BALALOK MATRICULATION HIGHER SEC. SCHOOL - CHENNAI
[JAYA GROUP OF Institution]

Class:11 **ONE MARK EXAMINATION-SEPTEMBER-2022**

MATHS - [ANSWER KEY]

[Max. Marks : 100

I. **Choose the correct or the most suitable answer from the given four alternatives.**

(b) 1. If A = {(x,y)) : y = sinx, x∈R} : and B = {(x,y) : y = cosx, x∈R} then A∩B contains
(a) cannot be determined (b) infinitely many elements (c) only oe element (d) no element

(d) 2. The relation R defined on a set A = {0,-1,1,2} by xRy if $|x^2+y^2| \le 2$, then which one of the following is true?
(a) R^{-1} = {(0,0), (0,-1), (0,1), (-1,0),(1,0)} (b) R = {(0,0), (0,-1), (0,1), (-1,0), (-1,1), (1,2), (1,0)}
(c) Domain of R is {0,-1,1,2} (d) Range of R is {0,-1,1}

(c) 3. If f(x) = |x-2| + |x+2|, x∈R, then
(a) $f(x) = \begin{cases} -2x & \text{if } x\in(-\infty,-2) \\ -4x & \text{if } x\in(-2,2) \\ 2x & \text{if } x\in(2,\infty) \end{cases}$ (b) $f(x) = \begin{cases} -2x & \text{if } x\in(-\infty,-2) \\ 2x & \text{if } x\in(-2,2) \\ 2x & \text{if } x\in(2,\infty) \end{cases}$ (c) $f(x) = \begin{cases} -2x & \text{if } x\in(-\infty,-2) \\ 4 & \text{if } x\in(-2,2) \\ 2x & \text{if } x\in(2,\infty) \end{cases}$ (d) $f(x) = \begin{cases} 2x & \text{if } x\in(-\infty,-2) \\ 4 & \text{if } x\in(-2,2) \\ -2x & \text{if } x\in(2,\infty) \end{cases}$

(c) 4. Let A and B be subsets of the universal set N, the set of natural numbers. Then A'∪[(A∩B)∪B'] is
(a) B (b) A' (c) N (d) A

(c) 5. If n((A x B)∩(A x C)) = 8 and n(B∩C) = 2, then n(A) is
(a) 16 (b) 8 (c) 4 (d) 6

(b) 6. If n(A) = 2 and n(B∪C) = 3, then n[(A x B)∪(A x C)] is
(a) 2^3 (b) 6 (c) 5 (d) 3^2

(c) 7. If two sets A and B have 17 elements in common, then the number of elements common to the set AxB and BxA is
(a) 2^{17} (b) 34 (c) 17^2 (d) insufficient data

(a) 8. For non-empty sets A and B, if A⊂B then (A x B)∩(B x A) is equal to
(a) A x A (b) A∩B (c) B x B (d) none of these

(c) 9. The number of relations on a set containing 3 elements is
(a) 1024 (b) 9 (c) 512 (d) 81

(c) 10. Let X = {1,2,3,4} and R = {(1,1),(1,2),(1,3),(2,2),(3,3),(2,1),(3,1),(1,4),(4,1)}. Then R is
(a) equivalence (b) transitive (c) symmetric (d) reflexive

(b) 11. The range of the function 1 / 1-2sinx is
(a) (-∞,-1)∪(1/3,∞) (b) (-∞,-1]∪[1/3,∞) (c) [-1,1/3] (d) (-1,1/3)

(c) 12. The range of the function f(x) = |[x] - x|, x∈R is
(a) [0,1] (b) [0,∞) (c) [0,1) (d) (0,1)

(c) 13. The number of constant functions from a set containing m elements to a set containing n elements is
(a) mn (b) m+n (c) n (d) m

(b) 14. If the function f : [-3,3] → S defined by f(x) = x² is onto, then S is
(a) [-3,3] (b) [0,9] (c) [-9,9] (d) R

(d) 15. The inverse of $f(x) = \begin{cases} x & \text{if } x < 1 \\ x^2 & \text{if } 1 \le x \le 4 \\ 8\sqrt{x} & \text{if } x > 4 \end{cases}$ is
(a) $f^{-1}(x) = \begin{cases} 2x\ ; & x < 1 \\ \sqrt{x}\ ; & 1\le x\le 16 \\ x^2/8\ ; & x > 16 \end{cases}$ (b) $f^{-1}(x) = \begin{cases} x^2\ ; & x < 1 \\ \sqrt{x}\ ; & 1\le x\le 16 \\ x^2/64\ ; & x > 16 \end{cases}$ (c) $f^{-1}(x) = \begin{cases} -x\ ; & x < 1 \\ \sqrt{x}\ ; & 1\le x\le 16 \\ x^2/64\ ; & x > 16 \end{cases}$ (d) $f^{-1}(x) = \begin{cases} x\ ; & x < 1 \\ \sqrt{x}\ ; & 1\le x\le 16 \\ x^2/64\ ; & x > 16 \end{cases}$

(d) 16. Let f : R→R be defined b y f(x) = 1 - |x|. Then the range of f is
(a) R (b) (-1,∞) (c) (1,∞) (d) [-∞,1]

(b) 17. The function f : R→R is defined by $f(x) = \dfrac{(x^2+\cos x)(1+x^4)}{(x-\sin x)(2x-x^3)} + e^{-|x|}$ is
(a) an odd function (b) an even function
(c) neither an odd function nor an even function (d) both odd function and even function

(b) 18. If |x+2| ≤ 9, then x belongs to
(a) (-11,7) (b) [-11,7] (c) (-∞,-7) (d) (-∞,-7)∪[11,∞)

(a) 19. Given that, x,y and b are real numbers x < y, b > 0, then,
(a) xb < yb (b) xb ≤ yb (c) xb > yb (d) x/b ≥ y/b

(c) 20. The solution set of 5x - 1 < 24 and 5x + 1 > -24 is
(a) (-5, -4) (b) (-5,4) (c) (-5,5) (d) (4,5)

(d) 21. The solution set of the following inequality |x-1| ≥ |x-3| is
(a) (0,2) (b) (-∞,2) (c) [0,2] (d) [2,∞)

(d) 22. The value of $\log_{\sqrt{2}} 512$ is
(a) 12 (b) 16 (c) 9 (d) 18

(c) 23. If $\log_{\sqrt{x}} 0.25 = 4$, then the value of x is
(a) 1.5 (b) 1.25 (c) 0.5 (d) 2.5

(b) 24. The value of $\log_a b \log_b c \log_c a$ is
(a) 4 (b) 1 (c) 2 (d) 3

(a) 25. If 3 is the logarithm of 343, then the base is
(a) 7 (b) 5 (c) 9 (d) 6

(d) 26. Find a so that the sum and product of the roots of the equation $2x^2 + (a-3)x + 3a - 5 = 0$ is
(a) 0 (b) 4 (c) 1 (d) 2

(b) 27. The number of solutions of $x^2 + |x-1| = 1$ is
(a) 3 (b) 2 (c) 0 (d) 1

(a) 28. The equation whose roots are numerically equal but opposite in sign to the roots of $3x^2 - 5x - 7 = 0$ is
(a) $3x^2 + 5x - 7 = 0$ (b) $3x^2 + x - 7$ (c) $3x^2 - 5x + 7 = 0$ (d) $3x^2 - 5x - 7 = 0$

(a) 29. If 8 and 2 are the roots of $x^2 + ax + c = 0$ and 3,3 are the roots of $x^2 + dx + b = 0$, then the roots of the equation $x^2 + ax + b = 0$ are
(a) 9,1 (b) -1,1 (c) 1,2 (d) -1,2

(b) 30. If a and b are the real roots of the equation $x^2 - kx + c = 0$, then the distance between the points (a,0) and (b,0) is
(a) $\sqrt{4c - k^2}$ (b) $\sqrt{k^2 - 4c}$ (c) $\sqrt{4k^2 - c}$ (d) $\sqrt{k - 8c}$

(b) 31. If $\frac{kx}{(x+2)(x-1)} = \frac{2}{x+2} + \frac{1}{x-1}$, then the value of k is
(a) 2 (b) 3 (c) 1 (d) 4

(c) 32. If $\frac{1-2x}{3+2x-x^2} = \frac{A}{3-x} + \frac{B}{x+1}$, then the value of A+B is
(a) ½ (b) 2/3 (c) -½ (d) -2/3

(c) 33. The number of roots of $(x+3)^4 + (x+5)^4 = 16$ is
(a) 0 (b) 3 (c) 4 (d) 2

(a) 34. The value of $\log_3 11 . \log_{11} 13 . \log_{13} 15 . \log_{15} 27 . \log_{27} 81$ is
(a) 4 (b) 3 (c) 1 (d) 2

(c) 35. $\frac{1}{\cos 80^\circ} - \frac{\sqrt{3}}{\sin 80^\circ} =$
(a) $\sqrt{3}$ (b) $\sqrt{2}$ (c) 4 (d) 2

(b) 36. If $\cos 28^\circ + \sin 28^\circ = k^3$, then $\cos 17^\circ$ is equal to
(a) $-k^3/\sqrt{2}$ (b) $k^3/\sqrt{2}$ (c) $\pm k^3/\sqrt{2}$ (d) $-k^3/\sqrt{3}$

(c) 37. $(1+\cos \pi/8)(1+\cos 3\pi/8)(1+\cos 5\pi/8)(1+\cos 7\pi/8) =$
(a) $1/\sqrt{3}$ (b) $1/\sqrt{2}$ (c) 1/8 (d) ½

(c) 38. If $\pi < 2\theta < 3\pi/2$, then $\sqrt{2 + \sqrt{2 + 2\cos 4\theta}}$ equals to
(a) $-2\sin\theta$ (b) $-2\cos\theta$ (c) $2\sin\theta$ (d) $2\cos\theta$

(a) 39. If $\tan 40^\circ = \lambda$, then $\frac{\tan 140^\circ - \tan 130^\circ}{1 + \tan 140^\circ \tan 130^\circ} =$
(a) $1-\lambda^2/2\lambda$ (b) $1+\lambda^2/2\lambda$ (c) $1+\lambda^2/\lambda$ (d) $1-\lambda^2/\lambda$

(b) 40. $\cos 1^\circ + \cos 2^\circ + \cos 3^\circ + \dots \cos 179^\circ =$
(a) 89 (b) 0 (c) 1 (d) -1

(b) 41. Let $f_k(x) = 1/k [\sin^k x + \cos^k x]$ where $x \in R$ and $k \ge 1$, then $f_4(x) - f_6(x) =$
(a) 1/3 (b) 1/12 (c) 1/4 (d) 1/6

(c) 42. Which of the following is not true?
(a) $\tan\theta = 25$ (b) $\cos\theta = -1$ (c) $\sec\theta = 1/4$ (d) $\sin\theta = -3/4$

(c) 43. $\frac{\sin(A-B)}{\cos A \cos B} + \frac{\sin(B-C)}{\cos B \cos C} + \frac{\sin(C-A)}{\cos C \cos A}$
(a) 1 (b) $\sin A + \sin B + \sin C$ (c) 0 (d) $\cos A + \cos B + \cos C$

(c) 44. If $\cos p\theta + \cos q\theta = 0$ and if $p \ne q$, then θ is equal to (n is any integer)
(a) $\pi(n\pm1)/p\pm q$ (b) $\pi(3n+1)/p-q$ (c) $\pi(2n+1)/p\pm q$ (d) $\pi(n+2)/p+q$

(d) 45. If $\tan\alpha$ and $\tan\beta$ are the roots of $x^2 + ax + b = 0$, then $\frac{\sin(\alpha+\beta)}{\sin\alpha \sin\beta}$ is equal to
(a) a/b (b) b/a (c) -b/a (d) -a/b

(a) 46. If $f(\theta) = |\sin\theta| + |\cos\theta|$, $\theta \in R$, then $f(\theta)$ is in the interval
(a) $[1, \sqrt{2}]$ (b) [0,2] (c) [0,1] (d) [1,2]

