2005 – CA

QUESTION BOOKLET CODE **A**

Test Paper Code: CA

Time: 3 Hours **Max. Marks: 300**

DO NOT BREAK THE SEALS ON THIS BOOKLET. AWAIT INSTRUCTIONS FROM THE INVIGILATOR.

SEAL

SEAL

INSTRUCTIONS:

A. General:

1. This Question Booklet is your Question Paper.
2. This Question Booklet contains **32** pages and has 100 questions.
3. The Question Booklet **Code** is printed on the right-hand top corner of this page.
4. The Question Booklet contains blank spaces for your rough work. No additional sheets will be provided for rough work.
5. **Clip board, log tables, slide rule, calculator, cellular phone, pager and electronic gadgets in any form are NOT allowed.**
6. Write your **Name and Roll Number** in the space provided at the bottom.
7. All answers are to be marked only on the machine gradable Objective Response Sheet **(ORS)** provided, as per the instructions therein.
8. The Question Booklet along with the Objective Response Sheet **(ORS)** must be handed over to the Invigilator before leaving the examination hall.

B. Filling-in the ORS:

9. Write your Roll Number in the boxes provided on the upper left-hand-side of the **ORS** and darken the appropriate bubble under each digit of your Roll Number using a **HB pencil**.
10. On the right-hand-side of the ORS, write the Code of the Question Booklet received by you in the box provided, with ball-point pen, and darken the appropriate bubble with **HB pencil**.
11. On the lower-left-hand-side of the **ORS**, write your Name, Roll Number, Name of the Test Centre and put your signature in the appropriate box with ball-point pen. Do not write these anywhere else.

C. Marking of Answers on the ORS:

12. Each question has **4 choices** for its answer: (A), (B), (C) and (D). Only **ONE** of them is the correct answer.
13. On the right-hand-side of **ORS**, for each question number, darken with a **HB Pencil,** ONLY one bubble corresponding to what you consider to be the most appropriate answer, from among the four choices.
14. There will be **negative marking** for wrong answers.

MARKING SCHEME:

(a) For each question, you will be awarded 3 (three) marks, if you have darkened only one bubble corresponding to the correct answer.

(b) In case you have not darkened any bubble for a question, you will be awarded 0 (zero) mark for that question.

(c) In all other cases, you will be awarded –1 (minus one) mark for the question.

Name ..... **Roll Number** ☐☐☐☐☐☐

A

1. The number of non-empty even subsets (even set is the set having even number of elements) of a set having n elements is

   (A) 2^n

   (B) $2^{n-1}+1$

   (C) $2^{n-1}-1$

   (D) 2^{n-1}

2. If $X \Delta Z = Y \Delta Z$ for the non-empty sets X, Y, and Z, where Δ represents the symmetric difference, then

   (A) $X = Y$

   (B) $X \neq Y$

   (C) X is a proper subset of Y

   (D) Y is a proper subset of X

3. The enrolments of the third year MCA student of a college in three elective papers, namely, AA (Advanced Algorithms), AOS (Advanced Operating Systems), and ACN (Advanced Computer Network) are as follows:

   30 students have taken both AA and AOS. 20 students have taken both AOS and ACN. 30 students have taken both ACN and AA. 50 students have taken AA. 60 students have taken ACN and 70 students have taken AOS. 5 students have taken all the three subjects. If each student in the class has taken at least one of AOS, AA, and ACN, then the total number of students in the class is

   (A) 75

   (B) 95

   (C) 100

   (D) 105

4. An abelian group of order 24 has

(A) exactly one subgroup of order 3

(B) exactly two subgroups of order 3

(C) no subgroup of order 3

(D) more than two subgroups of order 3

5. Which of the following set of vectors in R^3 forms a linearly independent set of vectors over R?

(A) $\{(1,0,0),(0,-1,0),(1,1,0)\}$

(B) $\{(1,0,1),(0,1,1),(1,1,0)\}$

(C) $\{(1,1,0),(0,1,-1),(1,2,-1)\}$

(D) $\{(1,0,0),(0,2,0),(1,1,0)\}$

6. Let A be an $n \times n$ matrix such that $\boldsymbol{x}^T A\boldsymbol{x} > 0$ for every non zero vector $\boldsymbol{x}$ in R^n. Which of the following is true?

