Question Booklet

D

Booklet Sl. No.

142488

Hall Ticket No.

1	7	1	1	8	4	-

OMR Answer Sheet No.

1	4	2	4	8	8

D

IMPORTANT NOTE

OMR Answer Sheet number and Question Booklet number SHOULD BE SAME

SEAL

Total No. of Questions : 120
Total No. of Pages : 16

This is to certify that, the entries of Hall Ticket number and OMR Answer Sheet number have been correctly written and verified.

Candidate's Signature

Invigilator's Signature

Instructions to the Candidate

1. The **Question Booklet with OMR Answer Sheet is issued** at the start of the examination.
2. Do not open the Question Booklet until the "**start opening**" signal is given. Candidates are required to verify that there are 120 questions in **16** pages in the Question Booklet. If any printing/binding etc. mistakes are found, immediately inform the invigilator and get a fresh booklet of the same version.
3. Each correctly answered question carries 4 **marks** and each wrongly answered question invites ONE NEGATIVE mark.
4. Use of **calculators, cell phones and any other electronic devices** inside Examination Hall is not permitted.
5. Candidate should carefully read the instructions printed on the Question Booklet and OMR Answer Sheet and make correct entries in the OMR Answer Sheet. As OMR Answer Sheets are designed to suit the COMPUTERISED ASSESSMENT SYSTEM, special care should be taken to darken the correct bubble. Fill the Hall Ticket number correctly. Do not write stray marks any where in the OMR Sheet.
6. For each question, choose the correct response answer from out of the four available options.
7. For answering a question, fill the appropriate bubble in the OMR Answer Sheet completely like this ● by using **blue/black ball point pen only**. Ensure that for each question only one bubble is darkened. Darkening of more than one bubble for any question will be treated as wrong and awarded one negative mark.
8. No white filling is permitted in OMR Answer Sheet for any correction.
9. Clarifications on questions are not permitted.
10. Rough work can be done in any blank space provided in the Question Booklet only. **Rough work should not be done anywhere on the OMR Answer Sheet**.
11. No candidate is allowed to leave the Examination Hall till the examination is over.
12. Immediately after the prescribed examination time is over, the **OMR Answer Sheet** should be returned to the Invigilator. Confirm that the Question Booklet and OMR Answer Sheet **bear the signature of candidate** and the **Invigilator at appropriate places**.

MATHEMATICS

1. If PQ is a double ordinate of the hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ such that OPQ is an equilateral triangle, where O is the centre of the hyperbola, then which of the following is true ?

   A) $b^2 > \frac{-a^2}{\sqrt{3}}$ B) $b^2 > \frac{a^2}{3}$ C) $b^2 < \frac{a^2}{3}$ D) $b^2 < \frac{-a^2}{\sqrt{3}}$

2. In a triangle ABC, if $a = 2$, $b = 4$ and $\angle C = 60°$, then $\angle A$ and $\angle B$ are respectively equal to

   A) 90°, 30° B) 45°, 75° C) 60°, 60° D) 30°, 90°

3. If $\int \frac{xe^x}{\sqrt{1+e^x}}\,dx = f(x)\sqrt{1+e^x} - 2\log\frac{\sqrt{1+e^x}-1}{\sqrt{1+e^x}+1} + C$, then f(x) is

   A) $2x-4$ B) $2x+4$ C) $x+4$ D) $x-4$

4. The average marks of boys in a class is 52 and that of girls is 42. The average marks of boys and girls combined is 50. The percentage of boys in the class is

   A) 80% B) 60% C) 40% D) 20%

5. How many even integers between 4000 and 7000 have four different digits ?

   A) 672 B) 840 C) 504 D) 728

6. If α and β are the roots of the equation $2x^2 + 2px + p^2 = 0$, where p is a non-zero real number, and α^4 and β^4 are the roots of $x^2 - rx + s = 0$, then the roots of $2x^2 - 4p^2x + p^4 - 2r = 0$ are

   A) real and unequal
   B) equal and zero
   C) imaginary
   D) equal and non-zero

7. The number of ways to arrange the letters of the English alphabet so that there are exactly 5 letters between the letters 'a' and 'b' is

   A) ${}^{24}P_5$ B) ${}^{24}P_5\, 20!$
   C) ${}^{24}P_5\, 20! \cdot 2$ D) ${}^{24}P_5 \cdot 24!.2$

8. Suppose the system of linear equations

   $-2x + y + z = l$
   $x - 2y + z = m$
   $x + y - 2z = n$

   is such that $l + m + n = 0$. Then the system has

   A) a non-zero unique solution
   B) trivial solution
   C) infinitely many solutions
   D) no solution

9. If $\vec{A} = 4\hat{i} + 3\hat{j} + \hat{k}$, $\vec{B} = 2\hat{i} - \hat{j} + 2\hat{k}$ then the unit vector $\hat{N}$ perpendicular to vectors $\vec{A}$ and $\vec{B}$ such that $\vec{A}$, $\vec{B}$, $\hat{N}$ form a right handed system is

A) $\frac{1}{\sqrt{185}}\left[7\hat{i} - 6\hat{j} - 10\hat{k}\right]$

B) $\frac{1}{7}\left[6\hat{i} + 2\hat{j} + 3\hat{k}\right]$

C) $\frac{1}{\sqrt{21}}\left[2\hat{i} + 4\hat{j} - \hat{k}\right]$

D) $\frac{1}{\sqrt{21}}\left[-2\hat{i} - 4\hat{j} + \hat{k}\right]$

10. $\int \frac{(x+1)}{x(xe^x + 1)}\, dx$ is equal to

A) $\log \frac{1 + xe^x}{xe^x} + c$

B) $\log [xe^x (1 + xe^x)] + c$

C) $\log \left[\frac{1}{1 + xe^x}\right] + c$

D) $\log \left[\frac{xe^x}{1 + xe^x}\right] + c$

11. A student takes a quiz consisting of 5 multiple choice questions. Each question has 4 possible answers. If a student is guessing the answers at random and answers to different questons are independent, the probability of at least one correct answer is

A) 0.237 B) 0.000976 C) 0.7623 D) 1

12. The condition that the line $lx + my + n = 0$ becomes a tangent to the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is

A) $a^2l + b^2m + n = 0$

B) $al^2 + bm^2 = n^2$

C) $al + bm = n$

D) $a^2l^2 + b^2m^2 = n^2$

13. The value of $\sin 20° \sin 40° \sin 80°$ is

A) $\frac{1}{2}$ B) $\frac{\sqrt{3}}{2}$ C) $\frac{\sqrt{3}}{8}$ D) $\frac{1}{8}$

14. Two non negative numbers whose sum is 9 and the product of one number and square of the other number is maximum, are

A) 5 and 4 B) 3 and 6 C) 1 and 8 D) 7 and 2

15. The median AD of a triangle ABC is bisected at E and BE is produced to meet the side AC at F. Then AF : FC is

A) 2 : 1 B) 1 : 2 C) 3 : 1 D) 1 : 3

16. A box contains 3 coins : one coin is fair; one coin is two-headed and one coin is weighted so that the probability of heads appearing is $\frac{1}{3}$. A coin is selected at random and tossed, then the probability that head appears is

A) $\frac{11}{18}$ B) $\frac{7}{18}$ C) $\frac{1}{8}$ D) $\frac{1}{4}$

17. If a vector $\vec{a}$ makes an angle with the co-ordinate axes and has magnitude 3, then the angle between $\vec{a}$ and each of the three co-ordinate axes is

A) $\cos^{-1}\left(\frac{1}{\sqrt{3}}\right)$ B) $\sin^{-1}\left(\frac{1}{\sqrt{3}}\right)$ C) $\pi/6$ D) $\pi/3$

18. If $f(x)=\begin{cases}\frac{\sin[x]}{[x]}, & [x]\neq 0\\ 0, & [x]=0\end{cases}$ where [x] is the largest integer not larger than x then $\underset{x\to 0}{Lt}\, f(x)$ is

A) -1 B) 0 C) 1 D) does not exist

19. If $\tan A - \tan B = x$ and $\cot B - \cot A = y$, then $\cot(A-B) =$

A) $\frac{1}{x}+\frac{1}{y}$ B) $\frac{1}{x}-\frac{1}{y}$

C) $-\frac{1}{x}+\frac{1}{y}$ D) $-\frac{1}{x}-\frac{1}{y}$

20. If $a = \log_{12}18$, $b = \log_{24}54$ then $ab + 5(a-b)$ is

A) 1 B) 0 C) 2 D) $\frac{3}{2}$

21. A password consists of two alphabets from English followed by three digits chosen from 0 to 3. Repetitions are allowed. The number of different passwords is

A) ${}^{26}P_1 \cdot {}^{25}P_2 \cdot {}^{4}P_1 \cdot {}^{3}P_1 \cdot {}^{2}P_1$ B) $({}^{26}P_1)^2 ({}^{4}P_1)^3$

C) ${}^{26}P_1 \cdot {}^{26}P_2 \cdot {}^{4}P_1 \cdot {}^{4}P_2 \cdot {}^{4}P_3$ D) $({}^{26}P_1 \cdot {}^{4}P_1)^2$

22. An equilateral triangle is inscribed in the parabola $y^2 = 4ax$ such that one of the vertices of the triangle coincides with the vertex of the parabola. The length of the side of the triangle is

A) $a\sqrt{3}$ B) $2a\sqrt{3}$ C) $4a\sqrt{3}$ D) $8a\sqrt{3}$

23. A chain of video stores sells three different brands of DVD players. Of its DVD player sales 50% are brand 1, 30% are brand 2 and 20% are brand 3. Each manufacturer offers one year warranty on parts and labor. It is known that 25% of brand 1 DVD players require warranty repair work, where as the corresponding percentages for brands 2 and 3 are 20% and 10% respectively. The probability that a randomly selected purchaser has a DVD player that will need repair while under warranty is

A) 0.795 B) 0.205

C) 0.1250 D) 0.060

24. The locus of intersection of two lines $\sqrt{3}x - y = 4k\sqrt{3}$ and $k(\sqrt{3}x + y) = 4\sqrt{3}$ for different values of k is a hyperbola. The eccentricity of the hyperbola is

A) 1.5 B) $\sqrt{3}$ C) 2 D) $\frac{\sqrt{3}}{2}$

25. Constant forces $\vec{P} = 2\hat{i} - 5\hat{j} + 6\hat{k}$ and $\vec{Q} = -\hat{i} + 2\hat{j} - \hat{k}$ act on a particle. The work done when the particle is displaced from A whose position vector is $4\hat{i} - 3\hat{j} - 2\hat{k}$ to B whose position vector is $6\hat{i} + \hat{j} - 3\hat{k}$, is

A) 10 units
B) – 15 units
C) – 50 units
D) 25 units

26. The sum of two vectors $\vec{a}$ and $\vec{b}$ is a vector $\vec{c}$ such that $|\vec{a}| = |\vec{b}| = |\vec{c}| = 2$. Then the magnitude of $\vec{a} - \vec{b}$ is equal to

A) $2\sqrt{3}$
B) 2
C) $\sqrt{3}$
D) 0

27. If x and y are positive real numbers satisfying the system of equations $x^2 + y\sqrt{xy} = 336$, $y^2 + x\sqrt{xy} = 112$ then $x + y$ is

A) $\sqrt{448}$
B) $\sqrt{224}$
C) 20
D) 40

28. From three collinear points A, B, C on a level ground which are on the same side of a tower, the angles of elevation of the top of the tower are 30°, 45°, 60° respectively. If BC = 60 meters, then AB is

A) $15\sqrt{3}$ meters
B) $30\sqrt{3}$ meters
C) $45\sqrt{3}$ meters
D) $60\sqrt{3}$ meters

29. If $x = 1$ is the directrix of the parabola $y^2 = kx - 8$ then k is

A) $\frac{1}{8}$
B) 8
C) 4
D) $\frac{1}{4}$

30. If $\sin x + a\cos x = b$, then $|a.\sin x - \cos x|$ is

A) $\sqrt{a^2 + b^2 + 1}$
B) $\sqrt{a^2 - b^2 + 1}$
C) $\sqrt{a^2 + b^2 - 1}$
D) None of the above

31. The value of $\int \sqrt{x}\, e^{\sqrt{x}}\, dx$ is

A) $2\sqrt{x} - e^{\sqrt{x}} - 4\sqrt{xe^{\sqrt{x}}} + C$
B) $(2x - 4\sqrt{x} + 4)e^{\sqrt{x}} + C$
C) $(2x + 4\sqrt{x} + 4)e^{\sqrt{x}} + C$
D) $(1 - 4\sqrt{x})e^{\sqrt{x}} + C$

32. For the vectors $\vec{a} = -4\hat{i} + 2\hat{j}$, $\vec{b} = 2\hat{i} + \hat{j}$ and $\vec{c} = 2\hat{i} + 3\hat{j}$, if $\vec{c} = m\vec{a} + n\vec{b}$, then the value of $m + n$ is

A) $\frac{1}{2}$
B) $\frac{3}{2}$
C) $\frac{5}{2}$
D) $\frac{7}{2}$

33. The value of $\int_0^{\pi/4} \log(1+\tan x)\,dx$ is

A) $\frac{\pi}{4}\log 2$ B) $\frac{\pi}{6}\log 2$ C) $\frac{\pi}{8}\log 2$ D) $\frac{\pi}{2}\log 2$

34. The number of ways in which 5 days can be chosen from each of the 12 months of a non-leap year is

A) $\left({}^{30}C_5\right)^4\left({}^{31}C_5\right)^7\left({}^{28}C_5\right)$ B) $\left({}^{30}C_5\right)^6\left({}^{31}C_5\right)^6$

C) $\left({}^{30}C_5\right)^7\left({}^{31}C_5\right)^4\left({}^{28}C_5\right)$ D) $\left({}^{30}C_5\right)^5\left({}^{31}C_5\right)^6\left({}^{28}C_5\right)$

35. If [x] represents the greatest integer not exceeding x, then $\int_1^9 [x]\,dx$ is

A) 32 B) 36 C) 40 D) 28

36. If the sets A and B are defined as $A=\left\{(x, y)\,|\,y=\frac{1}{x},\ 0\neq x\in \mathbb{R}\right\}$

$B=\{(x, y)\,|\,y=-x,\ x\in \mathbb{R}\}$, then

A) $A\cap B=\phi$ B) $A\cap B=B$ C) $A\cap B=A$ D) None of the above

37. Let A, B and C be three angles of a triangle T whose area is Δ. Let a, b and c be the sides opposite to the angles A, B and C respectively. If $s=\frac{a+b+c}{2}=6$, then the product

$\frac{1}{3}s^2(s-a)(s-b)(s-c)$ is equal to

A) 2Δ B) $2\Delta^2$ C) $\sqrt{2}\Delta$ D) $\sqrt{2}\Delta^2$

38. A normal to the curve $x^2=4y$ passes through the point (1, 2). The distance of the origin from the normal is

A) $\sqrt{2}$ B) $2\sqrt{2}$ C) $\frac{1}{\sqrt{2}}$ D) $\frac{3}{\sqrt{2}}$

39. Suppose r integers, $0 < r < 10$, are chosen from {0, 1, 2,...9} at random and with replacement. The probability that no two are equal is

A) $\frac{10!}{10!\,r!}$ B) $\frac{10!}{10!\,(10-r)!}$ C) $\frac{10!}{r!\,(10-r)!}$ D) $\frac{10!}{10^r\,(10-r)!}$

40. If $x^2+2ax+10-3a>0$ for all $x\in\mathbb{R}$, then

A) $-5<a<2$ B) $a<-5$ C) $a>5$ D) $2<a<5$

41. A condition that x^3+ax^2+bx+c may have no extremum is

A) $a^2\geq 3b$ B) $b^2<3a$

C) $a^2<3b$ D) $b^2\geq 3a$

42. If n and r are integers such that $1 \le r \le n$ then the value of $n\,({}^{n-1}C_{r-1})$ is
A) ${}^{n}C_{r}$ B) $r({}^{n}C_{r})$ C) $n({}^{n}C_{r})$ D) $(n-1)\,({}^{n}C_{r})$

43. If the foci of the ellipse $b^2x^2 + 16y^2 = 16b^2$ and the hyperbola $81x^2 - 144y^2 = \frac{81\times144}{25}$ coincide, then the value of b is
A) 1 B) $\sqrt{5}$ C) $\sqrt{7}$ D) 3

44. There are 8 students appearing in an examination of which 3 have to appear in Mathematics paper and the remaining 5 in different subjects. Then the number of ways they can be made to sit in a row if the candidates in Mathematics cannot sit next to each other is
A) 2400 B) 16200 C) 4200 D) 14400

45. If x is so small that x^2 and higher powers of x can be neglected, then $\frac{(9+2x)^{1/2}(3+4x)}{(1-x)^{1/5}}$ is approximately equal to
A) $9+\frac{74}{15}x$ B) $9+\frac{74}{5}x$ C) $3+\frac{74}{15}x$ D) $3+\frac{74}{5}x$

46. In a group of 200 students the mean and standard deviation of scores were found to be 40 and 15 respectively. Later on it was found that two scores 43 and 35 were misread as 34 and 53 respectively. The corrected mean of scores is
A) 40.95 B) 39.0 C) 39.95 D) 43

47. If the matrix $\begin{bmatrix} -1 & 3 & 2 \\ 1 & K & -3 \\ 1 & 4 & 5 \end{bmatrix}$ has an inverse matrix, then the value of K is
A) K is any real number B) $K \neq -4$
C) $K = -4$ D) $K \neq 4$

48. The mean deviation from the mean of the A.P : a, a+d, a + 2d, ..., a + 2nd is
A) $\frac{n}{n+1}d$ B) $\frac{n(n+1)}{2n+1}d$ C) $\frac{n+1}{2n+1}d$ D) $\frac{n(n-1)}{2n+1}d$

49. Let (x_0, y_0) be the solution of the following equations :
$(2x)^{\ln 2} = (3y)^{\ln 3}$
$3^{\ln x} = 2^{\ln y}$
Then x_0 is
A) $\frac{1}{6}$ B) $\frac{1}{3}$ C) $\frac{1}{2}$ D) 6

50. The value of $\tan1^\circ \cdot \tan2^\circ \cdot \tan3^\circ \ldots \tan89^\circ$ is
A) 0 B) $1/\sqrt{2}$ C) 1 D) 2

ANALYTICAL ABILITY AND LOGICAL REASONING

51. Find the number that comes next in the series.
120, 99, 80, 63, 48, _____
A) 35 B) 38 C) 39 D) 40

52. In a certain school, the number of students in each section was 24. After admitting some students, three new sections have been started and now there are 16 sections with 21 students in each. What is the number of newly admitted students ?
A) 14 B) 24 C) 16 D) 26

53. The nine alphabets L, M, N, O, P, Q, R, S and T are assigned to nine integers 1 to 9 not necessarily in the same order. 4 is assigned to P. The difference between P and T is 5. The difference between N and T is 3. What is the integer assigned to N ?
A) 7 B) 6 C) 5 D) 4

54. A road network has parallel roads, which are equidistant from each other and running north-south or east-west only. The road junctions A, B, C, H and X are such that A is east of B and west of C. H is south-west of C and south-east of B. B is south-east of X. Which of the junctions are the farthest south and the farthest east ?
A) H, B B) H, C C) C, H D) B, H

55. Four players A, B, C and D have to form into two pairs, however, no pair can play together more than seven times in a row. A and B have played seven games in a row. C and D have three in a row. C does not want to work with A. Who should partner with B ?
A) A B) D C) C D) Cannot be determined

56. If ROSE is coded as 6821, CHAIR is coded as 73456 and PREACH is coded as 961473, then the code for SEARCH is
A) 216473 B) 214673 C) 214763 D) 246173

Questions **57** to **59** are based on the following :

At a small company, parking spaces are reserved for the top executives : CEO, President, Vice President, Secretary and treasurer with the spaces lined up in that order. The parking lot guard can tell at a glance if the cars are parked correctly by looking at the color of the cars. The cars are yellow, green, purple, red and blue and the executives names are Alice, Bert, Cheryl, David and Enid.

The car in the first space is red.
A blue car is parked between the red car and the green car.
The car in the last space is purple.
The secretary drives a yellow car.
Alice's car is parked next to David's.
Enid drives a green car.
Bert's car is parked between Cheryl's and Enid's.
David's car is parked in the last space.

A Y
B G
C P
D R
E B

C B E A D
R Y P
B G

57. Who is the secretary ?
A) Enid B) David C) Cheryl D) Alice

58. Who is the CEO ?
A) Alice B) Bert C) Cheryl D) David

59. What color is the vice president's car ?
A) Green B) Yellow C) Blue D) Purple

Questions **60** to **62** are based on the following :

Cricket clubs in five towns A, B, C, D and E have one team each named P, Q, R, S and T, not necessarily in the same order.

The team in A has beaten R, P and S. Q has beaten the teams in E, C and A. Team R is in B and the team in C is not S.

60. Where is the team Q ?
A) A B) B C) C D) D

61. Where is the team P ?
A) A B) B C) C D) D

62. Which team is in A ?
A) P B) Q C) S D) T

Questions **63** to **66** are based in the following :

Five boys A, B, C, D, E and five girls P, Q, R, S, T are standing in two rows facing each other not necessarily in the order. E is not at any ends. C is to the immediate right of B and D is to the immediate left of A, who is facing P. There are as many girls between P and Q as between R and S. A is second to the left of B. S and R are not facing either B or D.

63. Which pair of boys are standing at the ends of the row ?
A) C and D B) C and B C) D and B D) None of these

64. Which of the following is definitely true ?
A) C is third to the right of D B) D is facing P
C) C is facing S D) None of these

65. Who is standing to the immediate right of A ?
A) E B) C C) D D) B

66. Who is facing B ?
A) R B) S C) Q D) T

Questions **67** to **71** are based on the following :

All the roads of a city are either perpendicular or parallel to one another. The roads are all straight. Roads A, B, C, D and E are parallel to one another. Roads F, G, H, I, J, K, L and M are parallel to one another.

