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Entrance Test for M.Sc. (Computer Science), 2014

[PROGRAMME CODE : MCS]

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 Centre of Examination 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 (Objective-type) has 20 questions of 1 mark each. All questions are compulsory.

(iv) Part—B (Objective-type) has 30 questions of 1 mark each. All questions are compulsory.

(v) Part—C (Objective-type) has 50 questions 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' and 'Programme Code' on the OMR/Answer Sheet in the space provided.**

(viii) Part—A, Part—B and Part—C (Multiple Choice) questions should be answered on OMR/Answer Sheet.

(ix) Answers written by the candidates 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 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'
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.**

    Example :

    Question Paper Series Code

    Write Question Paper Series Code A or B and darken appropriate circle.

    ☐ A or B

    ● (A)
    Ⓑ

    Programme Code

    Write Programme Code out of 14 codes given and darken appropriate circle.

    Write Programme Code ☐

MEC	○	MAM	○	PCS	○
MSO	○	MLS	○	PBT	○
MIR	○	PEC	○	PAM	○
MCS	●	PSO	○	PLS	○
MBT	○	PIR	○		

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 <u>ONLY ONE CIRCLE</u> for each question as shown below in the example :

    Example :

Wrong	Wrong	Wrong	Wrong	Correct
● ⓑ © ●	Ⓐ ⓑ © ⓓ	Ⓐ ⓑ © Ⓓ	⊙ ⓑ © ●	ⓐ ⓑ © ●

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 <u>no negative marking</u> in evaluation.

10. Write your six digits Roll Number in small boxes provided for the purpose; and also darken 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
●	①	①	①	①	①
②	②	②	②	●	②
③	●	③	③	③	③
④	④	④	④	④	④
⑤	⑤	●	⑤	⑤	⑤
⑥	⑥	⑥	⑥	⑥	⑥
⑦	⑦	⑦	●	⑦	⑦
⑧	⑧	⑧	⑧	⑧	⑧
⑨	⑨	⑨	⑨	⑨	⑨
⓪	⓪	⓪	⓪	⓪	●

PART—A

Read the sentences carefully and choose the correct option for the underlined text :

1. <u>Being abandoned by our friends is the cause of great sorrow for us.</u>

    (a)   Being abandoned by our friends is the cause of great sorrow for us.

    (b)   Our being abandoned by our friends is the cause of great sorrow.

    (c)   Being abandoned by our friends, we feel great sorrow.

    (d)   We feel great sorrow when our friends abandon us.

2. The government requires <u>that these forms should be submitted</u> before the end of the financial year.

    (a)   that these forms should be submitted

    (b)   that these forms be submitted

    (c)   for these forms to be submitted

    (d)   these forms submission

3. It ought to be <u>her with whom you share your secrets, not me.</u>

    (a)   her with whom you share your secrets, not me

    (b)   her with whom you share your secrets, not I

    (c)   she with whom you share your secrets, not me

    (d)   she with whom you share your secrets, not I

Read the sentences and choose the correct sentence carefully :

4. (a)   By and large, <u>there're are</u> many problems and questions in education that I cannot answer

    (b)   By and large, <u>there are</u> many problems and questions in education that I cannot answer

    (c)   By and large, <u>there's</u> many problems and questions in education that I cannot answer

    (d)   None of the above

5. (a) Homeless families with children <u>has</u> increased in the US over the last few decades

   (b) The number of homeless families with children <u>have</u> increased in the US over the last few decades

   (c) The number of homeless families with children <u>has</u> increased in the US over the last few decades

   (d) None of the above

6. (a) A pair of scissors <u>are</u> lying on the desk

   (b) The scissors <u>are</u> lying on the desk

   (c) The scissors <u>is</u> lying on the desk

   (d) None of the above

Each question consist of two words which have a certain relationship to each other followed by four pairs of related words, select the pair which has the same relationship :

7. LIGHT : BLIND

   (a) Speech : Dumb

   (b) Language : Deaf

   (c) Tongue : Sound

   (d) Voice : Vibration

8. AFTER : BEFORE

   (a) First : Second

   (b) Present : Past

   (c) Contemporary : Historic

   (d) Successor : Predecessor

9. DISTANCE : MILE

   (a) Liquid : Litre

   (b) Bushel : Corn

   (c) Weight : Scale

   (d) Fame : Television

In the following, choose the word which is the exact OPPOSITE of the given words :

10. COMMISSIONED

    (a) Started

    (b) Closed

    (c) Finished

    (d) Terminated

11. PERTINENT

    (a) Irrational

    (b) Irregular

    (c) Insistent

    (d) Irrelevant

12. OBSCURE

    (a) Implicit

    (b) Obnoxious

    (c) Explicit

    (d) Pedantic

13. At a party, you meet your mother's only sister's husband's sister-in-law. She has no brother. What do you call this person?

