

5

QUESTION PAPER SERIES CODE
A

Centre Name : _____

Roll No. : _____

Name of Candidate : _____

S A U

Entrance Test for M.Sc. (Computer Science), 2015

[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 Name 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) **One-fourth of the marks assigned to any question in Part—A, Part—B and Part—C will be deducted for wrong answers.**
- (vii) *Symbols have their usual meanings.*
- (viii) **Please darken the appropriate Circle of 'Question Paper Series Code' and 'Programme Code' on the OMR/Answer Sheet in the space provided.**
- (ix) Part—A, Part—B and Part—C (Multiple Choice) questions should be answered on OMR/Answer Sheet.
- (x) Answers written by the candidates inside the Question Paper will **NOT** be evaluated.
- (xi) Calculators and Log Tables may be used. Mobile Phones are **NOT** allowed.
- (xii) Pages at the end have been provided for Rough Work.
- (xiii) **Return the Question Paper and the OMR/Answer Sheet** to the Invigilator at the end of the Entrance Test.
- (xiv) **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 the appropriate circle.

	A or B
--	--------



Programme Code

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

Write Programme Code

MEC	<input type="radio"/>	MAM	<input type="radio"/>	PCS	<input type="radio"/>
MSO	<input type="radio"/>	MLS	<input type="radio"/>	PBT	<input type="radio"/>
MIR	<input type="radio"/>	PEC	<input type="radio"/>	PAM	<input type="radio"/>
MCS	<input checked="" type="radio"/>	PSO	<input type="radio"/>	PLS	<input type="radio"/>
MBT	<input type="radio"/>	PIR	<input type="radio"/>		

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
● (b) (c) ●	✗ (b) (c) (d)	✗ (b) (c) ✗	● (b) (c) ●	(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. **One-fourth of marks assigned to any question will be deducted for wrong answers.**
10. Write your six-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
●	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
⑩	⑩	⑩	⑩	⑩	●

PART—A

The following question consists 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 :

1. Always : Never :: ?

- (a) Frequently : Occasionally
- (b) Constantly : Frequently
- (c) Intermittently : Casually
- (d) Often : Rarely

2. The price of sugar increased by 30% and then decreased by 30%. What was the percentage increase or decrease in the final price as compared to the original price?

- (a) 9% decrease
- (b) 10% increase
- (c) 10% decrease
- (d) No increase or decrease

3. The average age of 40 boys in a class is 12 years. If 10 new boys are admitted, the average is increased by 0.1 year. What is the average age of the new boys?

- (a) 12.1 years
- (b) 12.4 years
- (c) 12.33 years
- (d) 12.5 years

4. If 12 men working 10 hours per day can do a work in 7 days, then 15 men working how many hours per day can do the same work in 28 days?

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

5. There are 150 students in a class. 80 percent of them can speak English and the rest can speak Hindi. 25 percent of those who can speak English, can also speak Hindi. The total number of students who can speak Hindi is
- (a) 60
 - (b) 75
 - (c) 30
 - (d) 45
6. Statements : All arrows are bows. All bows are crows.
Conclusions :
- I. All arrows are crows.
 - II. Some crows are arrows.
- (a) Only conclusion I follows
 - (b) Only conclusion II follows
 - (c) Both conclusion I and conclusion II follow
 - (d) Neither conclusion I nor conclusion II follows
7. Which of the following two implications can be inferred from the statement?
Statement : When the moon hides the sun, there is total eclipse.
Implications :
- I. The moon can hide the sun.
 - II. Total eclipses are rare.
- (a) Only I is implied
 - (b) Only II is implied
 - (c) Both I and II are implied
 - (d) Neither I nor II is implied
8. The HCF of two numbers is 34 and their LCM is 1020. If one of the numbers is 204, what is the other number?
- (a) 714
 - (b) 25488
 - (c) 170
 - (d) None of the above

9. If the compound interest on a certain sum at 5% for 3 years is ₹ 1,261, what is the simple interest?
- (a) ₹ 1,200
(b) ₹ 1,210
(c) ₹ 1,225
(d) ₹ 1,240
10. The sides of a triangle are in the ratio $\frac{1}{2} : \frac{1}{3} : \frac{1}{4}$. If the perimeter is 52 cm, the length of the smallest side is
- (a) 9 cm
(b) 10 cm
(c) 11 cm
(d) 12 cm
11. John walks 10 m straight and then 10 m to the right. Then three times he turns to his left and walks 5 m, 10 m and 15 m. How far is he now from the starting point?
- (a) 5 m
(b) 15 m
(c) 20 m
(d) Cannot be determined
12. If RIGHMG is PLEASE, what will be the code of SLEEP?
- (a) PMGGI
(b) IMGPG
(c) IMPGG
(d) MIGGR

Complete the sentence correctly from the choices given below :

13. He boasts that he is a man without prejudices; this — itself is very —.
- (a) realization; accomplishment
 - (b) pretension; prejudice
 - (c) statement; achievement
 - (d) fact; concession

Correct the underlined part of the sentence, if required :

14. He put off his coat before coming in.
- (a) put his coat off
 - (b) took off his coat
 - (c) took his coat off
 - (d) No change

Complete the sentence correctly from the choices given below :

15. The word 'atom' is now being used extensively in advertising; it has captured man's —.
- (a) opportunities
 - (b) wealth
 - (c) world
 - (d) imagination
16. Two trains 90 m and 110 m long approach one another from opposite directions at 54 km/h and 90 km/h, respectively. How long do they take to completely pass one another?
- (a) 0.5 sec
 - (b) 2 sec
 - (c) 5 sec
 - (d) 10 sec

17. In an examination, A gets 10% marks less than B and B gets 10% marks less than C . If A gets 810 marks, what marks does C get?

- (a) 1000
- (b) 963
- (c) 945
- (d) 900

18. Two equal glasses filled with mixtures of alcohol and water in the proportions of 2:1 and 1:1 respectively are emptied into a 3rd glass. What is the proportion of alcohol and water in the third glass?

- (a) 7:3
- (b) 5:7
- (c) 7:5
- (d) 5:6

19. A sphere of radius 10 cm is melted and the material obtained is drawn out in the form of a cylindrical wire of 1 mm diameter. What is the length of the wire?

- (a) 13.3 m
- (b) 533 m
- (c) 1.33 km
- (d) 5.33 km

20. What is the missing figure in the expression below?

$$\frac{16}{7} \times \frac{16}{7} - \frac{?}{7} \times \frac{9}{7} + \frac{9}{7} \times \frac{9}{7} = 1$$

- (a) 32
- (b) 1
- (c) 7
- (d) 224

PART—B

21. In a class of 120 students numbered 1 to 120, all even numbered students opt for Physics, whose numbers are divisible by 5 opt for Chemistry and those whose numbers are divisible by 7 opt for Mathematics. How many opt for none of the three subjects?

- (a) 19
- (b) 41
- (c) 21
- (d) 26

22. Which of the following subsets are equal?

$$A = \{r, t, s\}, B = \{s, t, r, s\}, C = \{t, s, t, r\}, D = \{s, r, s, t\}$$

- (a) A and B
- (b) A and C
- (c) B and D
- (d) All are equal

23. If $P(S)$ denotes the power set of set S , which of the following is always TRUE?

- (a) $P(P(S)) = P(S)$
- (b) $P(S) \cap P(P(S)) = [\varnothing]$
- (c) $S \notin P(S)$
- (d) None of the above

24. Given the relation $D = \{(6, 4), (8, -1), (x, 7), (-3, -6)\}$. Which of the following values for x will make the relation D a function?

- (a) -3
- (b) -6
- (c) 8
- (d) 6

25. N cadets have to stand in a row. If all possible permutations are equally likely, then the probability of two particular cadets standing side by side is

- (a) $4/N$
- (b) $3/N^2$
- (c) $1/2N$
- (d) $2/N$

26. In a lottery of 50 tickets numbered from 1 to 50, two tickets are drawn simultaneously. The probability that both the tickets drawn have prime numbers is
- (a) $3/245$
 - (b) $21/245$
 - (c) $3/25$
 - (d) $7/245$
27. Four persons are to be chosen at random from a group of 3 men, 2 women and 4 children. The chance that exactly 2 of them will be children is
- (a) $1/9$
 - (b) $10/21$
 - (c) $1/5$
 - (d) $1/12$
28. In a collection of 6 Mathematics books and 4 Physics books, the probability that 3 particular Mathematics books will be together is
- (a) $1/8$
 - (b) $1/10$
 - (c) $1/15$
 - (d) None of the above
29. Urn A contains 2 white and 2 black balls, urn B contains 3 white and 2 black balls. One ball is transferred from A to B and then one ball is drawn out of B. If this ball turns out to be white, the probability that the transferred ball was white, is
- (a) $4/7$
 - (b) $7/12$
 - (c) $1/3$
 - (d) None of the above
30. The odds against a husband who is 45 years old, living till he is 70 are 7: 5 and the odds against his wife who is 36 living till she is 61 is 5: 3. The probability that at least one of them will be alive 5 years hence is
- (a) $61/96$
 - (b) $5/32$
 - (c) $13/64$
 - (d) None of the above

31. A pair of dice is thrown 7 times. If getting a total of 7 is considered a success, the probability of getting at most 6 successes is

(a) $5/36$

(b) ${}^7C_6\left(\frac{1}{6}\right)^7$

(c) $1 - \left(\frac{1}{6}\right)^7$

(d) None of the above

32. The probability that at least one of the events A and B occurs is 0.6. If A and B occur simultaneously with probability 0.2, then $P(A)^C + P(B)^C$ is equal to

(a) 1

(b) 1.2

(c) 0.8

(d) 1.4

33. If two matrices have same size and same rank, then

(a) they have determinant 0

(b) they are equivalent

(c) they have common element

(d) None of the above

34. Let $A = \begin{bmatrix} 0 & 1 & -2 \\ -1 & 0 & 3 \\ a & -3 & 0 \end{bmatrix}$ be a singular matrix. Then the value of a is

(a) -2

(b) -1

(c) 1

(d) 2

35. For what value of a the system of equations $3x - y + z = 0$; $15x - 6y + 5z = 0$; $ax - 2y + 2z = 0$ has non-zero solution?
- (a) 6
 (b) -2
 (c) -3
 (d) None of the above

36. If $A = \begin{bmatrix} 1 & 2 \\ 4 & -3 \end{bmatrix}$, and $f(x) = 2x^2 - 4x + 5$, then $f(A)$ is equal to

(a) $\begin{bmatrix} 19 & -11 \\ -27 & 51 \end{bmatrix}$

(b) $\begin{bmatrix} 24 & -16 \\ -32 & 51 \end{bmatrix}$

(c) $\begin{bmatrix} 19 & -16 \\ -32 & 51 \end{bmatrix}$

- (d) None of the above

37. If A is an idempotent non-zero matrix other than the unit matrix, then A is a

- (a) triangular matrix
 (b) diagonal matrix
 (c) singular matrix
 (d) non-singular matrix

38. If $S_1 = \Sigma n$, $S_2 = \Sigma n^2$, and $S_3 = \Sigma n^3$, then the value of

$$\lim_{n \rightarrow \infty} \frac{S_1 \left(1 + \frac{S_3}{8}\right)}{S_2^2}$$

is equal to

(a) $\frac{3}{32}$

(b) $\frac{3}{64}$

(c) $\frac{9}{32}$

(d) $\frac{9}{64}$

39. If $f : \mathbb{R} \rightarrow \mathbb{R}$ is defined by

$$f(x) = \begin{cases} (\cos 3x - \cos x) / 2x^2, & x \neq 0 \\ \beta, & x = 0 \end{cases}$$