(A) All eigen values of A are negative

(B) All eigen values of A are positive

(C) Exactly one eigen value of A is zero

(D) More than one eigen values of A are zero

7. For the matrix $A = \begin{bmatrix} 0 & 0 & 1 \\ 2 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$, A^{-1} is given by

(A) $A^2 - 2A$

(B) $A^2 + 2A + 3I$

(C) $A^2 - 2A - I$

(D) $A - 3I$

8. Following system of linear equations

$$\begin{aligned} x_1 + 4x_2 + 3x_3 &= 0 \\ x_1 + 3x_2 + 4x_3 &= 0 \\ x_1 + 2x_2 + 5x_3 &= 0 \end{aligned}$$

does have

(A) no solution

(B) infinitely many solutions

(C) more than one but finitely many solutions

(D) exactly one solution

9. The eigen values of the matrix

$$A = \begin{bmatrix} 2 & 0 & 0 & 0 \\ 1 & 4 & 0 & 1 \\ 3 & 1 & 5 & 2 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

are

(A) 3, 2, 3, 4

(B) 4, 5, 1, 0

(C) 0, 3, 4, 5

(D) 1, 2, 4, 5

10. The eigen values of $\left(A^4 + 3A - 2I\right)$, where $A = \begin{bmatrix} 1 & 1 & 1 \\ 0 & 2 & 1 \\ 0 & 0 & 3 \end{bmatrix}$,

are

(A) 2, 20, 88

(B) 1, 2, 3

(C) 2, 20, 3

(D) 1, 20, 88

11. If A is an $n \times n$ matrix, then the system of linear equations $A\boldsymbol{x} = \mathbf{0}$

(A) is inconsistent if $\text{rank}(A) < n$

(B) has exactly r solutions if $\text{rank}(A) = r < n$

(C) has infinitely many solutions if $\text{rank}(A) = n$

(D) has infinitely many solutions if $\text{rank}(A) < n$

12. Which of the following is not true?

(A) The order of the subgroup of a finite group divides the order of the group

(B) Every group of finite order is cyclic

(C) Every cyclic group is abelian

(D) If k is a divisor of the order of a group G, then G must have a subgroup of order k

13. Which of the following is true?

(A) The set of all 2×2 real matrices forms a group under matrix multiplication

(B) A finite abelian group of order 6 has exactly two non-trivial subgroups

(C) Every finite group is always cyclic

(D) The set of all 2×2 real non-singular matrices forms an abelian group under matrix multiplication

14. For real symmetric matrices A and B, which of the following is true?

(A) AB is a symmetric matrix

(B) $AB = BA$

(C) All eigen values of AB are real if $AB = BA$

(D) AB is invertible if either A is invertible or B is invertible

15. Which of the following is a 2-dimensional subspace of R^3 over R?

(A) $\{(0, x, 0) \mid x \in R\}$

(B) $\{(0, x, 0) \mid x \in R\} \cup \{(0, 0, y) \mid y \in R\}$

(C) $\{(x, y, 0) \mid x, y \in R \text{ and } x \neq y\}$

(D) $\{(0, y, z) \mid y, z \in R\}$

A

16. The system of equations $A\boldsymbol{x} = \boldsymbol{b}$, where $A = \begin{bmatrix} 1 & 1 & 1 \\ 3 & 2 & 1 \\ 4 & 3 & 2 \end{bmatrix}$ and $\boldsymbol{b} = \begin{bmatrix} 1 \\ 2 \\ 3 \end{bmatrix}$ has

(A) no solution

(B) unique solution

(C) infinitely many solutions

(D) more than one but finitely many solutions

17. If an odd function increases for $x > 0$, then for $x < 0$ it

(A) increases

(B) decreases

(C) remains constant

(D) oscillates

18. The domain of the real valued function $f(x, y)$ defined by $f(x, y) = x + \sqrt{x^2 - y^2}$ is

(A) Points inside $y \leq |x|$

(B) Points inside $|y| \leq |x|$

(C) Points inside $y \leq x$

(D) Points inside $|y| \leq x$

19. For the function $z = x \tan^{-1}\left(\frac{y}{x}\right) + y \sin^{-1}\left(\frac{x}{y}\right) + 2$, the value of $x\frac{\partial z}{\partial x} + y\frac{\partial z}{\partial y}$ at (1,1) is