    (a) Son

    (b) Mother

    (c) Daughter

    (d) Father

14. A certain company currently has how many employees?

Statements :

    I. If 3 additional employees are hired by the company and all of the present employees remain, there will be at least 20 employees in the company.

    II. If no additional employees are hired by the company and 3 of the present employees resign, there will be fewer than 15 employees in the company.

    (a) Statement I alone is sufficient, but statement II alone is not sufficient

    (b) Statement II alone is sufficient, but statement I alone is not sufficient

    (c) Both statements together are sufficient, but neither statement alone is sufficient

    (d) Each statement alone is sufficient

15. A bookstore that sells used books sells each of its paperback books for a certain price and each of its hardcover books for a certain price. If Joe, Maria and Paul bought books in this store, how much did Maria pay for 1 paperback book and 1 hardcover book?

Statements :

I. Joe bought 2 paperback books and 3 hardcover books for $ 12·50.

II. Paul bought 4 paperback books and 6 hardcover books for $ 25·00.

(a) Statement I alone is sufficient, but statement II alone is not sufficient

(b) Statement II alone is sufficient, but statement I alone is not sufficient

(c) Both statements together are sufficient, but neither statement alone is sufficient

(d) Statements I and II together are not sufficient

16. If 3 and 8 are the lengths of two sides of a triangular region, which of the following can be the length of the third side?

I. 5

II. 8

III. 11

(a) II only

(b) III only

(c) I and II only

(d) II and III only

17. A rabbit on a control diet is fed daily 300 grams of a mixture of two foods—food X and food Y. Food X contains 10 percent protein and food Y contains 15 percent protein. If rabbit's diet provides exactly 38 grams of protein daily, how many grams of food X are in the mixture?

(a) 100

(b) 140

(c) 150

(d) 160

18. Of the 3600 employees of a company *X*, 1/3 are office staff. If the office staff were to be reduced by 1/3, what percent of the total number of the remaining employees would then be office staff?

(a)   25%

(b)   22·2%

(c)   20%

(d)   12·5%

Refer to the following pictograph of a survey of students at a university. Each symbol represents 10 students in a sample of 300 :
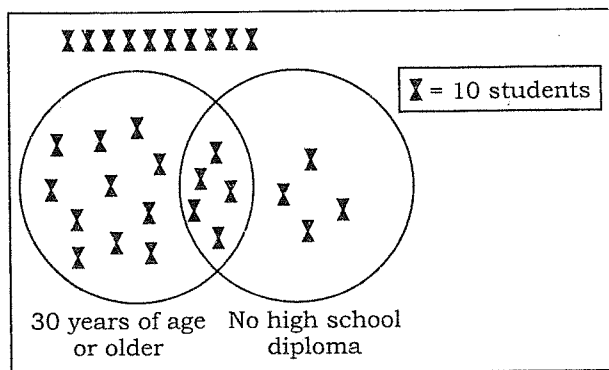
Answer the following questions :

19. If one student is selected at random from the 300 surveyed, the chance that the student will be under 30 or a high school diploma holder or both is

(a)   2 out of 3

(b)   1 out of 3

(c)   1 out of 6

(d)   5 out of 6

20. If one student is selected at random from the 300 surveyed, the chance that the student will be both under 30 and a high school diploma holder is