- Road A is 1 km east of road B.
- Road B is ½ km west of road C.
- Road D is 1 km west of road E.
- Road G is ½ km south of road H.
- Road I is 1 km north of road J.
- Road K is ½ km north of road L.
- Road K is 1 km south of road M.

67. Which of the following is necessarily true ?
A) E and B intersect B) D is 2 km west of B
C) D is at least 2 km west of A D) M is 1.5 km north of L

68. If E is between B and C, which of the following is false ?
A) D is 2 km west of A
B) C is less than 1.5 km from D
C) Distance from E to B added to distance of E to C is ½ km
D) E is less than 1 km from A

69. If road E is between B and C, then the distance between A and D is
A) Less than 1 km
B) Between 1 km and 1½ km
C) Between 1½ km and 2 km
D) More than 2 km

70. Which of the following possibilities would make some two roads coincide ?
A) L is ½ km north of I
B) C is 1 km west of D
C) I is ½ km north of K
D) E and B are ½ km apart

71. If K is parallel to I and if K is ½ km south of J and 1 km north of G, which of the following two roads would be ½ km apart ?
A) I and K
B) J and G
C) I and G
D) J and K

Questions **72** to **75** are based on the following :

Six friends P, Q, R, S, T and U are standing in two rows facing one another : P is in the middle of one row. U is to the left of S and facing R. Q and T are not in the same row. Only one person is in between R and T.

72. Which of the following are in the same row ?
A) U, S and T
B) R, P and T
C) U, Q and P
D) U, R and Q

73. Who is to the left of S ?
A) P
B) U
C) S
D) Q

74. Who faces P ?
A) Q
B) T
C) S
D) U

75. Which of the following pairs are facing each other ?
A) RS
B) TU
C) PU
D) TQ

76. The students in three classes are in the ratio 2 : 3 : 5. If 20 students are increased in each class, the ratio changes to 4 : 5 : 7. The total number of students before the increase were
A) 10
B) 90
C) 100
D) None of these

77. Ajith is three times older than Babita, Chetu is half the age of Das. Babita is older than Chetu. Which of the following additional information is needed to estimate the age of Ajith ?
I) Chetu is 10 years old
II) Both Babita and Das are older than Chetu by the same number of years.
A) I only
B) II only
C) I and II
D) None of these

Questions **78** and **79** are based on the following :

Six friends A, B, C, D, E and F are sitting round a hexagonal table. F, who is sitting exactly opposite A, is to be immediate right of B. D is between A and B and is exactly opposite to C.

78. Who are sitting next to A ?
A) D and E
B) D and F
C) C and E
D) B and D

79. Who is sitting opposite to B ?
A) A
B) C
C) E
D) F

80. The sum of ages of a daughter and mother is 63 years. Four years back mother's age was 4 times that of daughter's age at that time. What is the present age of the mother ?
A) 46 years B) 48 years C) 50 years D) 59 years

81. A watch which gains 10 seconds in 5 minutes was set correct at 9.00 AM. When the watch indicated 20 minutes past 7.00 PM in the same evening, the correct time is
A) 7.00 PM B) 7.40 PM C) 7.10 PM D) 8.00 PM

82. Father is aged three times more than the age of his son Ronit. After 8 years, he would be two and a half times of Ronit's age. After further 8 years, how many times would he be of Ronit's age ?
A) 2 times B) 3 times C) 2.5 times D) 3.5 times

83. What is the number that comes next in the series ?
1, 2, 3, 6, 11, 20, 37, 68, ___
A) 105 B) 124 C) 125 D) 126

84. The arithmetic mean of 2^{10} and 2^{20} is
A) 2^{15} B) $2^5 + 2^{10}$ C) $2^9 + 2^{20}$ D) $2^9 + 2^{19}$

85. There are five different boxes of different unknown weights but each less than 100 kgs. These boxes were weighed in pairs and the weights obtained are 110, 112, 113, 114, 115, 116, 117, 118, 120 and 121 kgs. What is the weight in kg of the heaviest box ?
A) 60 B) 62
C) 64 D) 61

Questions **86** to **90** are based on the following :

Six members of a family A, B, C, D, E and F are Psychologist, Manager, Advocate, Jeweller, Doctor and Engineer but not necessarily in the same order.