(b) 47. $\frac{\cos 6x + 6\cos 4x + 15\cos 2x + 10}{\cos 5x + 5\cos 3x + 10\cos x}$ is equal to
(a) $\cos 3x$ (b) $2\cos x$ (c) $\cos 2x$ (d) $\cos x$

(b) 48. The triangle of maximum area with constant perimeter 12m
(a) is an isosceles triangle with sides 2m,5m,5m
(b) is an equilateral triangle with side 4m
(c) is a triangle with sides 3m,4m,5m
(d) does not exist

(b) 49. A wheel is spinning at 2 radians/second. How many seconds will it take to make 10 complete rotations?
(a) 15 π seconds (b) 10 π seconds (c) 20 π seconds (d) 5 π seconds

(d) 50. If $\sin\alpha + \cos\beta = b$, then $\sin 2\alpha$ is equal to
(a) $b^2 - 1$, if $b > \sqrt{2}$ (b) $b^2 - 1$, if $b \geq 1$ (c) $b^2 - 1$, if $b \geq \sqrt{2}$ (d) $b^2 - 1$, if $b \leq \sqrt{2}$

(d) 51. In a ΔABC, if (i) $\sin A/2 \sin B/2 \sin C/2 > 0$ (ii) $\sin A \sin B \sin C > 0$ then
(a) only (i) is true (b) only (ii) is true (c) Neither (i) nor (ii) is true (d) Both (i) and (ii) are true

(d) 52. The sum of the digits at the 10^{th} place of all numbers formed with the help of 2,4,5,7 taken all at a time is
(a) 432 (b) 18 (c) 36 (d) 108

(a) 53. In an examination there are three multiple choice questions and each question has 5 choices. Number of ways in which a students can fail to get all answer correct is
(a) 124 (b) 64 (c) 63 (d) 125

(b) 54. The number of 5 digit numbers all digits of which are odd is
(a) 25 (b) 5^5 (c) 5^6 (d) 625

(d) 55. In 3 fingers, the number of ways four rings can be worn in ____ ways.
(a) 68 (b) 64 (c) $4^3 - 1$ (d) 3^4

(d) 56. If ${}^{(n+5)}P_{(n+1)} = \left(\frac{11(n-1)}{2}\right)^{(n+3)} P_n$, then the value of n are
(a) 2 and 11 (b) 2 and 6 (c) 7 and 11 (d) 6 and 7

(d) 57. The product of r conscufive positive integers is divisible by
(a) r^r (b) $(r+1)!$ (c) $(r-1)!$ (d) $r!$

(c) 58. There are 10 points in a plane and 4 of them are collinear. The number of straight lines joining any two points is
(a) 38 (b) 39 (c) 40 (d) 45

(b) 59. The number of ways in which a host lady invite 8 people for a party of 8 out of 12 people of whom two do not want to attend the party together is
(a) $2 \times {}^{11}C_7 + {}^{10}C_8$ (b) ${}^{12}C_8 - {}^{10}C_6$ (c) ${}^{10}C_6 + 2!$ (d) ${}^{11}C_7 + {}^{10}C_8$

(d) 60. Everybody in a room shakes hands with everybody else. The total number of shake hands is 66. The number of persons in the room is ____
(a) 6 (b) 10 (c) 11 (d) 12

(d) 61. Number of sides of a polygon having 44 diagonals is ____
(a) 4! (b) 4 (c) 22 (d) 11

(b) 62. In a plane there are 10 points are there out of which 4 points are collinear, then the number of triangles formed is
(a) ${}^{10}C_3$ (b) 116 (c) 110 (d) 120

(a) *63. In ${}^{2n}C_r$ 3 : ${}^{n}C_3$ = 11:1 then n is
(a) 6 (b) 5 (c) 7 (d) 11

(d) *64. ${}^{(n-1)}C_r$ 3 + ${}^{(n-1)}C_{(r-1)}$ is
(a) ${}^{(n-1)}C_r$ (b) ${}^{(n+1)}C_r$ (c) ${}^{n}C_{r-1}$ (d) ${}^{n}C_r$

