



*Sample Paper
&
Question Paper Pattern*

2022
2023

GOA BOARD

GOA BOARD OF SECONDARY AND HIGHER SECONDARY EDUCATION

MATHEMATICS SYLLABUS (2022– 2023)

CLASS XII - ARTS & SCIENCE

UNIT I: RELATIONS AND FUNCTIONS

Relations and Functions:

Types of relations: Reflexive, symmetric, transitive and equivalence relations. One to one and onto functions, composite functions, inverse of a function. Binary operations.

Inverse Trigonometric Functions :

Definition, range, domain, principal value branches. Graphs of inverse trigonometric functions. Elementary properties of inverse trigonometric functions.

UNIT II: ALGEBRA

Matrices

Concept, notation, order, equality, types of matrices, zero matrix, transpose of a matrix, symmetric and skew symmetric matrices. Addition, multiplication and scalar multiplication of matrices, simple properties of addition, multiplication and scalar multiplication. Non-commutativity of multiplication of matrices and existence of non-zero matrices whose product is the zero matrix (restrict to square matrices of order 2). Concept of elementary row and column operations. Invertible matrices and proof of the uniqueness of inverse, if it exists; (Here all matrices will have real entries).

Determinants

Determinant of a square matrix (up to 3×3 matrices), properties of determinants, minors, cofactors and applications of determinants in finding the area of a triangle. Adjoint and inverse of a square matrix. Consistency, inconsistency and number of solutions of system of linear equations by examples, solving system of linear equations in two or three variables (having unique solution) using inverse of a matrix.

UNIT III: CALCULUS

Continuity and Differentiability Continuity and differentiability, derivative of composite functions, chain rule, derivatives of inverse trigonometric functions, derivative of implicit function. Concepts of exponential, logarithmic functions.

Derivatives of $\log_e x$ and e^x . Logarithmic differentiation. Derivative of functions expressed in parametric forms. Second order derivatives. Rolle's and Lagrange's Mean Value Theorems (without proof) and their geometric interpretations

Applications of Derivatives: Applications of derivatives: Rate of change, increasing/decreasing functions, tangents and normals, approximation, maxima and minima (first derivative test motivated geometrically and second derivative test given as a provable tool). Simple problems (that illustrate basic principles and understanding of the subject as well as real-life situations).

Integrals: Integration as inverse process of differentiation. Integration of a variety of functions by substitution, by partial fractions and by parts, only simple integrals of the type –

$$\int \frac{dx}{x^2 \pm a^2}, \int \frac{dx}{\sqrt{x^2 \pm a^2}}, \int \frac{dx}{\sqrt{a^2 - x^2}}, \int \frac{dx}{ax^2 + bx + c}, \int \frac{dx}{\sqrt{ax^2 + bx + c}}$$

$$\int \frac{(px+q)}{ax^2 + bx + c} dx, \int \frac{(px+q)}{\sqrt{ax^2 + bx + c}} dx, \int \sqrt{a^2 \pm x^2} dx, \int \sqrt{x^2 - a^2} dx$$

$$\int \sqrt{ax^2 + bx + c} dx, \int (px+q)\sqrt{ax^2 + bx + c} dx \quad \text{to be evaluated.}$$

Definite integrals as a limit of a sum. Fundamental Theorem of Calculus (without proof). Basic properties of definite integrals and evaluation of definite integrals.

Applications of the Integrals : Applications in finding the area under simple curves, especially lines, arcs of circles/parabolas/ellipses (in standard form only), area between the two above said curves (the region should be clearly identifiable).

Differential Equations: Definition, order and degree, general and particular solutions of a differential equation. Formation of differential equation whose general solution is given. Solution of differential equations by method of separation of variables, homogeneous differential equations of first order and first degree. Solutions of linear differential equation of the type –

$$\frac{dy}{dx} + Py = Q \quad \text{where P and Q are functions of x or constant}$$

$$\frac{dx}{dy} + Px = Q \quad \text{where P and Q are functions of y or constant}$$

UNIT IV: VECTORS AND THREE-DIMENSIONAL GEOMETRY

Vectors

Vectors and scalars, magnitude and direction of a vector. Direction cosines/ratios of vectors. Types of vectors (equal, unit, zero, parallel and coplanar vectors), position vector of a point, negative of a vector, components of a vector, addition of vectors, multiplication of a vector by a scalar, position vector of a point dividing a line segment in a given ratio. Scalar (dot) product of vectors, projection of a vector on a line. Vector (cross) product of vectors, scalar triple product.

Three-dimensional Geometry

Direction cosines/ratios of a line joining two points. Cartesian and vector equation of a line, coplanar and skew lines, shortest distance between two lines. Cartesian and vector equation of a plane. Angle between (i) two lines, (ii) two planes, (iii) a line and a plane. Distance of a point from a plane.

UNIT V: LINEAR PROGRAMMING

Introduction, related terminology such as constraints, objective function, optimization, different types of linear programming (L.P.) problems, mathematical formulation of L.P. problems, graphical method of solution for problems in two variables, feasible and infeasible regions, feasible and infeasible solutions, optimal feasible solutions (up to three non-trivial constraints)

UNIT VI: PROBABILITY

Multiplication theorem on probability. Conditional probability, independent events, total probability, Baye's theorem. Random variable and its probability distribution, mean and variance of haphazard variable. Repeated independent (Bernoulli) trials and Binomial distribution.

GOA BOARD OF SECONDARY AND HIGHER SECONDARY EDUCATION

Alto , Betim- Goa

STD : XII ARTS & SCIENCE

2022-2023

SUB: MATHEMATICS

TOPICS FOR FIRST FORMATIVE / INTERNAL TEST & MARKS		
Sr. No	Topics/Units	Marks
1.	Relations and Functions	05
2.	Continuity and Differentiability	10
3.	Inverse Trigonometric Functions	05
	Total	20
TOPICS FOR SECOND FORMATIVE/ INTERNAL TEST & MARKS		
1.	Matrices	06
2.	Determinants	06
3.	Vectors	04
4.	Three-dimensional Geometry (Straight lines)	04
	Total	20
TOPICS FOR THIRD FORMATIVE/ INNOVATIVE TEST & MARKS		

1.	Integrals	10
2.	Linear Programming	04
3.	Probability	06
	Total	20

GOA BOARD OF SECONDARY AND HIGHER SECONDARY EDUCATION

Alto , Betim- Goa

STD : XII ARTS & SCIENCE

2022 - 2023

SUB: MATHEMATICS

TOPICS FOR FIRST TERM BOARD EXAM & MARKS		
Sr. No	Topics/Units	Marks
1.	Relations and Functions	05
2.	Continuity and Differentiability	10
3.	Inverse Trigonometric Functions	04
4.	Matrices	06
5.	Determinants	04
6.	Vectors	04
7.	Three-dimensional Geometry	07
	Total	40
TOPICS FOR SECOND TERM BOARD EXAM AND MARKS		
1.	Integrals	12
2.	Application of Integrals	04
3.	Differential Equations	07
4.	Linear Programming	04
5.	Probability	08
6.	Applications of Derivatives	05

	Total	40
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Goa Board of Secondary and Higher Secondary Education ,Alto –Porvorim – Goa

Model Question Paper of First Term Exam 2022-23

Std : XII Arts & Science

Maximum Marks : 40

Sub : Mathematics

Duration : 90 minutes

Instructions :

- a) All questions are compulsory.
- b) All questions are of multiple choice type and carry one mark each.
- c) For each question select only one correct option from the alternatives given .

1) The matrix $A = \begin{bmatrix} 0 & 1 \\ 1 & 0 \end{bmatrix}$ is a _____ matrix.
 A) unit B) symmetric C) diagonal D) skew-symmetric

2) The value of $\sin \left[\cos^{-1} \left(\frac{7}{25} \right) \right]$ is ____ .

A) $\frac{24}{25}$ B) $\frac{25}{7}$ C) $\frac{25}{24}$ D) $\frac{7}{24}$

3) The function given by $f: \mathbb{N} \rightarrow \mathbb{N}$ given by $f(x) = x^4$ is ____ .

