|$, if the input graph is represented by an adjacency matrix instead of an adjacency list?

a. $O(VE)$

b. $O(E^2)$

c. $O(V^2)$

d. $O(V^2 + E)$

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

```
int fun(int n)
{
  int count = 0;
  for (int i = n; i > 0; i/= 2)
    for (int j = 0; j < i; j++)
      count +=1;
  return count;
}
```

a. $O(n)$

b. $O(n^2)$

c. $O(n \cdot \log n)$

d. $O(n \cdot (\log n)^2)$

85. Which one of the given options provides the increasing order of asymptotic complexity of functions f_1, f_2, f_3 and f_4 defined below?

$f_1(n) = 2^n$

$f_2(n) = n^{3/2}$

$f_3(n) = n \cdot \log n$

$f_4(n) = n^{\log n}$

a. f_3, f_2, f_4, f_1

b. f_3, f_2, f_1, f_4

c. f_4, f_2, f_1, f_3

d. f_2, f_4, f_1, f_3

86. The conversion of $(1010101 \cdot 111)_2$ will give

a. $(85 \cdot 875)_{10}$

b. $(55.E)_{16}$

c. Both a. and b.

d. None of the above

87. If x and y are two binary variables, then which one of the following represents 'Absorption'?

a. $x + x = x$

b. $x \cdot x = x$

c. $x + yz = (x + y)(x + z)$

d. $x + x \cdot y = x$

88. Which one of the following ***cannot*** be called a literal?

a. Primed variable

b. Unprimed variable

c. Boolean expression

d. All of the above

89. The simplified version of the Boolean expression $(a+c)(a'+b+c)(a'+b'+c)$ is

a. a

b. b

c. c

d. None of the above

90. Which one of the following is ***true***?

a. $(2345)_6 = (569)_{10}$

b. $(2345)_6 = (965)_{10}$

c. $(2345)_6 = (596)_{10}$

d. None of the above

91. How many output ports are there in a 1-bit half-subtractor circuit?

a. One

b. Two

c. Three

d. Four

92. Which one of the following digital circuits converts the binary information obtained from n number of input lines to 2^n unique output lines?

a. Encoder

b. Decoder

c. Multiplexer

d. All of the above

93. A decoder may also work as a demultiplexer only if it contains

a. one select line

b. one enable input

c. two select lines

d. All of the above

94. Which one of the following requires mask programming?

a. Cache memory

b. Secondary memory

c. Primary memory

d. Read only memory

95. What is the least number of NAND gates needed to design a D latch (using only NAND gates)?

a. 3

b. 4

c. 5

d. 2

96. From the analysis of sequential circuits, which of the following is ***not*** an outcome?

a. A state table

b. A truth table

c. A state diagram

d. Both b. and c.

97. How many flip-flops are needed to design a 4-bit binary counter?

a. 4

b. 8

c. 12

d. 16

98. Which one of the following statements is ***true*** with regard to a shift register?

a. It shifts binary information either from left to right or from right to left

b. It uses flip-flops in cascade

c. It uses the same clock pulse for different flip-flops

d. All of the above

99. Which one of the following is most different from a CPU?

a. Registers

b. HDD

c. RAM

d. Cache

100. Which one of the following statements is true in the case of immediate addressing?

a. The operand resides in the memory

b. The operand is specified within the instruction itself

c. The address of the operand is provided within the instruction

d. None of the above

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK