

ENGLISH

SUTAPA CHAKRABORTY

Rudyard Kipling honoured motherhood with these words: "God could not be everywhere and, therefore, he made mothers." This is similar to what Sarada Devi, referred to as Holy Mother by her disciples, would say quoting her husband. Ramakrishana Paramhansa: "He had the attitude of a mother towards all creations and he has left me behind to demonstrate this motherhood of God." That, she said, was her purpose in life.

A mother's role is multifaceted. She is also her child's first teacher And Sarada Devi fully imbibed and imparted the philosophy of 'Vigyan Vedanta', demonstrating how all those teachings could be applied to make our own lives blessed.

In her own way, she taught "as many faiths, so many paths", Brahm, according to her, was in all things and in all creatures. Though the realised souls have imparted different teachings, and they don't say the same thing, however, since there are many paths leading to the same goal, all of their teachings are true. She gave a unique analogy for this. Imagine a tree with birds of different colours and plumage sitting and singing a wide variety of notes in varying octaves. We do not say that any one particular bird's chirp is the chirp, and the rest are not. She would say that founders of all religions are realised souls and they have witnessed different aspects of God on the basis of their own experience, and they are all correct as they have indeed known the truth. They are wrong in generalising it, though. Actually, they are only referring to different forms and aspects of one and the same infinite, divine reality.

Demonstrating harmony of religions in her day-to-day life and a mother's unconditional love for all, Sri Ma would say that the Muslim labourer called Amjad working for her was as much her son as was Sarat, Swami Saradananda, her personal attendant. When Sister Nivedita, Swami Vivekananda's disciple, came to visit her Ma Sarada embraced and accepted her as her own daughter. She maintained that the infinite divine reality is nirgun formless, in one aspect, and also sagun, with form. Once, when asked by a monk, "Are you really the mother of all? Even the birds, insects and beasts?" She said, "Yes" s. At her home in Jayrambati, West Bengal. when a monk once hit a cat, the Holy Mother was deeply hurt and said. "Don't beat it. Feed it, so it will not steal food. I live in that cat.

Pray for desirelessness, was her advice. If one can entirely give up all worldly desires, they can get a vision of God right away, she believed. Her final and most profound teaching was that if you want peace of mind, do not find faults with others. Rather, learn to see your own faults. "Learn to accept the whole world as your own. No one is a stranger, my child," she would say.

1. "God could not be everywhere and, therefore he made mother" who said this.
- (a) Sarada Devi (b) Ramakrishna Paramahansa
(c) Rudyard Kipling (d) Sutapa Chakraborty

ENGLISH – Author Identification

2. "Plumage" means:
- (a) A singing bird
(b) A bird of unique colour
(c) A bird's feathers collectively
(d) Number of birds chirping together

ENGLISH – Vocabulary (Meaning)

3. Who were described as Sri Ma Sarada Devi's children in the passage. The list must include all the names described:
- (a) Amjad, Sarat, Swami Vivekananda
(b) Sarat, Swami Vivekananda
(c) Nivedita, Amjad, Sarat
(d) Nivedita, Swami Saradananda, Amjad, Sarat

ENGLISH – Reading Comprehension

4. 'Vigyan Vedanta' philosophy could be applied to make our own lives blessed. Sarada Devi fully imbibed and imparted this philosophy.

Here imbibed means_____.

- (a) Kill our Knowledge
(b). Literary absorb (ideas or knowledge)
(c). Drink (alcohol)
(d).Absorb water

ENGLISH – Vocabulary (Imbibed)

5. Different aspects of God means:

- (A) Different nature of God
(B) Different character of God
(C) Different feature of God
(D) Different identity of God

Choose the most appropriate answer:

- (a). A, B only (b). A,B,C,D only
(c). A,B,C only (d). D only

ENGLISH – Comprehension (Inference)

6. Find the missing term in the given number series.

-1,0, 7, 26, 63, ?, 215, 342.....

- (a) 172 (b) 142
(c) 124 (d) 134

ENGLISH – Number Series

7. Who has been awarded the first prize in the National MSME Award 2022?

- (a) Assam (b) Odisha
(c) Gujarat (d) Uttar Pradesh

GK – Current Affairs

8. ISRO successfully put three satellites of which country into space orbit with PSLV-C53?

- (a) USA (b) Singapore
(c) Brazil (d) Spain

GK – Current Affairs (ISRO)

9. Choose a synonym of the underlined word.

Rohit's lugubrious eulogy at the funeral of his dog eventually made everyone start giggling.

- (a) morass (b) Sonorant
(c) melancholy (d) somber

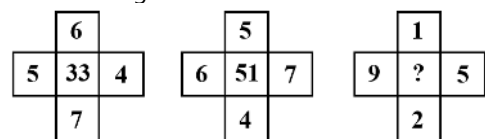
ENGLISH – Synonym

10. A sum of money doubles itself on simple interest in 10 years. Find the rate of interest per annum.

- (a) 10% (b) 12% (c) 12.5% (d) 8%

MATH – Simple Interest

11. Find out the missing number:



- (a). 40 (b). 44 (c). 46 (d). 48

REASONING – Missing Number

12. A severe deserved punishment

- (a) Reformation (b) Retribution
(c) Revisionism (d) Retreat

ENGLISH – Vocabulary

13. Out of the following options select the word that is correctly spelt:
 (a) CONVELESENSE (b) CONVALASENCE
 (c) CONVALESENSE (d) CONVALESCENCE

ENGLISH – Spelling

14. The area of a rhombus is 120 cm^2 and length of its one diagonal is 24 cm. Find the perimeter of the rhombus (in cm).
 (a) 50 (b) 52 (c) 54 (d) 56

MATH – Mensuration (Rhombus)

15. Given below are two statements:

Statement:

- I. Rabindranath Tagore wrote many poems.
 II. Every poet has aesthetic knowledge.
 III. Aesthetic is a part of axiological study.