and if f is continuous at $x = 0$, then β is equal to

- (a) -6
- (b) -8
- (c) -2
- (d) -4

40. The value of c prescribed by Lagrange's mean-value theorem, when $f(x) = \sqrt{x^2 - 4}$, $a = 2$ and $b = 2$, is

- (a) 2.5
- (b) $\sqrt{5}$
- (c) $\sqrt{3}$
- (d) $\sqrt{3} + 1$

41. The minimum value of the function, $f(x) = 2|x - 2| + 5|x - 3| \quad \forall x \in \mathbb{R}$ is

- (a) 2
- (b) 3
- (c) 5
- (d) 7

42. The solution of the differential equation $\frac{dy}{dx} + 1 = e^{x+y}$ is

- (a) $(x + y)e^{x+y} = 0$
- (b) $(x + c)e^{x+y} = 0$
- (c) $(x - c)e^{x+y} = 1$
- (d) $(x - c)e^{x+y} + 1 = 0$

43. The differential equation for the family of curves $x^2 - y^2 - 2ay = 0$, where a is an arbitrary constant, is
- (a) $(x^2 + y^2) \frac{dy}{dx} = 2xy$
- (b) $2(x^2 + y^2) \frac{dy}{dx} = xy$
- (c) $(x^2 - y^2) \frac{dy}{dx} = 2xy$
- (d) $2(x^2 - y^2) \frac{dy}{dx} = xy$
44. 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 of 1 and variable centre along the x -axis
- (d) fixed radius of 1 and variable centre along the y -axis
45. If $\frac{dy}{dx} = y + 3$ and $y(0) = 2$, then $y(\ln 2)$ is equal to
- (a) 7
- (b) 5
- (c) 13
- (d) -2
46. If the position vectors of three points are $\vec{a} - 2\vec{b} + 3\vec{c}$, $2\vec{a} + 3\vec{b} - 4\vec{c}$, $-7\vec{b} + 10\vec{c}$, then the three points are
- (a) collinear
- (b) non-coplanar
- (c) non-collinear
- (d) None of the above

47. If the vectors $\overrightarrow{AB} = 2\hat{i} + \hat{j} + \hat{k}$ and $\overrightarrow{AC} = 3\hat{j} + 5\hat{k}$ are the sides of a $\triangle ABC$, then the length of the median through A is
- $\sqrt{34}$
 - $\sqrt{6}$
 - $\sqrt{14}$
 - $\sqrt{28}$
48. Let \vec{a} , \vec{b} and \vec{c} be unit vectors such that $\vec{a} \cdot \vec{b} = 0 = \vec{a} \cdot \vec{c}$. If the angle between \vec{b} and \vec{c} is $\frac{\pi}{4}$, then \vec{a} equals to
- $\pm\sqrt{2}(\vec{b} \times \vec{c})$
 - $\pm\frac{1}{\sqrt{2}}(\vec{b} \times \vec{c})$
 - $\mp\sqrt{2}(\vec{b} \times \vec{c})$
 - $\pm\frac{3}{\sqrt{2}}(\vec{b} \times \vec{c})$
49. If $\vec{a} = 3\hat{i} + 2\hat{j} - \hat{k}$ and $\vec{b} = \hat{i} + \hat{j} - 2\hat{k}$, then the value of $\vec{a} \cdot \vec{b}$ is
- 7
 - 3
 - 4
 - 6
50. For the parallelogram $OABC$, $\overrightarrow{OA} = a\hat{i} + b\hat{j}$ and $\overrightarrow{OB} = c\hat{i} + d\hat{j}$. The area of the parallelogram is
- $(ab - cd)$
 - $(ad + bc)$
 - $(ad - bc)$
 - $(ac - bd)$

PART—C

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

```
#include <stdio.h>
main() {
    int p;
    int buf [8] = {1, 2, 3, 4, 5, 6, 7, 8};
    p = (buf+1) [5];
    printf ("%d\n", p);
}
```

- (a) 5
- (b) 6
- (c) 7
- (d) 8

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

```
#include <stdio.h>
main () {
    int x=4, y=9;
    int z;
    z = (x++) + (--y) + y;
    printf ("%d\n", z);
}
```

- (a) 19
- (b) 20
- (c) 22
- (d) 21

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

```
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
main () {
    printf ("%d, %d\n", sizeof ("string"), strlen ("string"));
}
```