(a)   1 out of 3

(b)   2 out of 3

(c)   5 out of 6

(d)   4 out of 6

21. The smallest set A such that $A \cup \{1, 2\} = \{1, 2, 3, 5, 9\}$ is

    (a) $\{2, 3, 5\}$

    (b) $\{3, 5, 9\}$

    (c) $\{1, 2, 5, 9\}$

    (d) None of the above

22. $A = \{x : x \neq x\}$ represents

    (a) $\{0\}$

    (b) $\{1\}$

    (c) ϕ

    (d) $\{x\}$

23. In a town of 10000 families it was found that 40% families buy newspaper A, 20% families buy newspaper B, 10% families buy newspaper C, 5% families buy newspapers A and B, 3% families buy newspapers B and C and 4% families buy newspapers A and C. If 2% families buy all the three newspapers, then the number of families which buy newspaper A only is

    (a) 3100

    (b) 2900

    (c) 3300

    (d) 1400

24. If $f : R \rightarrow R$ is given by $f(x) = 3x - 5$, then $f^{-1}(x)$ is

    (a) $3x - 5$

    (b) $(3x - 5) - 1$

    (c) $(x + 5)/3$

    (d) Does not exist

25. The domain of the real-valued function

    $$f(x) = \frac{(x - 3)(x - 1)}{\sqrt{x^2 - 4}}$$

    is

    (a) $(1, 2)$

    (b) $(-\infty, -2) \cup (2, \infty)$

    (c) $(-\infty, -2) \cup (1, \infty)$

    (d) $(-\infty, \infty) - \{1, \pm 2\}$

26. Set *A* has 3 elements and set *B* has 4 elements. The number of injections that can be defined from *A* to *B* is

(a) 144

(b) 12

(c) 24

(d) 64

27. For every *a*, *b*, *c* and *d* in a lattice *L*, which one of the following is correct?

(a) $a \vee b = a \wedge b$

(b) $a \vee (b \vee c) = (a \vee b) \vee c$

(c) $a \vee (b \wedge c) = a$

(d) $a \vee (b \vee c) = b$

28. A self-complemented, distributive lattice is called

(a) Boolean algebra

(b) modular lattice

(c) complete lattice

(d) self-dual lattice

29. Which of the following statements is correct for a square matrix *A*?

(a) $A(\text{adj } A) = |A| I_n$

(b) $|ABC| = |\text{adj } A||\text{adj } B||C|$

(c) $|A| = 0$ if *A* is skew symmetric matrix

(d) *A* is invertible since $|A| = 0$

30. Suppose that *A* is a 3×3 matrix and $|A| = -3$, then $|4A| =$

(a) $-3/4$

(b) -3

(c) -12

(d) -192

31. The given system of linear equations

$$x + y + z = c$$
$$x + 2y + az = 2c$$
$$x + 2y + bz = 2$$

has infinitely many solutions if

(a) $a \neq b$

(b) $c = 1$

(c) Never

(d) $a = b$ and $c = 1$

32. Out of 7 consonants and 4 vowels, how many words of 3 consonants and 2 vowels can be formed?

(a) 210

(b) 1050

(c) 25200

(d) 21400

33. In how many ways can 5 balls be chosen so that 2 are red and 3 are black?

(a) 910

(b) 990

(c) 980

(d) 970

34. Last year a small statistical consulting company paid each of its five statistical assistants $ 22,000, two statistical analysts $ 50,000 each, and the senior statistician/owner $ 2,70,000. The number of employees earning less than the mean salary is

(a) 0

(b) 4

(c) 5

(d) 7

35. Six balls are tossed independently into three boxes A, B and C. For each ball, the probability of going into a specific box is $1/3$. Find the probability that box A will contain exactly four balls.

(a) $^6C_4\left(\dfrac{1}{3}\right)^4\left(\dfrac{2}{3}\right)^2$

(b) $^6C_4\left(\dfrac{2}{3}\right)^4\left(\dfrac{1}{3}\right)^2$

(c) $^6C_2\left(\dfrac{1}{3}\right)^4\left(\dfrac{2}{3}\right)^2$

(d) $^6C_2\left(\dfrac{2}{3}\right)^4\left(\dfrac{1}{3}\right)^2$

36. If A and B are two events such that $A \subset B$ and $P(B) \ne 0$, then which of the following is true?

(a) $P(A|B) = P(B)/P(A)$

(b) $P(A|B) < P(A)$

(c) $P(A|B) \ge P(A)$

(d) None of the above

37. If two events are mutually exclusive, the probability that both occur at the same time is

(a) 0·00

(b) 0·50

(c) 1·00

(d) Cannot be determined from the information given

38. Throw two unbiased dice independently. Let $A = \{$sum of the faces $= 8\}$ and $B = \{$ faces are equal $\}$. What would be $P(B|A)$?