Conclusions:

- I. Rabindranath Tagore did different axiological studies.
 II. He followed the base of logic and ethics.

- (a) If only conclusion I follow
 (b) If only conclusion II follow
 (c) If either conclusion I or II follow
 (d) If neither conclusion I nor II follow

REASONING – Syllogism

16. Which player has won Gold in Women's Air pistol at the 65th National shooting Championship, 2022?
 (a) Sanskriti Bana (b) Divya T. S.
 (c) Manu Bhaker (d) Rhythm Sangwan

GK – Sports

17. Choose a word opposite to the meaning of the underlined word. History is replete with deeds of cruel and capricious kings.
 (a) erratic (b) steady
 (c) acquire (d) humble

ENGLISH – Antonym

18. Given below are two statements

Statement I: When a ray of white light is passed through a prism, it gets splitted into its constituents colours. This phenomenon is called dispersion of light.

Statement II: Rainbow is formed due to dispersion of sunlight by water droplets.

In the light of the above statements, choose the most appropriate answer from the options given below

- (a) Both Statement I and Statement II are correct
 (b) Both Statement I and Statement II are incorrect
 (c) Statement I is correct but Statement II is incorrect
 (d) Statement I is incorrect but Statement II is correct

SCIENCE – Physics (Dispersion)

19. Despite the family's insistence that she should get married. She has set her face against the idea. The underlined idiom implies that:
 (a) She got out of the difficulty on her own
 (b) She opposed the idea with determination
 (c) She pitched herself against her parents
 (d) She refused to confront and convince her parents

ENGLISH – Idiom

20. The monthly income and expenditure of a person were Rs.10,000 and Rs. 6,000 respectively. Next year, his income increased by 15% and his expenditure increased by 8%. Then the percentage increase in his savings is:

- (a) 20% (b) 25%
 (c) 25.5% (d) 452.5%

MATH – Percentage

21. Ajay said, "This girl is the wife of the grandson of my mother". Who is Ajay to the girl?

- (a) Father (b) Father-in-law
 (c) Cousin (d) Brother

REASONING – Blood Relation

22. Two boys and two girls are playing cards and are seated at North, East, South and West of a table. No boy is facing East. Persons sitting opposite to each other are not of the same sex. One girl is facing South. Which directions are the boys facing?

- (a) North and West (b) East and North
 (c) East and West (d) East and South

REASONING – Seating Arrangement

23. Match List I with List II

LIST I (Nobel Prize Awarde from India)		LIST II (Field)	
A.	Kailash Satyarthi	I.	Chemistry
B.	Abhijit Banerjee	II.	Peace
C.	Venkatraman Ramakrishnan	III.	Physics
D.	Subrahmanyam Chandrasekhar	IV.	Economics

Choose the correct answer from the options given below:

- (a). A-II, B-IV, C-I, D-III (b). A-IV, B-II, C-I, D-III
 (c). A-II, B-IV, C-III, D-I (d). A-III, B-IV, C-I, D-II

GK – Match the Following

24. If $\cot^2 45^\circ - \sin^2 45^\circ = K \sin^2 30^\circ \times \tan^2 45^\circ \times \sec^2 45^\circ$, then the value of K is
 (a) 0 (b) 1 (c) 2 (d) 3

MATH – Trigonometry

25. An athlete takes as much time in running 200 m as a car takes in covering 500m. The distance covered by the athlete during the time the car covers 2km is
 (a) 500 m (b) 600 m (c) 750 m (d) 800 m

MATH – Time & Distance

26. Given below are two statements:

Statement I. If the roots of the quadratic equation $x^2 - 4x - \log_3 a = 0$ are real, then the least value of a is $1/81$.

Statement II: The harmonic mean of the roots of the equations $(5 + \sqrt{2})x^2 - (4 + \sqrt{5})x + (8 + 2\sqrt{5}) = 0$ is 2

In the light of the above statements, choose the correct answer from the options given below:

- (a) Both Statement 1 and Statement II are true
 (b) Both Statement I and Statement II are false
 (c) Statement I is true but Statement II is false
 (d) Statement 1 is false but Statement II is true

MATH – Quadratic Equation

27. Let E be the ellipse $\frac{x^2}{9} + \frac{y^2}{4} = 1$ and C be the circle $x^2 + y^2 = 9$. Let P and Q be the points (1, 2) and (2, 1) respectively. Then
- Q lies inside C but outside E
 - Q lies outside both C and E
 - P lies inside both C and E
 - P lies inside C but outside E

MATH – Conic Section (Ellipse/Circle)

28. The amount of time required to read a block of data from a disk into memory is composed of seek time, rotational latency and transfer time. Rotational latency refers to
- the time its taken for the platter to make a full rotation
 - the time its taken for the read-write head to move into position over the appropriate track
 - the time it taken for the platter to rotate the correct sector under the head
 - to reduce number of bits in the field of instruction.

COMPUTER – Disk Scheduling

29. If x, y, are all distinct and $\begin{vmatrix} x & x^2 & 1+x^3 \\ y & y^2 & 1+y^3 \\ z & z^2 & 1+z^3 \end{vmatrix} = 0$ then the value of xyz is
- 2
 - 1
 - 2
 - 0

MATH – Determinant

30. A 32 bit wide main memory with a capacity of 1 GB is built using 256 m \times 4 bits DRAM chips. The number of rows memory cells in the DRAM chip is 2¹⁴. The time taken to perform one refresh operation is 50 nanoseconds. The refresh period is 2 milli seconds The percentage (rounded to the closest integer) of the time available for performing the memory read/write operations in the main memory unit is_____.
- 56.
 - 59
 - 54
 - 4.61

COMPUTER – Memory Organization

31. Given below are two statements:
- Statement I:** The number of different numbers each of 6 digits that can be formed by using all the digits 1, 2, 1, 0, 2, 2 is 50.
- Statement II:** These are 4536 possibilities of writing the four-digit numbers which have all distinct digits.
- In the light of the above statements, choose the correct answer from the options given below
- Both Statement I and Statement II are true
 - Both Statement 1 and Statement II are false
 - Statement I is true but Statement II is false
 - Statement I is false but Statement II is true

MATH – Permutation & Combination

32. Which of the following functions is differentiable at x = 0?
- cos (|x|) + |x|
 - cos (|x|) - |x|
 - sin (|x|) + |x|
 - sin (|x|) - |x|

MATH – Differentiability

33. If \oplus and \odot denote the exclusive OR and exclusive NOR operations, respectively, then which one of the following is not correct?
- $\overline{P \oplus Q} = P \odot Q$
 - $\overline{P \odot Q} = P \oplus Q$
 - $\overline{P \oplus Q} = \overline{P \odot Q}$
 - $(P \oplus \overline{P}) + Q = (P \odot \overline{P}) \odot \overline{Q}$

COMPUTER – Boolean Algebra

34. Given below are two statements:

Statement I : $\int_{-a}^a f(x) dx = \int_0^a [f(x) + f(-x)] dx$

Statement II : $\int_0^1 \sqrt{(1+x)(1+x^3)} dx$ is less than or equal to $\frac{15}{8}$.

In the light of the above statements, choose the most appropriate answer from the options given below:

- Both Statement I and Statement II are correct
- Both Statement I and Statement II are incorrect
- Statement I is correct but Statement II is incorrect
- Statement I is incorrect but Statement II is correct

MATH – Definite Integration

35. Given below are two statements:

Statement I : The angle between the vectors $2\hat{i} + 3\hat{j} + \hat{k}$ and $2\hat{i} - \hat{j} - \hat{k}$ is $\pi/2$

Statement II : The vector $\vec{a} \times (\vec{b} \times \vec{c})$ is coplanar with \vec{a} and \vec{b}

In the light of the above statement, choose the correct the answer from the options given below:

- Both Statement I and Statement II are true
- Both Statement I and Statement II are False
- Statement I is true but Statement II is False
- Statement I is false but Statement II is true

MATH – Vector Algebra

36. For $0 < \theta < \frac{\pi}{2}$, the solution (s) of

$$\sum_{m=1}^6 \operatorname{cosec} \left(\theta + (m-1) \frac{\pi}{4} \right) \operatorname{cosec} \left(\theta + \frac{m\pi}{4} \right) = 4\sqrt{2} \text{ is / are}$$

- $\frac{\pi}{4}$
- $\frac{\pi}{6}$
- $\frac{\pi}{12}$
- $\frac{5\pi}{12}$

Choose the correct answer from the option given below:

- A and B only
- C and D only
- A and C only
- B and D only

MATH – Trigonometric Series

37. A triangle with vertices (4, 0), (-1,-1), (3, 5) is

- Isosceles and right angled
- Isosceles but not right angled
- Right angled but not isosceles
- Neither right angled nor isosceles

MATH – Coordinate Geometry (Triangle)

38. If $\vec{a} = 2\hat{i} + 2\hat{j} + 3\hat{k}$, $\vec{b} = -\hat{i} + 2\hat{j} + \hat{k}$ and $\vec{c} = 3\hat{i} + \hat{j}$ are such that $\vec{a} + \gamma\vec{b}$ is perpendicular to \vec{c} then determine the value of γ ?

- 3
- 0
- 4
- 8

MATH – Vectors

39. Match List I with List II

LIST I		LIST II	
(A)	The angle between the straight lines, $2x^2 + 3y^2 - 7xy = 0$ is	(i)	$\tan^{-1} \frac{3}{5}$
(B)	The circles $x^2 + y^2 + x + y = 0$ and $x^2 + y^2 + x - y = 0$ intersect at angle	(ii)	25π
(C)	The area of circle centred at (1, 2) and passing through (4, 6) is	(iii)	$\pi/4$
(D)	The parabolas $y^2 = 4x$ and $x^2 = 32y$ intersect at point (16, 8) at angle	(iv)	$\pi/2$

Choose the correct answer from the options given below:

- A-IV, B-III, C-I, D-II
- A-IV, B-III, C-II, D-I
- A-III, B-IV, C-II, D-I
- A-III, B-IV, C-I, D-II

MATH – Coordinate Geometry

40. If each observation of a Row data whose variance is σ^2 is multiplied by h, then the variance of the new set is
 (a) σ^2 (b) $h^2\sigma^2$ (c) $h\sigma^2$ (d) $h + \sigma^2$

MATH – Statistics (Variance)