(d) 65. The number of rectangles that a chessboard has ____
(a) 9^9 (b) 81 (c) 6561 (d) 1296

(b) *66. If P_r stands for ${}^rP_r$ then the sum of the series $1 + P_1 + 2P_2 + 3P_3 + \ldots + nP_n$ is
(a) ${}^{(n+1)}P_{(n-1)}$ (b) $P_{n-1} + 1$ (c) $P_{n+1} - 1$ (d) P_{n+1}

(c) 67. If ${}^nC_4$, ${}^nC_5$, ${}^nC_6$ are in AP the value of n can be
(a) 5 (b) 9 (c) 14 (d) 11

(b) 68. 1+3+5+7+...+17 is equal to
(a) 71 (b) 81 (c) 61 (d) 101

(c) 69. The value of 2+4+6+ . . . +2n is
(a) n(n+1)/2 (b) n(n-1)/2 (c) n(n+1) (d) 2n(2n+1)/2

(b) 70. The coefficient of x^6 in $(2+2x)^{10}$ is
(a) ${}^{10}C_6 2^6$ (b) ${}^{10}C_6 2^{10}$ (c) ${}^{10}C_6$ (d) 2^6

(b) 71. The coefficient of x^8y^{12} in the expansion of $(2x+3y)^{20}$ is
(a) $2^8 3^{12} + 2^{12} 3^8$ (b) ${}^{20}C_8 2^8 3^{12}$ (c) 0 (d) $2^8 3^{12}$

(c) 72. If ${}^nC_{10} > {}^nC_r$ for all possible r, then a value of n is
(a) 21 (b) 19 (c) 20 (d) 10

(a) 73. If a is the arithmetic mean and g is the geometric mean of two numbers, then
(a) $a \geq g$ (b) $a > g$ (c) $a \leq g$ (d) $a = g$

(d) 74. If $(1+x^2)^2 (1+x)^n = a_0 + a_1x + a_2x^2 + \ldots + x^{n+4}$ and if a_0, a_1, a_2 are in AP, then n is
(a) 5 (b) 4 (c) 1 (d) 2

(c) 75. If a,8,b are in AP, a,4,b are in GP, and if a,x,b are in HP then x is
(a) 1 (b) 16 (c) 2 (d) 4

(a) 76. The sequence $\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}+\sqrt{2}}, \frac{1}{\sqrt{3}+2\sqrt{2}}, \ldots$ form an
(a) HP (b) AGP (c) AP (d) GP

(a) 77. The HM of two positive numbers whose AM and GM are 16,8 respectively is
(a) 4 (b) 10 (c) 5 (d) 6

(d) 78. If S_n denotes the sum of n terms of an AP whose common difference is d, the value of $S_n - 2S_{n-1} + S_{n-2}$ is
(a) 2d (b) 4d (c) d^2 (d) d

(a) 79. The n^{th} term of the sequence 1,2,4,7,11,. . . is
(a) $\frac{n^2-n+2}{2}$ (b) $\frac{n(n+1)(n+2)}{3}$ (c) $n^3 - 3n^2 + 3n$ (d) $n^3 + 3n^2 + 2n$

(b) 80. The sum up to n terms of the series $\frac{1}{\sqrt{1}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{5}} + \frac{1}{\sqrt{5}+\sqrt{7}} + \ldots$ is
(a) $\sqrt{2n+1} - 1$ (b) $\frac{\sqrt{2n+1}-1}{2}$ (c) $\sqrt{2n+1}$ (d) $\frac{\sqrt{2n+1}}{2}$

(d) 81. The nth term of the sequence 1/2, 3/4, 7/8, 15/16, ... is
(a) $2^{-n} + n - 1$ (b) 2^{n-1} (c) $2^n - n - 1$ (d) $1 - 2^{-n}$

(c) 82. The value of the series 1/2 + 7/4 + 13/8 + 19/16 + . . . is
(a) 4 (b) 6 (c) 7 (d) 14

(b) 83. The sum of an infinite GP is 18. If the first term is 6, the common ratio is
(a) 1/3 (b) 2/3 (c) 1/6 (d) 3/4