(A) $\frac{\pi}{4} - \sin^{-1} 1$

(B) $\frac{\pi}{4} + \sin^{-1} 1 + 2$

(C) $\frac{\pi}{4} + \sin^{-1} 1 - 2$

(D) $\frac{\pi}{4} + \sin^{-1} 1$

20. For the function $y = 1 - x^4$, the point $x = 0$ is a point of

(A) inflection

(B) minima

(C) maxima

(D) absolute minima

21. The point P closest to origin on the plane $2x + y - z - 5 = 0$ is

(A) $\left(\frac{1}{3}, \frac{5}{6}, \frac{-7}{2}\right)$

(B) $\left(\frac{5}{6}, \frac{5}{3}, \frac{-5}{3}\right)$

(C) $\left(\frac{5}{3}, \frac{5}{6}, \frac{-5}{6}\right)$

(D) $\left(\frac{5}{3}, \frac{1}{6}, \frac{-5}{6}\right)$

22. If the radius of a cylinder is measured with maximum error of 2%, height is measured with maximum error of 0.5%, then the maximum possible error in the computation of volume of the cylinder is

(A) 4.25%

(B) 5%

(C) 4%

(D) 4.5%

23. If Taylor series expansion of $\cos x$ is restricted to only first two terms and the permissible error is 0.54×10^{-2}, then x can be at most

(A) 0.6

(B) 0.5

(C) 0.4

(D) 0.3

24. The values of a and b for which the function $f(x) = x^3 + ax^2 + bx$ has local minima at $x = 4$ and point of inflection at $x = 1$ are

(A) 3, 24

(B) – 3, – 24

(C) – 3, 24

(D) 0, 0

25. The values of x_1 and x_2 with $x_1 < x_2$ such that $\int_{x_1}^{x_2} (12 - x - x^2)\,dx$ has the largest value are

(A) – 3, 3

(B) – 4, 1

(C) – 4, 4

(D) – 4, 3

26. The value of $\int_1^e \frac{1}{x^2} e^{(1+\ln x)} dx$ is

(A) 1

(B) $1/e$

(C) e

(D) 0

27. The value of $\int \frac{dx}{x\sqrt{1-\cos^2(1+\ln x)}}$ is

(A) $\ln \tan\left(\frac{1+\ln x}{2}\right) + c$

(B) $\ln \tan\left(\frac{1-\ln x}{2}\right) + c$

(C) $\ln \cot\left(\frac{1+\ln x}{2}\right) + c$

(D) $\ln \sin\left(1+\frac{\ln x}{2}\right) + c$

A

28. Area enclosed by the curves $y^2 = x$ and $y^2 = 2x - 1$ lying in the first quadrant is

(A) 1/6

(B) 1/4

(C) 1/2

(D) 1/3

29. The value of $\int_0^1 \int_y^1 x^2 e^{xy} dxdy$ is

(A) $\frac{e+2}{2}$

(B) $\frac{e-2}{2}$

(C) $\frac{e-1}{2}$

(D) $\frac{e+1}{2}$

30. The value of $\int_0^1 \int_y^1 \frac{x}{(x^2+y^2)} dxdy$ is

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

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

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

(D) $\frac{\pi}{5}$

31. The volume of a solid bounded by the cylinder $x^2 + y^2 = 1$ and the paraboloid $z = x^2 + y^2$ lying above xy plane is

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

(B) $\frac{2\pi}{3}$

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

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

32. The curves with constant curvature are

(A) circles only

(B) straight lines only

(C) circles and straight lines

(D) ellipse

33. The Wronskian of the function $f_1(x) = x^2$ and $f_2(x) = x|x|$ is zero for

(A) all x

(B) $x > 0$

(C) $x < 0$

(D) $x = 0$

34. The solution of the differential equation $y'' + 4y = 0$ subject to $y(0) = 1$, $y'(0) = 2$ is

(A) $\sin 2x + 1$

(B) $\cos 2x + 2x$

(C) $\sin 2x + \cos 2x$

(D) $\sin 2x - \cos 2x$

A

35. General solution of the differential equation $x\,dy = \left(y + xe^{-y/x}\right)dx$ is given by

(A) $e^{-y/x} = \ln x + c$

(B) $e^{y/x} = \ln x + c$

(C) $e^{-x/y} = x + c$

(D) $e^{x/y} = x + c$

36. A particular solution of the differential equation $(D^4 + 2D^2 - 3)\,y = e^x$ is

(A) $(x+1)e^x$

(B) xe^x

(C) $\dfrac{xe^x}{4}$

(D) $\dfrac{xe^x}{8}$

37. A particular solution of the differential equation $y''' - 3y'' + 3y' - y = e^x \cos 2x$ is

(A) $-\dfrac{1}{8}e^x \sin 2x$

(B) $\dfrac{1}{8}e^x \sin 2x$

(C) $\dfrac{1}{8}e^x \cos 2x$

(D) $e^x \sin 2x$

38. If $y = \ln(\sin(x+a)) + b$, where a and b are constants, is the primitive, then the corresponding lowest order differential equation is