41. Match List I with List II

LIST I		LIST II	
A	Addition Theorem on probability	I.	$P\left(\frac{E_i}{A}\right) = \frac{P(E_i)P\left(\frac{A}{E_i}\right)}{\sum_{i=1}^n P(E_i)P\left(\frac{A}{E_i}\right)}, i = 1, 2$
B	Binomial distribution	II.	$P(A \cap B) = P(A)P(B/A), \text{ if } P(A) \neq 0$
C	Baye's rule	III	$P(A \cup B) = P(A) + P(A)P(B) - P(A \cap B)$
D	Multiplication theorem on prob	IV	$P(x = r) = {}^n C_r P^r q^{n-r}, r = 0, 1, \dots, n$

Choose the correct answer from the options given below:

- (a) A-III, B-IV, C-I, D-II (b) A-III, B-IV, C-II, D-I
 (c) A-III, B-II, C-IV, D-I (d) A-III, B-I, C-IV, D-II

MATH – Probability

42. If each of n numbers $x_i = i$ is replaced by $(i + 1)x_i$ then the new mean is

- (a) $(n + 1)(n + 2)/n$ (b) $n + 1$
 (c) $(n + 1)(n + 2)/3$ (d) $(n + 1)(5n + 4)/6$

MATH – Statistics (Mean)

43. Match List I with List II

LIST I	LIST II
(A) Value of $\lim_{x \rightarrow 0} \left(\frac{\sin x}{x} \right)^{\frac{\sin x}{x - \sin x}}$	(I) e^3
(B) Value of $\lim_{x \rightarrow 0} \int_0^x \frac{\sin t^2 dt}{x^2}$ is	(II) 0
(C) Value of $\lim_{x \rightarrow 0} (e^{2x} + x)^{\frac{1}{x}}$ is	(III) 1
(D) Value of $\lim_{x \rightarrow a} \frac{\log(x-a)}{\log(e^x - e^a)}$ of	(IV) e^{-1}

Choose the correct answer from the options given below:

- (a) A-II, B-III, C-I, D-IV (b) A-II, B-IV, C-III, D-I
 (c) A-IV, B-II, C-III, D-I (d) A-IV, B-II, C-I, D-III

MATH – Limits

44. If the unit vectors \vec{a} and \vec{b} are inclined at an angle 2θ such that $|\vec{a} - \vec{b}| < 1$ and $0 \leq \theta \leq \pi$, then θ lies in the interval.

- (a) $[0, \pi/2]$ (b) $[5\pi/6, \pi]$
 (c) $[\pi/6, \pi/2]$ (d) $[\frac{\pi}{2}, 5\pi/6]$

MATH – Vector Algebra

45. If x, w, y, z are Boolean variables, then which of the following is incorrect?

- (a) $wx + w(x + y) + x(x + y) = x + wy$
 (b) $w\bar{x}(y + \bar{z}) + \bar{w}x = \bar{w} + x + \bar{y}z$
 (c) $(w\bar{x}(y + x\bar{z}) + \bar{w}x)y = x\bar{y}$
 (d) $(w + y)(wxy + wyz) = wxy + wyz$

COMPUTER – Boolean Algebra

46. If a Chord which is normal to the parabola $y^2 = 4ax$ at one end subtends a right angle at the vertex, then its slope is -

- (a) 1 (b) $\sqrt{3}$ (c) $\sqrt{2}$ (d) 4.2

MATH – Parabola (Normal)

47. Which of the following is true:

- A. Two vectors are said to be identical if their difference is zero.
 B. Velocity is not a vector quantity.

- C. Projection of one vector on another is not an application of dot product.

- D. The maximum space rate of change of the function which is increasing direction of line function is known as gradient of scalar function.

Choose the most appropriate answer from the options given below:

- (a) B and C only (b) A and C only
 (c) A and D only (d) B and D only

SCIENCE – Vector Concepts

48. The moment of the couple formed by the forces $5\hat{i} + \hat{k}$ and $-\hat{5}\hat{i} - \hat{k}$ acting at the points (9, -1, 2) and (3, -2, 1) respectively, is

- (a) $11\hat{i} - \hat{j} + 5\hat{k}$ (b) $-\hat{i} + 11\hat{j} - 5\hat{k}$
 (c) $-\hat{i} + 11\hat{j} + 5\hat{k}$ (d) $\hat{i} - \hat{j} - 5\hat{k}$

MATH – Vector Moment

49. Match List I with List II

	List I		List II
(A)	No. of triangles formed using 5 points in a line and 3 points on parallel line is	(I)	20
(B)	No. of diagonals drawn using the vertices of an octagon	(II)	10
(C)	The no. of diagonals in a regular polygon of 100 sides is	(III)	45
(D)	A polygon with 35 diagonals has sides	(IV)	4850

Choose the correct answer from the options given below:

- (a) A-I, B-II, C-III, D-IV (b) A-II, B-III, C-I, D-IV
 (c) A-III, B-IV, C-I, D-II (d) A-III, B-I, C-IV, D-II

MATH – Permutation & Combination

50. Match List I with List II

	LIST I		LIST II
A	$ \vec{A} + \vec{B} = \vec{A} - \vec{B} $	I.	45°
B	$ \vec{A} \times \vec{B} = \vec{A} \cdot \vec{B}$	II.	30°
C	$\vec{A} \cdot \vec{B} = \frac{AB}{2}$	III	90°
D	$ \vec{A} \times \vec{B} = \frac{AB}{2}$	IV	60°

Choose the correct answer from the options given below:

- (a) A-III, B-I, C-IV, D-II (b) A-III, B-II, C-IV, D-IV
 (c) A-III, B-I, C-II, D-IV (d) A-II, B-I, C-III, D-IV

MATH – Vector Algebra

51. Given below are two statements: One is labelled as Assertion A and the other is labelled as Reason R.

Assertion A: $\int_{-3}^3 (x^3 + 5) dx = 30$

Reason R: $f(x) = x^3 + 5$ is an odd function

In the light of the above statements, choose the correct answer from the options given below:

- (a) Both A and R are true and R is the correct explanation of A
 (b) Both A and R are true but R is not the correct explanation of A
 (c) A is true but R is false
 (d) A is false but R is true

MATH – Definite Integration

52. A 2's-complement adder- subtractor can add or subtract binary numbers. Sign-magnitude numbers represent _____ decimal numbers, and 2's complements stand for _____ decimal numbers.

- (a) hexa, sign (b) sign, hexa
(c) positive, negative (d) negative, positive

COMPUTER – Number Representation

53. The mean deviation from the mean of the AP $a, a+d, a+2d, \dots, a+2nd$ is

- (a) $n(n+1)d$ (b) $\frac{n(n+1)d}{2n+1}$
(c) $\frac{n(n+1)d}{2n}$ (d) $\frac{n(n-1)d}{2n+1}$

MATH – Arithmetic Progression

54. If \hat{n}_1, \hat{n}_2 are two-unit vectors and θ is the angle between them, then $\cos \frac{\theta}{2}$ is equal to

- (a) $\frac{1}{2} |\hat{n}_1 + \hat{n}_2|$ (b) $\frac{1}{2} |\hat{n}_1 - \hat{n}_2|$
(c) $\frac{1}{2} |\hat{n}_1 \cdot \hat{n}_2|$ (d) $\frac{1}{2} \frac{|\hat{n}_1 \times \hat{n}_2|}{|\hat{n}_1||\hat{n}_2|}$

MATH – Vector Algebra

55. The top of a hill observed from the top and bottom of a building of height h is at angles of elevation p and q respectively. The height of the hill is-

- (a) $\frac{h \cot q}{\cot q - \cot p}$ (b) $\frac{h \cot p}{\cot p - \cot q}$
(c) $\frac{h \tan p}{\tan p - \tan q}$ (d) $\frac{h \sec p}{\tan p - \tan q}$

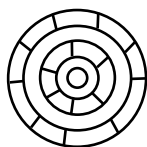
MATH – Heights & Distances

56. A straight line has equation $y = -x + 6$ which of the following line is parallel to it?

- (a) $2y + 3x = -5$ (b) $-3x - 3y + 7 = 0$
(c) $2y = -x + 12$ (d) $y - x = \frac{1}{10}$

MATH – Straight Line

57. Consider the adjoining diagram: What is the minimum number of different colours required to paint the figure such that no two adjacent regions have some colour?



- (a) 3 (b) 4 (c) 5 (d) 6

REASONING – Figure Coloring

58. Consider the expression $(a-1)^x \left(\left(\frac{b+c}{3} \right) + d \right)$. Let x be the minimum number of registers required by an optimal code generation (without any register spill) algorithm for a load/store architecture, in which

- (1) Only load and store instructions can have memory operands and
(2) Arithmetic instructions can have only register or immediate operands. The value of x is
(a) 2 (b) 4 (c) 1 (d) 3

COMPUTER – Compiler / Code Generation

59. If A_1, A_2 be two AM's and G_1, G_2 be two GM's between a and b , then $\frac{A_1+A_2}{G_1G_2}$ is equal to

- (a) $\frac{a+b}{2ab}$ (b) $\frac{2ab}{a+b}$
(c) $\frac{a+b}{ab}$ (d) $\frac{a+b}{\sqrt{ab}}$

MATH – A.M.–G.M.

60. Match List I with List II

LIST I		LIST II	
A	8:81:: 64: ?	I.	290
B	182: ? :: 210: 380	II.	132
C	42: 56:110: ?	III	342
D	48: 122::168: ?	IV	625

Choose the correct answer from the options given below:

- (a). A-II, B-I, C-IV, D-III (b). A-III, B-II, C-I, D-IV
(c). A-II, B-III, C-IV, D-I (d). A-IV, B-III, C-II, D-I

REASONING – Number Analogy

61. If A, B and C are any three sets, then

- (a) $A - (B \cap C) = (A \cap B) - (A \cap C)$
(b) $A - (B \cup C) = (A - B) \cap (A - C)$
(c) $n(A - B) = n(A) - n(A \cap B)$
(d) $A \cap (B - C) = (A \cap B) \cap (A - C)$

Choose the most appropriate answer from the options given below:

- (a) A, B, C only (b) B, C, D only
(c) C, D only (d) B, C only

MATH – Set Theory

62. The point(s) at which function f is given by $f(x) = \begin{cases} \frac{x}{|x|} & x < 0 \\ -1 & x \geq 0 \end{cases}$ is continuous is/are

- (a) $x \in R$ (b) $x = 0$
(c) $x \in R \setminus \{0\}$ (d) -1 and 1

MATH – Continuity

63. Given below are two statements: One is labelled as Assertion A and the other is labelled as Reason R.

Assertion A: An elevator starts with m passengers and stops at n floors ($m \leq n$). The probability that no passengers alight at the same floor is $\frac{{}^n P_m}{m^n}$.