A) injective B) surjective C) bijective D) neither injective nor surjective

4) A square matrix is said to be a diagonal matrix if its _____ are zero.

A) non-diagonal elements B) diagonal elements
 C) first row elements D) first column elements

5) If $(x\hat{i} + 6\hat{j} - \hat{k})$ and $(7\hat{i} - 3\hat{j} + 17\hat{k})$ are perpendicular vectors ,then x is equal to ____.

A) 4 B) 5 C) $\frac{3}{2}$ D) 7

6) The range of $\tan^{-1} x$ is ____.

- A) $(0, \pi)$ B) $[0, \pi]$ C) $[-\frac{\pi}{2}, \frac{\pi}{2}]$ D) $(-\frac{\pi}{2}, \frac{\pi}{2})$

7) The area of the triangle with vertices $(-3, 0)$, $(3, 0)$ and $(0, k)$ is 9 sq.units. The value of k will be ____.

- A) 9 B) -9 C) 3 D) 6

8) . The coordinates of the foot of the perpendicular drawn from the point $(3, 4, -5)$ on the z-axis is given by ____.

- A) $(0, 0, 5)$ B) $(0, 4, 0)$ C) $(0, 0, -5)$ D) $(3, 4, 0)$

9) Let $A = \{1, 2, 3\}$ and R is a relation in A given by $R = \{(1, 1), (2, 2), (3, 3)\}$, Then R is ____.

- A) only Reflexive B) Reflexive & symmetric
C) Reflexive & Transitive D) Equivalence relation

10) If $A = \begin{bmatrix} 4 & x+2 \\ 2x-3 & x-1 \end{bmatrix}$ is a symmetric matrix, then x is ____.

- A) 3 B) 5 C) 2 D) 4

11) The distance of the plane $\vec{r} \cdot \left(\frac{2}{7}\hat{i} + \frac{3}{7}\hat{j} - \frac{6}{7}\hat{k}\right) = 1$ from the origin is ____.

- A) 1 B) 7 C) $\frac{1}{7}$ D) none of these

12) If A and B are square matrices of same order and A^{-1} & B^{-1} exist, then $(AB)^{-1}$ is ____.

- A) AB^{-1} B) $A^{-1}B^{-1}$ C) $B^{-1}A^{-1}$ D) BA^{-1}

13) Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be defined by $f(x) = \frac{1}{x} \quad \forall x \in \mathbb{R}$. Then f is _____.
 A) one-one B) onto C) bijective D) f is not defined

14) The value of $\tan\left[\tan^{-1}\left(\frac{1}{7}\right) + \tan^{-1}\left(\frac{1}{13}\right)\right]$ is equal to _____.

A) $\frac{2}{9}$ B) $\frac{9}{2}$ C) $\frac{7}{9}$ D) $\frac{9}{7}$

15) A function ' f ' is said to have a removable type of discontinuity at $x = a$ if _____.

A) $\lim_{x \rightarrow a} f(x) = f(a)$ B) $\lim_{x \rightarrow a^-} f(x) = \lim_{x \rightarrow a^+} f(x)$
 C) $\lim_{x \rightarrow a^-} f(x) \neq \lim_{x \rightarrow a^+} f(x)$ D) $\lim_{x \rightarrow a^-} f(x) = \lim_{x \rightarrow a^+} f(x) \neq f(a)$

16) If A and B are skew-symmetric matrices of same order then _____.

A) $A+B$ is skew-symmetric matrix B) $A+B$ is symmetric matrix
 C) $A+B$ is diagonal matrix D) $A+B$ is null matrix

17) If $\vec{a}, \vec{b}, \vec{c}$ are unit vectors such that $\vec{a} + \vec{b} + \vec{c} = \vec{0}$ then the value of $\vec{a} \cdot \vec{b} + \vec{b} \cdot \vec{c} + \vec{c} \cdot \vec{a}$ is _____.

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

18) If $3^x + 3^y = 3^{x+y}$, then the derivative w.r.t. x at $x = 1$ and $y = 1$ is _____.

A) 1 B) -1 C) 0 D) 2

19) If A is a non-singular square matrix of order n $|\text{adj}A|$ is equal to _____.