- (a) 6, 6
- (b) 6, 7
- (c) 7, 6
- (d) 7, 7

54. What is the return value of the following function?

```
#include <stdio.h>
main () {
    printf ("%d, %d, %d\n", 5>3&&5<10, 8<5||5==5, !(8==8));
}
```

- (a) 0, 1, 1
- (b) 1, 0, 1
- (c) 1, 1, 0
- (d) Error

55. How many times the while loop iterates in the following C code?

```
#include <stdio.h>
main () {
    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

56. If integer needs two bytes of storage, then the maximum value of an unsigned integer is

- (a) 2^{15}
- (b) 2^{16}
- (c) $2^{15} - 1$
- (d) $2^{16} - 1$

57. The C language is

- (a) a context-free language
- (b) a context-sensitive language
- (c) a regular language
- (d) parsable fully only by a Turing machine

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

```
#include <stdio.h>
main () {
    int num;
    num = 4 + 6 / 3 * 2 - 2 + 7 % 3;
    printf ("%d\n", num);
}
```

- (a) 3
- (b) 4
- (c) 6
- (d) 7

59. What is the output of the following C code? In the list of choices, _ indicates a space and - is a minus sign.

```
#include <stdio.h>
main () {
    int x=9876;
    printf ("%6d, %06d, %-6d\n", x, x, x);
}
```

- (a) __9876, 009876, --9876
- (b) 9876__, 069876, 9876
- (c) __9876, 009876, 9876
- (d) None of the above

60. Given the following pointer declaration :

```
int * ptr;
```

Which of the following is a valid line of C code?

- (a) ptr = &malloc (100, sizeof (int));
- (b) ptr = malloc (400);
- (c) ptr = *malloc (100, sizeof (int));
- (d) None of the above

61. In which stage the following code

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

gets replaced by the contents of the file *stdio.h*?

- (a) During linking
- (b) During execution
- (c) During preprocessing
- (d) During runtime

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

```
#include <stdio.h>
main () {
    int i = 10, j = 20, k = 30;
    int *ip1, *ip2, **ipp;
    ip1 = &i;
    ip2 = &j;
    ipp = &ip1;
    *ipp = ip2;
    *ipp = &k;
    printf ("%d, %d, %d\n", *ip1, *ip2, **ipp);
}
```

- (a) 10, 20, 10
- (b) 20, 20, 20
- (c) 10, 20, 30
- (d) 30, 20, 30

63. Consider the following code fragment. What is the value of fun(2, 3)?

```
int fun (int a, int b) {
    if (b==1)
        return a;
    else
        return a + fun (a, b-1);
}
```

- (a) 2
- (b) 4
- (c) 6
- (d) 8

64. Consider the following code fragment. What is the value of fun(54)?