(A) $y'' = -\left(1 + (y')^2\right)$

(B) $y'' = y^2 - (y')^2$

(C) $y'' = 1 + (y')^2$

(D) $y'' = y' + y^2$

39. For $\vec{a}$, $\vec{b}$, and $\vec{c}$ to be unit vectors satisfying $\vec{a} \times \left(\vec{b} \times \vec{c}\right) = \frac{\vec{b}}{2}$, the angles between $\vec{a}$ and $\vec{b}$, $\vec{a}$ and $\vec{c}$, respectively, are

(A) 90°, 45°

(B) 60°, 90°

(C) 90°, 60°

(D) 45°, 90°

40. The temperature T at a surface is given by $T = x^2 + y^2 - z$. In which direction a mosquito at the point (4, 4, 2) on the surface will fly so that it cools fastest ?

(A) $8\boldsymbol{i} + 8\boldsymbol{j} - \boldsymbol{k}$

(B) $-8\boldsymbol{i} - 8\boldsymbol{j} + \boldsymbol{k}$

(C) $\boldsymbol{i} - \boldsymbol{j} + 2\boldsymbol{k}$

(D) $\boldsymbol{i} + \boldsymbol{j} - \boldsymbol{k}$

41. Solution of the differential equation $xy' + \sin 2y = x^3 \sin^2 y$ is

(A) $\cot y = -x^3 + cx^2$

(B) $2\cot y = x^3 + 2cx^2$

(C) $\tan y = -x^3 + cx^2$

(D) $2\tan y = x^3 + 2cx^2$

42. The scalar function f which corresponds to $\vec{V} = \vec{\nabla} f$ where $\vec{V} = \frac{x\boldsymbol{i} + y\boldsymbol{j} + z\boldsymbol{k}}{\sqrt{x^2 + y^2 + z^2}}$ is

(A) $\sqrt{x^2 + y^2 + z^2} + c$

(B) $\frac{1}{\sqrt{x^2 + y^2 + z^2}} + c$

(C) $(x^2 + y^2 + z^2)^{\frac{-3}{2}} + c$

(D) xyz

A

43. One of the point at which the derivative of the function $f(x, y) = x^2 - xy - y + y^2$ vanishes along the direction $\frac{\boldsymbol{i} + \sqrt{3}\boldsymbol{j}}{2}$ is

(A) $\left(-1, \frac{2}{2\sqrt{3}+1}\right)$

(B) $\left(-1, \frac{2}{2\sqrt{3}-1}\right)$

(C) $\left(1, \frac{2}{2\sqrt{3}+1}\right)$

(D) $\left(1, \frac{2}{2\sqrt{3}-1}\right)$

44. Area of a parallelogram where diagonals are $2\vec{m} - \vec{n}$ and $4\vec{m} - 5\vec{n}$, $\vec{m}$, $\vec{n}$ being unit vectors, inclined at an angle 45° is