A) $|A|^{n-1}A$ B) $|A|^{n-2}A$ C) A^n D) none of these

20) If $y = \log(\sin x)$, then $\frac{d^2y}{dx^2}$ is ____.

- A) $\cot x$ B) $-\operatorname{cosec} x$ C) $-\operatorname{cosec}^2 x$ D) $-\operatorname{cosec} x \cdot \cot x$

21) Let the equation of two line be $\vec{r} = \vec{a} + \lambda \vec{b}$ and $\vec{r} = \vec{c} + \mu \vec{d}$ where λ & μ are parameters, then the shortest distance between them is given by ____.

- A) $\frac{(\vec{a} - \vec{b}) \cdot (\vec{c} \times \vec{d})}{|\vec{c} \times \vec{d}|}$ B) $\frac{(\vec{c} - \vec{d}) \cdot (\vec{a} \times \vec{b})}{|\vec{a} \times \vec{b}|}$ C) $\frac{(\vec{c} - \vec{a}) \cdot (\vec{b} \times \vec{d})}{|\vec{b} \times \vec{d}|}$ D) $\frac{(\vec{c} - \vec{b}) \cdot (\vec{a} \times \vec{d})}{|\vec{a} \times \vec{d}|}$

22) Let '*' be the binary operation defined on the set Z of all integers as $a * b = a + b + 1$ for all $a, b \in Z$. The identity element w.r.t. this operation is ____.

- A) 0 B) -1 C) 2 D) 1

23) If $f(x)$ is continuous on $[0, 8]$ where

$$f(x) = \begin{cases} ax + b + 2, & 0 \leq x < 2 \\ 4x - 3, & 2 \leq x \leq 4 \\ ax - 5b, & 4 < x \leq 8 \end{cases}, \text{ then the values of } a \text{ \& } b \text{ are respectively ____.$$

- A) $a = 1, b = 2$ B) $a = -1, b = 2$
C) $a = 2, b = -1$ D) $a = 2, b = 1$

24) . If $y = \tan^{-1}\left(\frac{\sin x}{1 + \cos x}\right)$ then $\frac{dy}{dx}$ is ____.

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

25) If P is a point on the line segment joining the points $(3, 2, -1)$ and $(6, 2, -2)$. If the x- coordinate of P is 5, then its y-coordinate is ____.

- A) 2 B) 1 C) -1 D) -2

26) The relation R in the set $\mathbb{R}$ (the set of real numbers) given by

$$R = \{(x, y) : x - y + \sqrt{2} \text{ is irrational}, x, y \in \mathbb{R}\} \text{ is ____}.$$

- A) only Reflexive B) Reflexive & symmetric
C) Reflexive & Transitive D) Equivalence relation

27) The value $\tan^{-1} 1 + \cos^{-1}\left(-\frac{1}{2}\right) + \sin^{-1}\left(-\frac{1}{2}\right)$ is ____.

A) $\frac{2\pi}{3}$

B) $\frac{3\pi}{4}$

C) $\frac{\pi}{2}$

D) 6π

28) If the function $f(x) = \begin{cases} \frac{\log x - \log 2}{\sin(2x-4)}, & x \neq 2 \\ k, & x = 2 \end{cases}$ is continuous at $x = 2$, then the value of $k =$ ____.

A) 2

B) 1

C) $\frac{1}{4}$

D) $\frac{1}{2}$

29) If $y = \frac{x}{2}\sqrt{x^2 + a^2} + \frac{a^2}{2} \log|x + \sqrt{x^2 + a^2}|$ then $\frac{dy}{dx}$ is ____.

A) $\sqrt{x^2 + a^2}$

B) $\sqrt{a^2 - x^2}$

C) $\sqrt{x^2 - a^2}$

D) none of these

30) If A is any square matrix of order n , then which of the following is not true.

A) $(\text{adj} A) = |A|$

B) $(\text{adj} A)^{-1} = \text{adj}(A^{-1})$

C) $(AB)^{-1} = B^{-1}A^{-1}$

D) $A^{-1} = \frac{\text{adj} A}{|A|}$

31) If $A = \begin{bmatrix} 1 & 0 & 2 \\ 0 & 1 & 1 \\ 0 & 0 & 3 \end{bmatrix}$ then the value of $|4A|$ is ____.