(a) 1/5

(b) 2/5

(c) 1

(d) 4/5

39. The slope of the tangent to the curve $y^3 x + y^2 x^2 = 6$ at $(2, 1)$ is

(a) $-3/2$

(b) -1

(c) $-5/14$

(d) $-3/14$

40. If $f(x) = x + \int_x^1 f(t)\,dt$, then the value of $\int_0^1 f(t)\,dt$ is

(a) 0

(b) e

(c) $1/e$

(d) 1

41. If f is continuous for all x, which of the following integrals necessarily have the same value?

I. $\int_a^b f(x)\,dx$

II. $\int_0^{b-a} f(x+a)\,dx$

III. $\int_{a+c}^{b+c} f(x+c)\,dx$

(a) I and II only

(b) I and III only

(c) II and III only

(d) I, II and III

42. If the function g is defined by $g(x) = \int_0^x \sin(t^2)\,dx$ on the closed interval $-1 \leq x \leq 3$, then g has a local minimum at $x =$

(a) $1{\cdot}084$

(b) $1{\cdot}772$

(c) $2{\cdot}171$

(d) $2{\cdot}507$

43. For the differential equation

$$\frac{dy}{dx} = y^2$$

with $y(0) = 1$ if $\lim\limits_{x \to x^*} y(x) = \infty$, then x^* is equal to

(a) 2

(b) 3/2

(c) 1

(d) 1/2

44. If y is a solution of

$$\frac{dy}{dx} + \frac{y}{x} = \frac{2}{x}$$

with $y(1) = 0$, then $\lim\limits_{x \to \infty} y(x)$ is

(a) ∞

(b) 2

(c) 1

(d) 0

45. An integrating factor for the differential equation $2xy\,dx + (y^2 - 3x^2)\,dy = 0$ is

(a) $e^y y^2$

(b) $e^y y^{-2}$

(c) y^{-4}

(d) y^2

46. The equation

$$(\alpha xy^3 + y\cos x)\,dx + (x^2 y^2 + \beta \sin x)\,dy = 0$$

is exact for

(a) $\alpha = \frac{3}{2},\ \beta = 1$

(b) $\alpha = 1,\ \beta = \frac{3}{2}$

(c) $\alpha = \frac{2}{3},\ \beta = 1$

(d) $\alpha = 1,\ \beta = \frac{2}{3}$

47. If $\vec{a} \times \vec{b} = \vec{b} \times \vec{c} \neq \vec{0}$, where $\vec{a}, \vec{b}$ and $\vec{c}$ are coplanar vectors, then the true statement is

(a) $\vec{a} \times \vec{c} = \vec{0}$

(b) $\vec{a} + \vec{c} = k\vec{b}$

(c) $\vec{a} + \vec{c} = k\vec{c}$

(d) $\vec{a} + \vec{c} = k\vec{a}$

48. If $\vec{a} \times \vec{b} = \vec{b} \times \vec{c} \neq \vec{0}$, then $\vec{a} + \vec{c}$ equals

(a) $\vec{0}$

(b) $k\vec{b}$

(c) $k\vec{c}$

(d) None of the above

49. A unit vector perpendicular to the plane of vectors $A = 2\hat{i} - 6\hat{j} - 3\hat{k}$ and $B = 4\hat{i} + 3\hat{j} - \hat{k}$ is

(a) $\dfrac{3}{7}\hat{i} - \dfrac{2}{7}\hat{j} + \dfrac{6}{7}\hat{k}$

(b) $\dfrac{3}{7}\hat{i} + \dfrac{2}{7}\hat{j} + \dfrac{6}{7}\hat{k}$

(c) $\dfrac{3}{7}\hat{i} + \dfrac{2}{7}\hat{j} - \dfrac{6}{7}\hat{k}$

(d) $-\dfrac{3}{7}\hat{i} + \dfrac{2}{7}\hat{j} + \dfrac{6}{7}\hat{k}$

50. For $n \times n$ matrices A and B, if $AB = 0$, then

(a) either $A = 0$ or $B = 0$

(b) $\det(A) = 0$ and $\det(B) = 0$

(c) either $\det(A) = 0$ or $\det(B) = 0$

(d) $A = 0$ and $B = 0$

PART—C

51. How many times does the while loop iterate in the following C code?

```
int a=6;
int b=12;
while(a<b)
{
printf("SAU2014");
a+=2;
b-=2;
}
```

(a) 1

(b) 2

(c) 3

(d) None of the above

52. Which of the following is true regarding the continue statement in a for loop?

(a) Continue transfers the control flow to the initialization statement of the for loop

(b) Continue transfers the control flow to the conditional statement of the for loop

(c) Continue transfers the control flow to the update statement of the for loop

(d) Continue transfers the control flow to the statement just after the for loop

53. Consider the following C code :

```
int result(int n)
{
if(n==1)
return 2;
else
return 2* result(n-1);
}
```

What value does result(5) return?

(a) 8

(b) 16

(c) 32

(d) 64

54. Consider the following C code :

```
void foo(int n)
{
if (n>0)
  {
  foo(n-1);
  printf("%d", n);
  foo(n-1);
  }
}
```

What will the output following the call foo(3)?

(a) 3211211

(b) 1121213

(c) 1213121

(d) 1211213

55. * is the —— operator.

(a) dereference

(b) indirection

(c) Both of the above

(d) None of the above

56. What is the output of the following C code?

```
main( )
{
printf(5+"Good Morning");
}
```

(a) Good

(b) Morning

(c) Compilation error

(d) Garbage values

57. What is the output of the following C code?

```
main( )
{
static int num=4;
printf("%d", --num);
if(num)
main( );
}
```

(a) 43210

(b) 3210

(c) Infinite times 4

(d) Compile or run-time error

58. What does the following declaration mean?

```
int (*ptr)[10];
```

(a) ptr is an array of pointers to 10 integers

(b) ptr is an array of 10 integers

(c) ptr is a pointer to an array

(d) ptr is a pointer to an array of 10 integers

59. What is the output of the following C code?

```
#include<stdio.h>
#define SQUARE(n) n*n
main( )
{
printf("%d", 64/SQUARE(4));
}
```

(a) 4

(b) 64

(c) Compile or run-time error

(d) None of the above

60. What is the output of the following C code?

```
main( )
{
int x=2, y=3, z=4;
printf("%d", x++ - --y + ++z);
}
```

(a) 3

(b) 4

(c) 5

(d) 6

61. An $n \times n$ array, V is defined as follows :

$$V(i, j) = i - j, \quad \forall i, j, \quad 1 \le i \le n, \quad 1 \le j \le n$$

The sum of the elements of the array V is

(a) 0

(b) $n - 1$

(c) $n^2 - 3n + 2$

(d) $n^2(n+1)/2$

62. The best data structure to check whether an arithmetic expression has balanced parentheses is a

(a) queue

(b) stack

(c) tree

(d) list

63. The following sequence of operations is performed on stack :

PUSH(10), PUSH(20), POP, PUSH(10), PUSH(20), POP, POP, POP, PUSH(20), POP

The sequence of values popped out is

(a) 20, 10, 20, 10, 20

(b) 20, 20, 10, 10, 20

(c) 10, 20, 20, 10, 20

(d) 20, 20, 10, 20, 10

64. Suppose you are given an implementation of a queue of integers. The operations that can be performed on the queue are :

I. isEmpty (Q) : Returns true if the queue is empty, false otherwise.

II. Delete (Q) : Deletes the element at the front of the queue and returns its value.

III. Insert (Q, i) : Inserts the integer i at the rear of the queue.

Consider the following function :

```
void f (queue Q)
{
int i;
if (! isEmpty (Q))
{
i = delete (Q);
f(Q);
insert (Q, i);
}
}
```

What operation is performed by the above function f ?

(a) Leave the queue Q unchanged

(b) Reverse the order of the elements in the queue Q

(c) Deletes the element at the front of the queue Q and insert it at the rear keeping the other elements in the same order

(d) Empties the queue Q

65. The postfix expression for the infix expression

$(4 + 8) * (6 - 5) / ((3 - 2) * (2 + 2))$

is

(a) 4 8 6 5 + * − 3 2 2 2 − * + /

(b) 4 8 + 6 5 − * / 3 2 − 2 2 + *

(c) 4 8 + 6 5 − 3 2 − 2 2 + * * /

(d) 4 8 + 6 5 − * 3 2 − 2 2 + * /

66. Let P be a singly linked list and let Q be the pointer to an intermediate node x in the list. What is the worst case complexity of the best known algorithm to delete the node x from the list?

(a) $O(n)$

(b) $O(\log n^2)$

(c) $O(\log n)$

(d) $O(1)$

67. The height of a binary tree is the maximum number of edges in any root to leaf path. The maximum number of nodes in a binary tree of height h is

(a) $2^h - 1$

(b) $2^{h-1} - 1$

(c) $2^{h+1} - 1$

(d) 2^{h+1}

68. What is the runtime complexity for performing an inorder traversal of a binary search tree containing n nodes?

(a) $O(n \log n)$

(b) $O(n)$

(c) $O(\log n)$

(d) $O(\sqrt{n})$

69. The inorder and preorder traversal of a binary tree are $\{4, 2, 5, 1, 3, 6\}$ and $\{1, 2, 4, 5, 3, 6\}$ respectively. Then the post-order traversal of the binary tree is

(a) 1, 2, 3, 4, 5, 6

(b) 2, 4, 5, 1, 3, 6

(c) 4, 6, 2, 3, 1, 5

(d) 4, 5, 2, 6, 3, 1

70. What is the inorder traversal of the following binary search tree (BST) after deleting node 7?
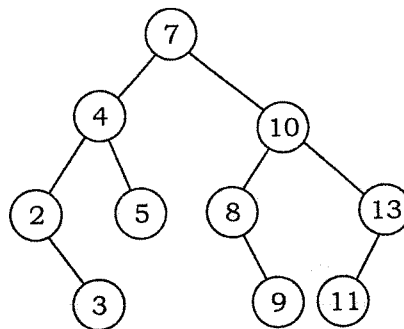
(a) 4, 10, 2, 5, 8, 13, 3, 9, 11

(b) 10, 4, 13, 8, 5, 2, 11, 9, 3

(c) 4, 11, 2, 5, 8, 13, 3, 9, 10

(d) 2, 3, 4, 5, 8, 9, 10, 11, 13

71. If $A = \{(x, y) \mid y = e^x, x \in R\}$ and $B = \{(x, y) \mid y = x, x \in R\}$, then

(a) $B \subseteq A$

(b) $A \subseteq B$

(c) $A \cap B = \phi$

(d) $A \cup B = A$

72. If $A = \{\phi, \{\phi\}\}$, then the power set of A is

(a) A

(b) $\{\phi, \{\phi\}, A\}$

(c) $\{\phi, \{\phi\}, \{\{\phi\}\}, A\}$

(d) None of the above

73. If R is a relation from a finite set A having m elements to a finite set B having n elements, then the number of relations from A to B is

(a) 2^{mn}

(b) $2^{mn} - 1$

(c) $2mn$

(d) m^n

74. Let $P = \{(x, y) \mid x^2 + y^2 = 1, \ x, y \in R\}$. Then P is

(a) reflexive

(b) symmetric

(c) transitive

(d) anti-symmetric

75. The value of non-zero real α for which $f(x) = 1 + 2\alpha x$ is the inverse of itself is

(a) $-1/2$

(b) -1

(c) $1/2$

(d) 1

76. The number of bijective functions from set A to itself when A contains 106 elements is

(a) 106

(b) $(106)^2$

(c) 106!