```
int fun (int n) {  
    switch (n) {  
        case 0 : return 0;  
        case 1 : return 0;  
        default : return 1 + fun (n/3);  
    }  
}
```

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

65. The initial configuration of a queue is a, b, c, d (a is in the front end). 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

66. Given two sorted lists of sizes m and n respectively. The number of comparisons needed in the worst case by the merge-sort algorithm will be

- (a) $m \times n$
- (b) maximum of m, n
- (c) minimum of m, n
- (d) $m + n - 1$

67. The depth of a complete binary tree with n nodes is (\log is to the base two)

- (a) $\log(n + 1) - 1$
- (b) $\log(n)$
- (c) $\log(n - 1) + 1$
- (d) $\log(n) + 1$

68. Which of the following expressions accesses the (i, j) th entry of an $(m \times n)$ matrix stored in column major form?
- (a) $n \times (i - 1) + j$
 - (b) $m \times (j - 1) + i$
 - (c) $m \times (n - j) + j$
 - (d) $n \times (m - i) + j$
69. For merging two sorted lists of sizes m and n into a sorted list of size $m + n$, we require comparisons of
- (a) $O(m)$
 - (b) $O(n)$
 - (c) $O(m + n)$
 - (d) $O(\log(m) + \log(n))$
70. Let $W(n)$ and $A(n)$ denote respectively, the worst-case and average case running time of an algorithm executed on an input of size n . Which of the following is ALWAYS TRUE?
- (a) $A(n) = \Omega(W(n))$
 - (b) $A(n) = \Theta(W(n))$
 - (c) $A(n) = O(W(n))$
 - (d) $A(n) = o(W(n))$
71. Suppose a circular queue of capacity $(n - 1)$ elements is implemented with an array of n elements. Assume that the insertion and deletion operations are carried out using REAR and FRONT as array index variables, respectively. Initially, REAR = FRONT = 0. The conditions to detect queue full and queue empty are
- (a) full : $(\text{REAR} + 1) \bmod n == \text{FRONT}$
empty : $\text{REAR} == \text{FRONT}$
 - (b) full : $(\text{REAR} + 1) \bmod n == \text{FRONT}$
empty : $(\text{FRONT} + 1) \bmod n == \text{REAR}$
 - (c) full : $\text{REAR} == \text{FRONT}$
empty : $(\text{REAR} + 1) \bmod n == \text{FRONT}$
 - (d) full : $(\text{FRONT} + 1) \bmod n == \text{REAR}$
empty : $\text{REAR} == \text{FRONT}$

72. A list of n strings, each of length n , is sorted into lexicographic order using the merge-sort algorithm. The worst-case running time of this computation is
- (a) $O(n \log n)$
 - (b) $O(n^2 \log n)$
 - (c) $O(n^2 + \log n)$
 - (d) $O(n^2)$
73. What is time complexity to multiply $n \times m$ matrix A with $m \times p$ matrix B ?
- (a) mn^2p
 - (b) mp
 - (c) mnp
 - (d) np
74. The worst case occurs in linear search algorithm when
- (a) item is somewhere in the middle of the array
 - (b) item is not in the array at all
 - (c) item is the last element in the array
 - (d) item is the last element in the array or is not there at all
75. Linked lists are best suited for
- (a) relatively permanent collections of data
 - (b) the size of the structure and the data in the structure are constantly changing
 - (c) both of above situations
 - (d) none of above situations
76. Which of the following is not a limitation of binary search algorithm?
- (a) Must use a sorted array
 - (b) Requirement of sorted array is expensive when a lot of insertions and deletions are needed
 - (c) There must be a mechanism to access middle element directly
 - (d) Binary search algorithm is not efficient when the data elements are more than 1000

77. When inorder traversing a tree resulted E A C K F H D B G; the preorder traversal would return
- (a) F A E K C D B H G
 - (b) F A E K C D H G B
 - (c) E A F K H D C B G
 - (d) F E A K D C H B G
78. If the following sequences of operations, push(1) push(2) pop push(1) push(2) pop pop pop push(2) pop, are performed in a stack, the sequence of popped out values are
- (a) 2 1 2 2 2
 - (b) 2 2 1 1 2
 - (c) 2 2 1 2 2
 - (d) 2 1 2 2 1
79. Consider the following pseudocode :
- ```