Doctor is the grandfather of F, who is a psychologist

Manager D is married to A

C, who is a Jeweller, is married to Advocate

B is the mother of F and E

There are two married couples in the family

86. What is the profession of A ?
A) Manager B) Engineer
C) Cannot be determined D) None of these

87. What is the profession of E ?
A) Manager B) Engineer C) Doctor D) None of these

88. How is A related to E ?
A) Grandmother B) Wife
C) Grandfather D) None of these

89. How many male members are there in the family ?
A) Two B) Three
C) Four D) Cannot be determined

90. Who are the two couples in the family ?
A) AD and CB B) AB and CD
C) AC and BD D) None of these

GENERAL ENGLISH

91. Choose the most suitable antonym for the word "Rude"
A) Sweet B) Polite C) Decent D) Gentle

92. Choose the word that matches suitably with the word underlined in the given sentence.
"Developing indigenous technology is important to lead the nation to self-sufficiency."
A) Intelligent B) Native C) Capitalistic D) Wise

93. Change the voice :
'Why did your brother write such a letter' ?
A) Why was such a letter written by your brother ?
B) Why did your brother write such a letter ?
C) Why was such a letter wrote by your brother ?
D) Why does your brother write such letter ?

94. The first and the last parts of a sentence are numbered as 1 and 6. The rest of the sentence is split into four parts named P, Q, R, S. These four parts are not given in their proper order. Read the sentence and find out which of the four combinations is correct
1. Let's never
(P) that food
(Q) virtually impossible
(R) forget
(S) is seductive and
6. to resist
A) SRPQ B) PSRQ C) QSRP D) RPSQ

95. Arrange the given words to form a meaningful sentence
a) dejected b) students c) lot d) the e) a f) were
A) dbfeac B) abfecd C) eacfbd D) afebcd

96. The synonym of 'stupendous' is
A) Astounding B) Horrible C) Appealing D) Comforting

97. Select the pair with same relationship AFTER : BEFORE
A) FIRST : SECOND B) CONTEMPORARY : HISTORIC
C) PRESENT : PAST D) SUCCESSOR : PREDECESSOR

98. Choose the one which can be substituted for the phrase "A person who insists on something".
A) Disciplinarian B) Stickler C) Instantaneous D) Boaster

99. Choose the one which can be substituted for the sentence "The study of ancient societies"
A) Anthropology B) Archeology
C) History D) Ethnology

Questions **100** and **101** are based on the following passage :

Population explosion, malnutrition and ill health are the problems that modern scientists examine for solutions. The agriculture scientists are required to concentrate not only on large production but also more on improved varieties and protein-rich foods to ward off the ills of malnutrition. The medical scientists responsibilities is not limited to the manufacture of drugs

to cure diseases, they must invent medicines to protect humanity from epidemics. No less important is the area of war and weapons. The large scale devastation in Japan by the atom bomb is a stigma on the fair name of scientist. The modern scientist must make a point not to help in the proliferation of atomic weapons. They should rather devote their energies to the peaceful uses of atomic energy for the emancipation of humanity from hunger and diseases. They must realise that the benefit of their researches and inventions should reach the hands of all, the rich and poor alike.

100. Modern scientists must make a point not to help :
A) In the peaceful use of atomic energy B) In the prevention of malnutrition
C) In the proliferation of atomic weapons D) In the removal of ill health

101. What does the expression 'malnutrition' used in the passage mean ?
A) Excessive nourishment B) Prevention of epidemics
C) Proliferation of diseases D) Lack of proteins

102. Fill in the blank with a correct word :
The kitten was soaked to the skin from the _____
A) craven B) storm
C) abyss D) wind

103. Fill in the blank with the correct word :
The ship was attacked by _____ near a deserted Island.
A) burglars B) gangsters
C) pirates D) thieves

104. From the given alternatives, choose the one which best expresses the given sentence in indirect/direct Speech. The boy said, "who dare call you a thief ?"
A) The boy enquired who dared call him a thief.
B) The boy asked who called him a thief.
C) The boy told that who dared call him a thief.
D) The boy wondered who dared call a thief.

105. Fill in the blank with appropriate question tag.
She lives in Chennai now, _____
A) lives she ? B) doesn't she ? C) does she ? D) she does ?