Reason R : If $(n+1)$ is an integer, say m , then $P(x = r) = {}^n C_r \cdot p^r (1-p)^{n-r}$ is maximum when $r = m$ or $r = m-1$

In the light of above statements, choose the most appropriate answer from the options given below:

- (1). Both A and R are correct and R is the correct explanation of A
(2). Both A and R are correct but R is not the correct explanation of A
(3). A is correct but R is not correct
(4). A is not correct but R is correct

MATH – Probability

64. Each of the angle between vectors \vec{a}, \vec{b} and \vec{c} is equal to 60° If $|\vec{a}| = 4, |\vec{b}| = 2$ and $|\vec{c}| = 6$ then the modulus of $\vec{a} + \vec{b} + \vec{c}$ is

- (a) 10 (b) 15
(c) 12 (d) 20

MATH – Vector Algebra

65. Given below are two statements: One is labelled as Assertion A and the other is labelled as Reason R.

Assertion A: If two circles intersect at two points, then the line joining their centres is perpendicular to the common chord

Reason R: The perpendicular bisectors of two chords of a circle intersect at its centre.

In the light of the above statements, choose the correct answer from the options given below:

- (a) Both A and R are true and R is the correct explanation of A
- (b) Both A and R are true but R is not the correct explanation of A
- (c) A is true but R is false
- (d) A is false but R is true

MATH – Circle Geometry

66. Given the following binary number in 32-bit (single precision) IEEE-754 format:

00111110011011010000000000000000

The decimal value closest to this floating-point number is

- (a) 1.45×10^1
- (b) 1.45×10^{-1}
- (c) 2.27×10^{-1}
- (d) 2.27×10^1

COMPUTER – IEEE-754

67. Given below are two statements: One is labelled as Assertion A and the other is labelled as Reason R.

Assertion A: If $a \neq b$, then $(a, b) \neq (b, a)$

Reason R: (4, -3) lies in quadrant IV.

In the light of the above statements, choose the correct answer from the options given below

- (a) Both A and R are true and R is the correct explanation of A
- (b) Both A and R are true but R is not the correct explanation of A
- (c) A is true but R is false
- (d) A is false but R is true.

MATH – Coordinate Geometry

68. Given below are two statements : One is labelled as Assertion A and the other is labelled as Reason R.

Assertion A : The number of parallelograms in a chess board is 1296.

Reason R : The number of parallelograms when a set of m parallel lines is intersected by another set of n parallel lines is ${}^m C_2 \cdot {}^n C_2$

In the light of the above statements, choose the correct answer from the options given below:

- (a) Both A and R are true and R is the correct explanation of A
- (b) Both A and R are true but R is not the correct explanation of A
- (c) A is true but R is false
- (d) A is false but R is true

MATH – Combinatorics

69. Find the missing term in the given series:

4, 10, ?, 82, 244, 730

- (a) 24
- (b) 28
- (c) 77
- (d) 218

REASONING – Number Series

70.

- A. If $(12P)_3 - (123)_p$, then value of P is infeasible.
- B. The simplified sum of product form of the Boolean expression is $(P + \bar{Q} + \bar{R}) \cdot (P + \bar{Q} + R) \cdot (P + Q + \bar{R})$ is $(P + \bar{Q} \cdot \bar{R})$.
- C. The minimum number of D flip-flops needed to design a mod (258) counter is 8.

Choose the correct answer from the options given below:

- (a) A only
- (b) A and B only
- (c) A and C only
- (d) C only

COMPUTER – Digital Electronics

71. These are eight members in the family. Bravo and Priya are siblings. Angel is Kajal's grand daughter, Kajal who is Priya's mother-in-law. Ziva is a married woman and is older than Tim. Tim is the son of Sam who is the brother-in-law of Bravo. Smith is the eldest male in the family. Angel is not Ziva's daughter. So how is Bravo related to Ziva?

- (a) Son
- (b) Husband
- (c) Brother-in-law
- (d) Son-in-law

REASONING – Blood Relation

72. The two adjacent sides of a cyclic QUADRILATERAL are 2 and 5 and the angle between them is 60°. If the third side is 3, the remaining fourth side is

- (a) 2
- (b) 3
- (c) 4
- (d) 5

MATH – Cyclic Quadrilateral

73. Which of the following is true:

- A. If $a \cos A = b \cos B$, then the triangle is isosceles or right angled.
- B. If in a triangle ABC $\cos A \cos B + \sin A \sin B \sin C = 1$ then the triangle is isosceles right angled.
- C. If the ex-radii r_1, r_2, r_3 of ΔABC are in the HP, then its sides are not in AP

Choose the correct answer from the options given below:

- (a) A and B only
- (b) B and C only
- (c) B and C only
- (d) B only

MATH – Trigonometry

74. The number of 1's in the binary representation of $(3 \cdot 4096 + 15 \cdot 256 + 5 \cdot 16 + 3)$ are

- (a) 8
- (b) 29
- (c) 10
- (d) 12

COMPUTER – Binary Numbers

75. The value of $e^{\log_{10} \tan 1^\circ + \log_{10} \tan 2^\circ + \log_{10} \tan 3^\circ + \dots + \log_{10} \tan 89^\circ}$ is

- (a) 0
- (b) e
- (c) 1/e
- (d) 1

MATH – Logarithm

76. Given below are two statements: One is labelled as Assertion A and the other is labelled as Reason R

Assertion A: If dot product and cross product of \vec{A} and \vec{B} are zero, it implies that one of the vector \vec{A} and \vec{B} must be null vector

Reason R: Null vector is a vector with a zero magnitude. In the light of the above statements, choose the correct answer from the options given below:

- (a) Both A and R are true and R is the correct explanation of A
- (b) Both A and R are true but R is not the correct explanation of A
- (c) A is true but R is false
- (d) A is false but R is true

MATH – Vector Algebra

77. Observe the following premises and select the correct

conclusion:

Major premise: All engineers are innovative

Minor premise: All students are engineers.