(d) 2^{106}

77. Which of the following statements is the negation of the statement "2 is even and –3 is negative"?

(a) 2 is even and –3 is not negative

(b) 2 is odd and –3 is not negative

(c) 2 is even or –3 is not negative

(d) 2 is odd or –3 is not negative

78. The product of all the maxterms of a Boolean function of n variables is

(a) 0

(b) 1

(c) 10

(d) 11

79. $p \to q$ is logically equivalent to

(a) $\sim q \to p$

(b) $\sim p \to q$

(c) $\sim p \wedge q$

(d) $\sim p \vee q$

80. 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

(a) $p \wedge q$

(b) $\sim (\sim p \vee q)$

(c) $p \vee \sim q$

(d) $\sim p \wedge q$

81. Which of the following statements is the negation of the statement "4 is even or –5 is negative"?

    (a)   4 is odd and –5 is not negative

    (b)   4 is even or –5 is not negative

    (c)   4 is odd or –5 is not negative

    (d)   4 is even and –5 is not negative

82. What is the converse of the following assertion "I stay only if you go"?

    (a)   I stay if you go

    (b)   If you do not go, then I do not stay

    (c)   If I stay, then you go

    (d)   If you do not stay, then you go

83. Transitivity and irreflexive imply

    (a)   symmetric

    (b)   reflexive

    (c)   irreflexive

    (d)   asymmetric

84. If 10×10 square matrix is given such that each element is a Boolean variable, how many different matrices can be constructed?

    (a) 2^{10}

    (b)   10!

    (c)   100!

    (d) 2^{100}

85. The '2421' code for the decimal number '7' will be

    (a)   0110

    (b)   1101

    (c)   1010

    (d)   1100

86. $(153.513)_{10}$ is equal to

(a) $(231.401567)_8$

(b) $(213.401567)_8$

(c) $(213.406517)_8$

(d) $(231.406517)_8$

87. The sum of all the minterms of a Boolean function of n variables is

(a) 0

(b) 1

(c) 10

(d) 11

88. If B is a Boolean algebra, then which of the following is true?

(a) B is a finite but not complemented lattice

(b) B is a finite, complemented and distributive lattice

(c) B is a finite, distributive but not complemented lattice

(d) B is not distributive lattice

89. The following K-map represents which Boolean function?

$CD \rightarrow$ $AB \downarrow$	00	01	11	10
00	1	1		1
01	1	1	1	
11			1	
10			1	

(a) $F(A, B, C, D) = \Sigma(1, 4, 5, 6, 12, 14, 15)$

(b) $F(A, B, C, D) = \Sigma(0, 1, 2, 4, 5, 7, 11, 15)$

(c) $F(A, B, C, D) = \Sigma(0, 1, 3, 4, 5, 7, 11, 15)$

(d) $F(A, B, C, D) = \Sigma(0, 1, 3, 5, 7, 9, 11, 15)$

90. Which one is false?

(a) SRAM (Static RAM) is non-volatile

(b) DRAM (Dynamic RAM) is volatile

(c) DRAM is used in main memory

(d) SRAM is used in cache memory

91. Which logic is known as universal logic?

(a) Decoder logic

(b) NAND logic

(c) MUX logic

(d) All of the above

92. Currently most of the computer processors are made with CMOS technology, because of

(a) high static power dissipation

(b) high packing density

(c) low external noise immunity

(d) All of the above

93. Which of the following is a combinational circuit?

(a) An *R-S* flip-flop

(b) A *J-K* flip-flop

(c) A ripple counter

(d) A multiplexer

94. What would be the output of the following C code?

```c
#include <stdio.h>
void main()
{
  int x=0;
  if (x=0)
    printf("Its zero\n");
  else
    printf("Its not zero\n");
}
```

(a) Its not zero

(b) Its zero

(c) Compile time error

(d) None of the above

95. How many addressing modes are there in MIPS?

(a) 4

(b) 5

(c) 6

(d) 7

96. What is the output of the following C code?

```c
#include <stdio.h>
int x=5;
void main()
{
  int x=3;
  m ();
  printf("%d", x);
}
void m()
{
  x=8;
  n();
}
void n()
{
  printf("%d", x);
}
```

(a) 8 3

(b) 3 8

(c) 8 5

(d) 5 3

97. A machine needs a minimum of 100 sec to sort 1000 names by quicksort. The minimum time needed to sort 100 names will be approximately

(a) 50·2 sec

(b) 6·7 sec

(c) 72·7 sec

(d) 11·2 sec

98. The output of a NOR gate is HIGH if

(a) all inputs are HIGH

(b) any input is HIGH

(c) any input is LOW

(d) all inputs are LOW

99. In which kind of addressing the operand is actually present in instruction?

(a) Immediate addressing

(b) Direct addressing

(c) Register addressing

(d) None of the above

100. The average time required to reach a storage location in memory and obtain its contents is called

(a) latency time

(b) access time

(c) turnaround time

(d) response time

★ ★ ★