106. Pick out the correct word that best expresses the meaning of 'prudent'.
A) Skillful B) Efficient C) Wise D) Profitable

107. Choose the correct article for the sentence below.
"Many _____ flower is born to blush unseen".
A) an B) the C) a D) No article

108. Choose the correct form of verb for the sentence below.
I propose that the meeting _____ put off till Sunday next.
A) will be B) is to be C) should be D) be

109. Fill in the blank with correct preposition.
The policeman told me to keep _____ the left.
A) for B) of C) to D) by

110. Choose the most suitable synonym for the word "Amicable".
A) Just B) Pleasant C) Peaceful D) Complete

COMPUTER AWARENESS

111. Multiplication of 111_2 by 101_2 is
A) 110011_2 B) 100011_2 C) 111100_2 D) 000101_2

112. What is the 8 bit 2's complement representation of the negative integer – 93 ?
A) 10100011 B) 10100010
C) 0XA2 D) None of these

113. The result of multiplication of the numbers $(10101)_2$ and $(11101)_2$, in hexadecimal form is
A) 609 B) 216 C) 261 D) 906

114. The binary equivalent of $(531.53125)_{10}$ is
A) $(1001010011.100001)_2$
B) $(1000010011.10011)_2$
C) $(1010010011.11001)_2$
D) $(1000010011.10001)_2$

115. How many bytes are there in a nibble ?
A) one-fourth B) half C) 2 D) 4

116. The number of bit strings of length 8, that start with the bit 0 or end with the bits 11 is
A) 132 B) 180 C) 256 D) 160

117. The decimal equivalent of the hexadecimal operation A10 + B21 is
A) 5425 B) 5246
C) 2849 D) 5344

118. What is the 2's complement of 0011 0101 1001 1100 ?
A) 1100 1010 1100 1011 B) 1100 1010 0110 0011
C) 1100 1010 0110 0100 D) 1100 1010 1111 1111

119. Consider the values $A = 2.0\times10^{30}$, $B = -2.0\times10^{30}$, C = 1.0. Assume that the floating point numbers are represented with 32 bits. What are the values of X and Y when the following sequence of operations are executed on a computer ?
X = A + B
Y = A + C
X = X + C
Y = Y + B
A) X = 1.0, Y = 1.0 B) X = 1.0, Y = 0.0
C) X = 0.0, Y = 1.0 D) X = 0.0, Y = 0.0

120. The boolean expression X.(X+Y) is same as
A) X.(1+Y) B) X
C) X.1 D) All of the above

NIMCET 2014
BOOKLET - D
ANSWER KEY

1.	(B)	**16.**	(A)	**31.**	(B)	**46.**	(C)	**61.**	(C)	**76.**	(C)	**91.**	(B)	**106.**	(C)
2.	(D)	**17.**	(A)	**32.**	(C)	**47.**	(B)	**62.**	(D)	**77.**	(C)	**92.**	(B)	**107.**	(C)
3.	(A)	**18.**	(D)	**33.**	(C)	**48.**	(B)	**63.**	(A)	**78.**	(A)	**93.**	(A)	**108.**	(C)
4.	(A)	**19.**	(A)	**34.**	(A)	**49.**	(C)	**64.**	(D)	**79.**	(C)	**94.**	(D)	**109.**	(C)
5.	(D)	**20.**	(A)	**35.**	(B)	**50.**	(C)	**65.**	(A)	**80.**	(B)	**95.**	(A)	**110.**	(B)
6.	(D)	**21.**	(B)	**36.**	(A)	**51.**	(A)	**66.**	(C)	**81.**	(A)	**96.**	(C)	**111.**	(B)
7.	(C)	**22.**	(D)	**37.**	(B)	**52.**	(B)	**67.**	(D)	**82.**	(A)	**97.**	(D)	**112.**	(A)
8.	(C)	**23.**	(B)	**38.**	(D)	**53.**	(B)	**68.**	(A)	**83.**	(C)	**98.**	(B)	**113.**	(C)
9.	(A)	**24.**	(C)	**39.**	(D)	**54.**	(B)	**69.**	(C)	**84.**	(D)	**99.**	(A)	**114.**	(D)
10.	(D)	**25.**	(B)	**40.**	(A)	**55.**	(C)	**70.**	(C)	**85.**	(B)	**100.**	(C)	**115.**	(B)
11.	(C)	**26.**	(A)	**41.**	(C)	**56.**	(B)	**71.**	(D)	**86.**	(D)	**101.**	(D)	**116.**	(D)
12.	(D)	**27.**	(C)	**42.**	(B)	**57.**	(D)	**72.**	(B)	**87.**	(B)	**102.**	(B)	**117.**	(A)
13.	(C)	**28.**	(D)	**43.**	(C)	**58.**	(C)	**73.**	(B)	**88.**	(C)	**103.**	(C)	**118.**	(C)
14.	(B)	**29.**	(C)	**44.**	(D)	**59.**	(A)	**74.**	(C)	**89.**	(D)	**104.**	(A)	**119.**	(B)
15.	(B)	**30.**	(B)	**45.**	(B)	**60.**	(D)	**75.**	(D)	**90.**	(A)	**105.**	(B)	**120.**	(D)