Conclusions:

- (a) All innovative are students
- (b) All students are innovative
- (c) No innovative are students
- (d) No engineers are students

REASONING – Syllogism

78. The H.P. of two numbers is 4 and the arithmetic mean A and geometric mean G satisfy the relation $2A+G^2=27$. the numbers are

- (a) 6,3
- (b) 5,4
- (c) 5,-25
- (d) -3,1

MATH – A.M.–G.M.–H.M.

79. A RAM chip has a capacity of 1024 words of 8 bits each ($1k \times 8$) The number of 2×4 decoders with enable line needed to construct a $16k \times 16$ RAM from $1k \times 8$ RAM is

- (a) 5
- (b) 4
- (c) 7
- (d) 6

COMPUTER – Memory & Decoder

80. If the curve $ay + x^2 = 7$ and $x^3 = y$, cut orthogonally at (1, 1), then the value of a is -

- (a) 1
- (b) 6
- (c) -6
- (d) 0

MATH – Differentiation

81. Given below are two statements : One is labelled as Assertion A and the other is labelled as Reason R.

Assertion A : $f(x) = \tan^2 x$ is continuous at $x = \pi/2$

Reason R : $g(x) = x^2$ is continuous at $x = \pi/2$

In the light of the above statements, choose the correct answer from the options given below:

- (a) Both A and R are true and R is the correct explanation of A
- (b) Both A and R are true but R is not the correct explanation of A
- (c) A is true but R is false
- (d) A is false but R is true

MATH – Continuity

82. A. If A and B are two invertible matrix of order is invertible
 B. Every skew- symmetric matrix of odd order is invertible
 C. If A is non- singular matrix, then $(A^T)^{-1} = (A^{-1})^T$
 D. If A is an involutory matrix, then $(I+A)(I-A)=0$
 E. A diagonal matrix is both an upper triangular and a lower triangular

Choose the correct answer from the options given below:

- (a). A,B,C,E only
- (b). B,D,E only
- (c). A,D,E only
- (d). C,D,E only

MATH – Matrices

83. The number of possible Boolean function that can be defined for n Boolean variables over n- valued Boolean algebra is _____.

- (a). n^{2^n}
- (b). 2^{n^2}
- (c). 2^{2^n}
- (d). n^{n^n}

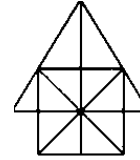
COMPUTER – Boolean Function

84. The tangent to the hyperbola $x^2 - y^2 = 3$ are parallel to the straight line $2x + y + 8 = 0$ at the following points:

- (a) (2, 2), (1, 2)
- (b) (2, -2), (-2, 1)
- (c) (-2, -1), (1, 2)
- (d) (-2, -1), (-1, -2)

MATH – Hyperbola

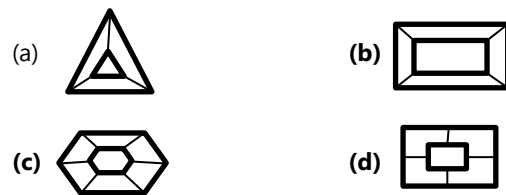
85. Count the number of triangles and square in the given figure.



- (a). 26 triangles, 5 square
- (b). 28 triangles, 5 square
- (c). 28 triangles, 6 square
- (d). 26 triangles, 6 square

REASONING – Figure Counting

86. Choose the figure that which is different from the rest?



REASONING – Odd Figure

87. Let $a = \cos \frac{2\pi}{7} + i \sin \frac{2\pi}{7}$, $\alpha = a + a^2 + a^4$ and $\beta = a^3 + a^5 + a^6$ then the equation whose root are α, β is

- (a) $x^2 + x + 2 = 0$
- (b) $x^2 + x - 2 = 0$
- (c) $x^2 - x - 2 = 0$
- (d) $x^2 - x + 2 = 0$

MATH – Complex Numbers

88. Given below are two statements: One is labelled as Assertion A and the other is labelled as Reason R.

Assertion A: If the A.M. and G.M. between two numbers are in the ratio m : n, then the numbers are in the ratio $m + \sqrt{m^2 - n^2} : m - \sqrt{m^2 - n^2}$

Reason R: If each term of a G.P. be raised to the same power, the resulting sequence also forms a G.P.