(A) $3\sqrt{2}$

(B) $\frac{\sqrt{2}}{3}$

(C) $\frac{3}{\sqrt{2}}$

(D) $2\sqrt{3}$

45. For the function $f(x)$ given by the following table,

x	0	2	5
$f(x)$	6	0	6

$f(3)$ is interpolated as

(A) 1

(B) 0

(C) 2

(D) 4

A

46. The iterative formula to compute cube root of a number x using Newton Raphson method is

(A) $y_{n+1} = \frac{1}{3}\left(2 + \frac{x}{y_n^2}\right)$

(B) $y_{n+1} = \frac{1}{3}\left(4y_n + \frac{x}{y_n^2}\right)$

(C) $y_{n+1} = \frac{1}{3}\left(\frac{4}{y_n} + \frac{x}{y_n^3}\right)$

(D) $y_{n+1} = \frac{1}{4}\left(3 + \frac{x}{y_n^2}\right)$

47. From the given table

x	1	2	3	4
$f(x)$	1	7	17	31

the interpolated value of $f(1.5)$ is

(A) 4.5

(B) 4

(C) 3.5

(D) 4.6

48. The distance x covered by a particle in different times t (minutes) is given in the following table.

t (minute)	1	2	3	4
x (metre)	4	7	10	14

The velocity (metre/minute) of the particle at the end of 2 minutes is given by

(A) $\frac{15}{6}$

(B) $\frac{17}{6}$

(C) $\frac{19}{6}$

(D) $\frac{22}{6}$

49. The value of the integral $\int_0^2 \frac{dx}{(1+x)}$ using Simpson's $\frac{1}{3}$ rule with $h = 0.5$ is given by

(A) $\frac{56}{3}$

(B) $\frac{11}{5}$

(C) $\ln 3$

(D) $\frac{11}{10}$

50. The maximum error in evaluating $\int_0^1 e^{-x^2} dx$ using trapezoidal rule with 5 sub intervals is

(A) 0.033

(B) 0.0033

(C) 0.0066

(D) 0.008

51. For $x = r\cos\theta$, $y = r\sin\theta$, which of the following is correct?

(A) $\frac{\partial r}{\partial x} = \sec\theta$ and $\frac{\partial \theta}{\partial x} = \frac{-1}{r\sin\theta}$

(B) $\frac{\partial r}{\partial x} = \sec\theta$ and $\frac{\partial \theta}{\partial x} = \operatorname{cosec}\theta$

(C) $\frac{\partial r}{\partial x} = \cos\theta$ and $\frac{\partial \theta}{\partial x} = \frac{1}{r\cos\theta}$

(D) $\frac{\partial r}{\partial x} = \cos\theta$ and $\frac{\partial \theta}{\partial x} = \frac{-\sin\theta}{r}$

52. For the events A and B to be independent, the probability that both A and B occur is 1/6 and probability that neither of them occur is 1/3. Then the probability of occurrence of A is

(A) 1/2 or 1/3

(B) 1/4

(C) 1/2 only

(D) 1/3 only

53. For n independent events $A_1, A_2, \cdots, A_n$, let $P(A_i)=1/(i+1)$, $i = 1, 2\cdots, n$. Then, the probability that none of the events will occur is

(A) $n/(n+1)$

(B) $n-1/(n+1)$

(C) $1/(n+1)$

(D) $1/n$

54. Let A, B and C be independent and mutually exclusive events with probability of occurrences $\frac{1-3p}{2}, \frac{1+4p}{3}, \frac{1+p}{6}$, respectively, then p lies in

(A) $[-1/4, 5/6]$

(B) $[-1/4, 1/3]$

(C) $[-1/4, 1/2]$

(D) $[-1/2, 1/3]$

55. A communication system consists of n components. Each of these components functions independently with probability p. The system functions correctly if and only if at least half of its components function. For what range of p, the probability that a five-component system functions correctly is higher than the probability that a three-component system functions correctly?

(A) [0.4, 0.6]

(B) [0, 0.5]

(C) [0, 1]

(D) [0.5, 1]

56. The probability of getting a defective floppy in three boxes A, B, and C are 1/3, 1/6 and 3/4, respectively. A box is selected randomly and a floppy is drawn from it. The probability that the floppy is defective and is drawn from box A is

(A) 4/15

(B) 12/15

(C) 2/15

(D) 3/5

57. Which of the following is an optimal solution for the LPP given below?

Maximize $2x_1 + 5x_2$

Subject to

$2x_1 + 4x_2 \leq 16$

$x_1 + 5x_2 \geq 5$

$x_1, x_2 \geq 0$

(A) $x_1 = 0, \ x_2 = 1$

(B) $x_1 = 8, \ x_2 = 0$

(C) $x_1 = 0, \ x_2 = 4$

(D) $x_1 = 5, \ x_2 = 0$

58. A company wants to hire some system programmer and application programmer to complete two of its projects. Project A requires 100 hours of programmer's time per day and project B requires 30 hours of programmer's time per day. A system programmer can work 8 hours for project A and 2 hours for project B per day. An application programmer can work 5 hours for project A and 3 hours for project B per day. The salary of a system programmer is thirty thousand and that of an application programmer is twenty thousand. The company wants to minimize the salary spent for the programmers to carry out the project. Which of the following is the correct LPP formulation of the problem?