declare a stack of characters
while (there are more characters in the word to read)
{
 read a character
 push the character on the stack
}
while (the stack is not empty)
{
 write the stack's top character to the screen
 pop a character off the stack
}

```
- What is written to the screen for the input "carpets"?
- (a) serc
  - (b) carpets
  - (c) steprac
  - (d) ocaarrppeettss
80. The inorder traversal of tree will yield a sorted listing of elements of tree in
- (a) binary trees
  - (b) binary search trees
  - (c) heaps
  - (d) None of the above

81. What is the minimum number of nodes in complete binary tree of height 3?

- (a) 7
- (b) 8
- (c) 15
- (d) 9

82.  $G$  is an undirected graph with  $n$  nodes. What is the maximum number of possible edges in  $G$ ?

- (a)  $n^2$
- (b)  $n(n+1)/2$
- (c)  $(n-1)n/2$
- (d)  $n(n-1)$

83. Consider the following system of equations :

$$\begin{aligned}x_1 + x_3 &= 3 \\x_1 - x_2 - x_3 &= 1 \\-x_1 + x_2 &= 4\end{aligned}$$

The above system of linear equations is

- (a) inconsistent
- (b) consistent with infinitely many solutions
- (c) consistent with a unique solution
- (d) None of the above

84. Which of the following is the 2421 code of the number  $(6027)_{10}$ ?

- (a) 0110 0000 0010 0111
- (b) 1001 0011 0101 1010
- (c) 1100 0000 0010 1101
- (d) None of the above

85. When expressed as the sum of minterms, the function  $(xy + z)(y + xz)$  becomes
- (a)  $\Sigma(3, 5, 6, 7)$
  - (b)  $\Sigma(3, 4, 6, 7)$
  - (c)  $\Sigma(1, 3, 6, 7)$
  - (d)  $\Sigma(1, 3, 5, 7)$
86. A micro-operation is usually performed on data stored in
- (a) registers
  - (b) cache memory
  - (c) Both (a) and (b)
  - (d) None of the above
87. As sum of minterms, the complement of the function  $F(A, B, C, D) = \Sigma(0, 2, 6, 11, 13, 14)$  is
- (a)  $F'(A, B, C, D) = \Sigma(1, 2, 4, 5, 7, 8, 9, 10, 12, 15)$
  - (b)  $F'(A, B, C, D) = \Sigma(1, 3, 4, 5, 7, 8, 9, 10, 12, 15)$
  - (c)  $F'(A, B, C, D) = \Sigma(1, 3, 4, 6, 7, 8, 9, 10, 12, 15)$
  - (d)  $F'(A, B, C, D) = \Sigma(1, 2, 3, 5, 7, 8, 9, 10, 12, 15)$
88. Which of the following is a sequential component?
- (a) Flip-flop
  - (b) Multiplexor
  - (c) Decoder
  - (d) None of the above



- 89.** A combination circuit is different from a sequential circuit since
- (a) it contains a memory element
  - (b) output depends on the current input combinations only
  - (c) Both (a) and (b)
  - (d) None of the above
- 90.** The number of select lines in a 3-to-8 line decoder is
- (a) 3
  - (b) 2
  - (c) 1
  - (d) None of the above
- 91.** Which of the following is used for the cache memory?
- (a) DRAM
  - (b) SRAM
  - (c) Both (a) and (b)
  - (d) Flash memory
- 92.** As per IEEE 754 floating-point standard, the exponent part of a single precision floating number can be expressed with
- (a) 11 bits
  - (b) 9 bits
  - (c) 8 bits
  - (d) 22 bits

93. In the biased notation for the 32-bit binary numbers, the zero is expressed by
- (a)  $00_{\text{two}}$
  - (b)  $11_{\text{two}}$
  - (c)  $10_{\text{two}}$
  - (d) None of the above
94. Which of the following is generally regarded as the von Neumann bottleneck?
- (a) Control unit
  - (b) Arithmetic logical unit
  - (c) Instruction set
  - (d) Processor/memory interface
95. Execution time is the time required for the computer to complete
- (a) disk access, memory access
  - (b) I/O activities, operating system overhead
  - (c) CPU operations
  - (d) All of the above
96. The minimum time that the input to a memory device must be valid before the clock edge is called
- (a) hold time
  - (b) setup time
  - (c) clock time
  - (d) valid time

97. According to Moore's law, number of transistors per chip increases
- (a) quadratically
  - (b) linearly
  - (c) cubically
  - (d) exponentially
98. CPU stalls a pipeline when there is a
- (a) Cache hit
  - (b) Cache miss
  - (c) Cache crash
  - (d) Cache overload
99. In the case of Harvard architecture, which of the following is true?
- (a) Same memory holds data, instructions
  - (b) A single-set of address/data buses between CPU and memory
  - (c) Separate memories for data and instructions
  - (d) Three sets of address/data buses between CPU and memory
100. In a general memory hierarchy, which one of the following is the fastest storage unit?
- (a) Cache
  - (b) Main memory
  - (c) Hard disk
  - (d) Register

\*\*\*

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK

SPACE FOR ROUGH WORK