In the light of the above statements, choose the correct answer from the options given below:

- (a) Both A and R are true and R is the correct explanation of A
- (b) Both A and R are true but R is not the correct explanation of A
- (c) A is true but R is false
- (d) A is false but R is true

MATH – Sequence & Series

89. The unit vectors orthogonal to the vector $-\hat{i} + 2\hat{j} + 2\hat{k}$ and making equal angles with x and y axis is (are)

- (a) $\pm \frac{1}{3}(2\hat{i} + 2\hat{j} - 2\hat{k})$
- (b) $\pm \frac{1}{3}(\hat{i} + \hat{j} - \hat{k})$
- (c) $\pm \frac{1}{3}(2\hat{i} - 2\hat{j} - 2\hat{k})$
- (d) $\pm \frac{1}{3}(\hat{i} + 2\hat{j} - 2\hat{k})$

MATH – Vectors

90. A circle S passes through the point (0, 1) and is orthogonal to the circles $(x - 1)^2 + y^2 = 16$ and $x^2 + y^2 = 1$. Then

- (A) Radius of S is 8
- (B) Radius of S is 7
- (C) Centre of S is (-7, 1)
- (D) Centre of S is (-8, 1)
- (a) A only
- (b) A and B only
- (c) B and C only
- (d) D only

MATH – Circle

91. If f and g are differentiable function in $(0,1)$ satisfying $f(0) = 2 = g(1)$, $g(0) = 0$ and $f(1) = 6$, then for some $c \in [0, 1]$
- (a). $2f'(c) = g'(c)$ (b). $2f'(c) = 3g'(c)$
(c). $f'(c) = g'(c)$ (d). $f'(c) = 2g'(c)$

MATH – Mean Value Theorem

92. Find out trend and choose the missing character from given alternative.

- (a) 20
(b) 26
(c) 27
(d) 32

2	5	10
17	?	37
50	65	82

REASONING – Alphabet/Number Pattern

93. A person goes in for an examination in which there are four papers with a maximum of m marks from each paper. The number of ways in which one can get $2m$ marks is
- (a) $\frac{1}{3}(m+1)(2m^2+4m+1)$ (b) $\frac{1}{3}(m+1)(2m^2+4m+2)$
(c) $\frac{1}{3}(m+1)(2m^2+4m+3)$ (d) $2^{m+3}C_3$

MATH – Combinatorics

94. If $\sin \beta$ is the GM between $\sin \alpha$ and $\cos \alpha$, then $\cos 2\beta$ is equal to
- (a) $2 \sin^2\left(\frac{\pi}{4} - \alpha\right)$ (b) $2 \cot^2\left(\frac{\pi}{4} - \alpha\right)$
(c) $2 \cos^2\left(\frac{\pi}{4} - \alpha\right)$ (d) $2 \sin^2\left(\frac{\pi}{4} + \alpha\right)$

MATH – Trigonometry

95. Match List I and List II

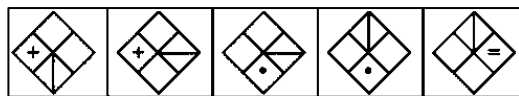
LIST I		LIST II	
A.	Dog : Rabies :: Mosquito :	I.	Bacteria
B.	Amnesia : Memory :: Paralysis :	II.	Liver
C.	Meningitis : Brain :: Cirrhosis :	III.	Movement
D.	Influenza : Virus :: Typhoid :	IV.	Malaria

Choose the correct answer from the options given below:

- (a) A-II, B-III, C-I, D-IV (b) A-III, B-IV, C-II, D-I
(c) A-IV, B-III, C-II, D-I (d) A-IV, B-III, C-I, D-II

REASONING – (As per paper key)

- 96.



Which of the following will be the next figure in the sequence.

- (a) (b)
(c) (d)

REASONING – Figure Series

97. If every pair from among the equation $x^2 + px + qr = 0$, $x^2 + qx + rp = 0$ and $x^2 + px + pq = 0$ has a common root, then the product of three common roots is
- (a) pqr (b) $2pqr$
(c) $p^2q^2r^2$ (d) p^2qr^2

MATH – Quadratic Equation

98. If A , B and C are acute positive angles such that $A + B + C = \pi$ and $\cot A \cot B \cot C = K$, then
- (a) $K \leq \frac{1}{3\sqrt{3}}$ (b) $K \geq \frac{1}{3\sqrt{3}}$
(c) $K < \frac{1}{9}$ (d) $K > \frac{1}{3}$

MATH – Trigonometric Inequality

99. If $f : R \rightarrow R$ defined as of $f(x) = x^2 + 1$ then minimum value of $f(x)$ is
- (a) 4 (b) 3
(c) 2 (d) 1

MATH – Function (Minimum Value)

100. Which of the following is a correct definition of volatile memory?
- (a) It does not retain its contents at high temperature
(b) It is to be kept in air tight box
(c) It loses its contents on failure of power supply
(d) It does not lose its contents on failure of power supply

MATH – Memory (Volatile)

Answer Key

1.	d	2.	a	3.	a	4.	d	5.	d
6.	c	7.	c	8.	b	9.	c	10.	a
11.	d	12.	b	13.	d	14.	b	15.	c
16.	a	17.	a	18.	b	19.	d	20.	c
21.	b	22.	b	23.	b	24.	a	25.	d
26.	c	27.	a	28.	c	29.	b	30.	b
31.	a	32.	d	33.	d	34.	a	35.	c
36.	c	37.	a	38.	c	39.	c	40.	b
41.	a	42.	c	43.	d	44.	a	45.	c
46.	b	47.	a	48.	d	49.	d	50.	a
51.	c	52.	c	53.	b	54.	c	55.	c
56.	b	57.	d	58.	d	59.	a	60.	b
61.	d	62.	b	63.	d	64.	a	65.	d
66.	c	67.	d	68.	b	69.	b	70.	b
71.	d	72.	b	73.	b	74.	c	75.	d
76.	b	77.	b	78.	c	79.	d	80.	c
81.	b	82.	a	83.	c	84.	d	85.	a
86.	c	87.	d	88.	c	89.	b	90.	c
91.	a	92.	b	93.	a	94.	a	95.	c
96.	d	97.	a	98.	d	99.	d	100.	c