(A) Minimize $3x + 2y$

Subject to $8x + 5y \geq 100$

$2x + 3y \geq 30$

$x, \ y \geq 0$

(B) Minimize $30x + 20y$

Subject to $5x + 8y \geq 100$

$2x + 3y \geq 30$

$x, \ y \geq 0$

(C) Minimize $30x + 20y$

Subject to $2x + 5y \geq 100$

$8x + 3y \geq 30$

$x, \ y \geq 0$

(D) Minimize $30x + 20y$

Subject to $3x + 5y \geq 100$

$2x + 8y \geq 30$

$x, \ y \geq 0$

59. Which of the following is not a convex set of R^3?

(A) $\{(x, y, 0) | x, y \in R\}$

(B) $\{(x, 0, 0) | x \in R\}$

(C) $\{(x, y, 0) | y = |x| \text{ and } x, y \in R\}$

(D) $\{(x, y, z) | x, y, z \in R\}$

60. Which of the following is true for the following LPP?

Maximize $2x_1 + 5x_2$

Subject to $x_2 - x_1 \geq 2$

$x_2 \leq -1$

$x_2 - 3x_1 \leq -3$

$x_1, x_2 \geq 0$

(A) $x_1 = 0$, $x_2 = 1$ is an optimal solution

(B) There is no feasible solution

(C) The system is unbounded

(D) The system has more than one optimal solution

61. One Giga byte is

(A) 2^{30} bytes

(B) 2^{20} bytes

(C) 2^{10} bytes

(D) 2^{40} bytes

62. The binary representation of the hexadecimal number 125 is

(A) 0000000001111101

(B) 0000000100100101

(C) 0000000111011010

(D) 0000000001111111

A

63. Which of the following group of statements is correct?

P. Mouse, Key Board, and Plotter are all input devices

Q. Unix, Windows, and Linux are all operating systems

R. Register, Cache, and Hard Disk are all memory modules

S. Monitor, Printer and Scanner are all output devices

(A) P, Q

(B) P, S

(C) R, S

(D) Q, R

64. If $(x)_7 = (122)_5$, then x is equal to

(A) 25

(B) 37

(C) 52

(D) 233

65. The product of the two binary numbers 00001101 and 00001111 is

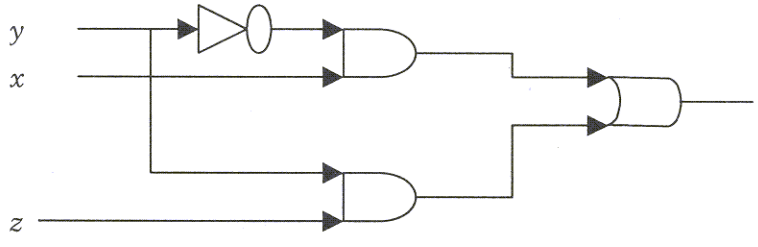
(A) 11000011

(B) 00001101

(C) 00010010

(D) 01100011

66. What is the output of the following logic circuit diagram if $x = 1$, $y = 0$ and $z = 1$?



(A) 11

(B) 0

(C) 10

(D) 1

67. Let $B = (X, +, ., ')$ be a Boolean algebra and $x, y \in B$. Which of the following is false?

(A) $x + x \cdot y = x$ and $x \cdot (x + y) = x$

(B) If $x + y = 1$ and $x \cdot y = 0$, then $y = x'$

(C) $(x + y)' = x' + y'$ and $(x \cdot y)' = x' \cdot y'$

(D) $x + 1 = 1$ and $x \cdot 0 = 0$

68. Let n be a non-negative integer. Which of the following numbers can be the number of elements in a finite Boolean algebra?

(A) 2^n

(B) $2^{n+1} - 1$

(C) $2^n + 1$

(D) $2^{n+1} + 1$

69. Which of the following filp-flops use two inputs?

P. JK-Flip-flop

Q. SR-Flip-flop

R. D-Flip-flop

S. T-Flip-flop

(A) P, S

(B) P, Q

(C) R, S

(D) P, R

70. What does the function Mystery (x, y) return?

```
int Mystery( int x, int y)
{
if (y= =0) return (x);
else if (x < y) return(Mystery(y,x));
else return(Mystery(y, x %y));
}
```