(d) 84. The coefficient of x^5 in the series e^{-2x} is
(a) 3/2 (b) 2/3 (c) 4/15 (d) -4/15

(b) 85. The equation of the locus of the point whose distance from y-axis is half the distance from origin is
(a) $3x^2 + y^2 = 0$ (b) $3x^2 - y^2 = 0$ (c) $x^2 + 3y^2 = 0$ (d) $x^2 - 3y^2 = 0$

(d) 86. Which of the following point lie on the locus of $3x^2 + 3y^2 - 8x - 12y + 17 = 0$
(a) (-2,3) (b) (0,0) (c) (0,-1) (d) (1,2)

(d) 87. If the point (8,-5) lies on the locus $\frac{x^2}{16} - \frac{y^2}{25} = k$. then the value of k is
(a) 2 (b) 1 (c) 0 (d) 3

(d) 88. Straight line joining the points (2,3) and (-1,4) passes through the point (α,β) if
(a) $3\alpha + \beta = 9$ (b) $\alpha + 2\beta = 7$ (c) $3\alpha + \beta = 11$ (d) $\alpha + 3\beta = 11$

(c) 89. The slope of the line whih makes an angle 45^0 with the line $3x - y = -5$ are
(a) 2, -½ (b) 1,½ (c) ½, -2 (d) 1, -1

(a) 90. Equation of the straight line that forms an isosceless triangle with coordinate axes in the I-quadrant with perimeter $4+2\sqrt{2}$ is
(a) x+y-2=0 (b) x+y+2=0 (c) $x+y+\sqrt{2}=0$ (d) $x+y-\sqrt{2}=0$

(d) 91. The intercepts of the perpendicular bisector of the line segment joining (1,2) and (3,4) with coordinate axes are
(a) 5,3 (b) 5,-4 (c) 5,-5 (d) 5,5

(c) 92. The equation of the line with slope 2 and the length of the perpendicular from the origin equal to $\sqrt{5}$ is
(a) $x - 2y = \sqrt{5}$ (b) $2x - y = \sqrt{5}$ (c) $2x - y = 5$ (d) $x - 2y - 5 = 0$

(b) 93. A line perpendicular to the line 5x-y=0 forms a triangle with the coordinate axes. If the area of the triangle is 5 sq.units, then its equation is
(a) $x - 5y \pm 5\sqrt{2} = 0$ (b) $x + 5y \pm 5\sqrt{2} = 0$ (c) $5x - y \pm 5\sqrt{2} = 0$ (d) $5x + y \pm 5\sqrt{2} = 0$

(d) 94. Equation of the straight line perpendicular to the line x - y + 5 = 0, through the point of intersection the y-axis and the given line
(a) x+y+5=0 (b) x+y+10=0 (c) x-y-5=0 (d) x+y-5=0

(a) 95. The point on the line 2x - 3y = 5 is equidistance from (1,2) and (3,4) is
(a) (4,1) (b) (7,3) (c) (1,-1) (d) (-2,3)

(d) 96. The length ⊥ of from the origin to the line $\frac{x}{3} - \frac{y}{4} = 1$, is
(a) -5/12 (b) 11/5 (c) 5/12 (d) 12/5

(b) 97. The y - intercept of the straight line passing through (1,3) and perpendicular to 2x - 3y + 1 = 0 is
(a) 2/3 (b) 9/2 (c) 2/9 (d) 3/2

(a) 98. If the two straight lines x + (2k - 7)y + 3 = 0 and 3kx + 9y - 5 = 0 are perpendicular then the value of k is
(a) k=3 (b) k=2/3 (c) k=1/3 (d) k=3/2

(b) 99. If the lines represented by the equation $6x^2 + 41xy - 7y^2 = 0$ make angles α and β with x-axis, then $\tan\alpha \tan\beta$ =
(a) 6/7 (b) -6/7 (c) 7/6 (d) -7/6

(b) 100. If one of the lines given by $6x^2 - xy + 4cy^2 = 0$ is 3x + 4y = 0, the c equals to
(a) 3 (b) -3 (c) 1 (d) -1

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