(A) maximum of x and y

(B) LCM of x and y

(C) minimum of x and y

(D) GCD of x and y

71. The register which stores the address of the next instruction during the execution of a program is called

(A) Program register

(B) Program counter

(C) Address register

(D) Accumulator

72. Which of the following group of statements is correct?

P. An assembler is a system program that converts an assembly code file into an object code file

Q. An assembler is a system hardware that assembles different parts of a computer

R. A compiler is a system software that converts a source code into an object code

S. Interpreter is a system program that translates a program completely and then executes

(A) P, S

(B) Q, R

(C) Q, S

(D) P, R

73. The output of the following program is

```
main()
{
int i=5, j=6;
printf("i=%d, j=%d\n",i++,++j);
}
```

(A) i=5, j=6

(B) i=5, j=7

(C) i=6, j=7

(D) i=6, j=6

74. The number printed by the following program is:

```
main()
{
        int x=7, y=5, z=7;
x=(x<y)?(y<z? y: y%2): (x < z ? z%4: x);
printf("%d\n",x);
}
```

(A) 5

(B) 3

(C) 7

(D) 1

75. What is the output of the following program?

```
main()
{
int i, j, k=0;
for(i=0; i < 4; i++)
  {
      for(j=0; j < i; j++)
      {
      if (i+j= = 3)
      continue;
      k=k+i+j;
      }
   }
printf("%d\n",k);
}
```

(A) 3

(B) 5

(C) 18

(D) 30

76. What is the value of x after the execution of the following C statements?

```
int x=5, y=256, z=1;
x+=y >>1+z;
```

(A) 69

(B) 5

(C) 134

(D) 261

77. What is the output of the following program?

```
void swap(int x, int y);
main()
{
int x=5, y=10;
3+swap(x,y);
printf(" %d\n",y);
}
void swap(int x, int y)
{
int temp;
temp=x;
x=y;
y=temp;
}
```

(A) 13

(B) 5

(C) 8

(D) 10

78. What is the output of the following program?

```
main()
{
int A[ ]={5,4,3,2};
int *p;
p=A;
printf("a=%d, b=%d\n",*p++, A[2]);
}
```

(A) a=5, b=2

(B) a=5, b=3

(C) a=5, b=5

(D) a=5, b=4

79. How many times the function Horror() is called by the main() function?

```
main()
    {
int x=3,y=0;
while(x > 0)
{
y=Horror(x);
if ( y= = x)
break;
}
    }
int Horror( int x)
    {
    static int i=0;
    i+=x%2;
    return(i);
    }
```

(A) 0

(B) 2

(C) 3

(D) infinity

80. Which of the following group of strings are valid C identifiers?

P. 2_MCA

Q. MCA_*2

R. MCA-BCA

S. M_CA

T. M2CA_MCA

(A) P, S

(B) Q, R

(C) S, T

(D) R, S

81. Let the node structure in a linked list be

```
struct node
    {
    int x;
    struct node *next;
    }
```

Which of the following correctly adds a node pointed to by the pointer Q after the node pointed to by the pointer P?

(A)
```
Q->next=P->next;
P->next=Q;
```

(B)
```
P->next=Q
Q->next=P;
```

(C)
```
P->next=Q;
Q->next=P->next;
```

(D)
```
Q->next=P;
P->next=Q;
```

82. Let P be a variable defined by

```
struct node
    {
    int x;
    int A[10];
    } P;
```

Which of the following is syntactically correct?

(A) P->A[5]=10;

(B) P.A->5=10;

(C) A[0].P=5;

(D) P.(*A)=5;

83. What is the output of the following program?

```
main() {
        int x=0;
        switch(x)
        {
        case 0: x=2;
        case 1: x=x+7;
        default: x=x%5;
        }
        printf("%d\n",x);
        }
```

(A) 0

(B) 2

(C) 4

(D) 5

84. Which of the following group of statements is correct?

P.
```
for(int i=0; ; i=i*i)
x=x+i;
```

Q.
```
for (int i=0; int j=0 ; i++)
x=x+i;
```

R.
```
for ( ; )
x=x+i;
```

S.
```
for ( int i=0; ; i++)
x=x+1;
```

(A) Q, R

(B) P, S

(C) P, Q

(D) R, S

85.
```
while ( x > 0)
{
y=x;
x=x–1;
}
```

Which of the following group contains equivalent for loops to the above while loop?

P. `for ( ; x > 0; x– –) y=x;`

Q. `for ( ; x > 0; ) {y=x; x=x–1;}`

R. `for ( ; ; ) { y=x; x=x–1;if (x <= 0) break; }`

S. `for ( ; ; x– –) { y=x; if ( x <=0) break;}`

(A) P, Q

(B) P, R

(C) R, S

(D) Q, R

86. Match list I and list II and select the correct answer.

	List I		List II
P.	Linux	1.	Internet
Q.	Assembly language	2.	High level language
R.	C++	3.	Low level language
S.	Modem	4.	Operating System

(A) (P, 4), (Q, 3), (R, 1), (S, 2)

(B) (P, 1), (Q, 2), (R, 3), (S, 4)

(C) (P, 2), (Q, 1), (R, 3), (S, 4)

(D) (P, 4), (Q, 3), (R, 2), (S, 1)

87. Bar code is a series of bars and spaces in binary system. Which of the following is true?

(A) Bars represent 1 and spaces represent 0

(B) Bars represent 0 and spaces represent 1

(C) Thick bars mean more zeros together

(D) Bars and spaces are application dependent

88. Match list I and list II and select the correct group of matching.

	List I		List II
P.	Nagaland	1.	Imphal
Q.	Chhatisgarh	2.	Indore
R.	Uttaranchal	3.	Kohima
S.	Manipur	4.	Dehradun
		5.	Raipur
		6.	Nainital

(A) (P, 3), (Q, 5), (R, 1), (S, 2)

(B) (P, 4), (Q, 3), (R, 5), (S, 2)

(C) (P, 3), (Q, 5), (R, 4), (S, 1)

(D) (P, 3), (Q, 5), (R, 6), (S, 1)

89. Next cricket world cup will be held in

(A) India

(B) Australia

(C) England

(D) West Indies

90. The term CD-ROM stands for

(A) Compact digital read only memory

(B) Compact disk read only memory

(C) Compressed data read only memory

(D) Compressed digital read only memory

91. IC chip used in a computer is made of

(A) Chromium

(B) Iron Oxide

(C) Silica

(D) Silicon

92. The two missing terms in the sequence 3, 7, 15, 31, —, 127, 255, — are

(A) 63, 511

(B) 62, 511

(C) 63, 412

(D) 62, 512

93. Which of the following group consists of volatile memory?

(A) RAM and Floppy Disk

(B) Hard Disk and ROM

(C) RAM and Cache

(D) Cache and ROM

94. On a bumper sale of woolens a shopkeeper offers successive discounts of 10%, 20%, and 30%. These discounts are equivalent to a single discount of

(A) 51.6%

(B) 49.6%

(C) 50.4%

(D) 60.6%

95. If the median of the sequence 50, x, 32, $x+2$, 29, 95, 72, 48, 84, 78 is 63 and x lies between 55 and 66, then x is

(A) 56

(B) 59

(C) 62

(D) 64

96. If INDIA is equivalent to lpgkd, then DELHI is equivalent to

(A) ggojl

(B) ghnkl

(C) ggojk

(D) ghnkm

97. Which of the following is true?

(A) National song of India was composed by Rabindra Nath Tagore and National emblem was taken from Ashok Stambh

(B) National song of India was composed by Bankim Chandra Chattopadhyaya and National animal is Tiger

(C) National song of India was composed by Rabindra Nath Tagore and National animal is lion

(D) National bird is peacock and National animal is Lion

98. Match List I and List II and select the correct answer.

	List I		List II
P.	Azim Premji	1.	Petroleum
Q.	Subir Raha	2.	Automobile
R.	Laxmi Narayan Mittal	3.	Software
S.	Jagdish Khattar	4.	Steel

(A) (P, 3), (Q, 4), (R, 1), (S, 2)

(B) (P, 4), (Q, 3), (R, 2), (S, 1)

(C) (P, 3), (Q, 2), (R, 3), (S, 4)

(D) (P, 3), (Q, 1), (R, 4), (S, 2)

99. A library has an average of 510 visitors on Sundays and 240 visitors on other days. Then the average number of visitors per day in a 30 days month beginning with a Sunday is

(A) 285

(B) 276

(C) 250

(D) 280

100. Two persons Ram and Shyam sort the letters at constant rate. Ram sorts L letters in 60 minutes while Shyam takes 30 minutes to sort L letters. The total time taken by both of them in sorting L letters working together but independently is

(A) 10 minutes

(B) 20 minutes

(C) 15 minutes

(D) 45 minutes