A) 12

B) 48

C) 192

D) none of these

32) A vector perpendicular to both of the vectors $(\hat{i} + \hat{j} + \hat{k})$ and $(\hat{i} + \hat{j})$ is ____.

A) $\hat{i} + \hat{j}$

B) $\hat{j} - \hat{k}$

C) $\hat{i} - \hat{k}$

D) $-\hat{i} + \hat{j}$

33) The Cartesian equation of the line is $6x - 2 = 3y + 1 = 2z - 2$. The equation of a line parallel to this line and passing through $(2, -1, -1)$ is ____.

A) $6x - 12 = 3y + 3 = 2z + 2$

B) $6x - 12 = 3y + 3 = 2z - 2$

C) $6x + 12 = 3y - 3 = 2z - 2$

D) none of these

34) . If $A = \begin{bmatrix} 1 & x & -1 \\ 0 & 2 & 2 \\ 1 & 1 & 3 \end{bmatrix}$, then A^{-1} exist if ____.

A) $x = 3$

B) $x = -3$

C) $x \neq 3$

D) $x \neq -3$

35) $\lim_{h \rightarrow 0} \frac{\sin^2(x+h) - \sin^2 x}{h}$ is equal to ____ .

A) $2\sin x$

B) $\sin 2x$

C) $\sin x \cos x$

D) none of these

36) The meaning of $\frac{\vec{a} \cdot \vec{b} + \vec{a} \cdot \vec{c}}{|\vec{a}|}$ is ____ .

A) Projection of $(\vec{b} + \vec{c})$ on $\vec{a}$

B) Projection of $\vec{a}$ on $(\vec{b} + \vec{c})$

C) Vector perpendicular to $\vec{b}$ and $\vec{c}$

D) none of these

37) A line makes the same angle θ with the positive direction each of x and z-axis . If the angle which it makes with the positive direction of y-axis is such that $\sin^2 \beta = 3 \sin^2 \theta$ then $\cos^2 \theta$ equals to ____ .

A) $\frac{1}{5}$

B) $\frac{3}{5}$

C) $\frac{5}{3}$

D) $\frac{2}{5}$

38) If $f(x) = \frac{e^{x^2} - \cos x}{x^2}$, $x \neq 0$, is continuous at $x = 0$, then the value of $f(0) =$ ____ .

A) 2

B) $\frac{1}{2}$

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

D) $\frac{2}{3}$

39) The d.r.s. of the normal to the plane passing through the points $(0, 1, 1)$, $(1, 1, 2)$ and $(-1, 2, -2)$ are ____ .

A) $1 : 1 : 1$

B) $1 : -2 : -1$

C) $1 : 2 : -1$

D) $2 : 1 : -1$

40) If $x^y y^x = 1$, then $\frac{dy}{dx} =$ ____ .

A) $\frac{y(y+x \log y)}{x(y \log x+y)}$

B) $\frac{y(y+x \log y)}{x(y+x \log x)}$

C) $\frac{y(y+x \log y)}{x(y+x \log y)}$

D) None of these

*****THE END*****

Goa Board of Secondary and Higher Secondary Education ,Alto –Porvorim – Goa

Model Question Paper of Second Term Exam 2022-23

Sub: Mathematics

Time: $1\frac{1}{2}$ hr

Std: XII Arts & Science

Max. Marks: 40

INSTRU

CTIONS:

1. The question paper contains four sections **A, B, C** and **D**.
2. The question paper consists of 16 questions.
3. **Section -A** has **4** questions (VSA- type) of **1** mark each.
4. **Section- B** has **4** questions (SA1- type) of **2** marks each.
5. **Section -C** has **4** questions (SA2 -type) of **3** marks each.
6. **Section- D** has **4** questions (LA - type) of **4** marks each.
7. There is internal choice provided in **1** question of **3** marks and **1** question of **4** marks.
8. Use of Calculator is not permitted.
9. Log tables will be supplied on request.
10. Graph should be drawn on the answer paper only.

Section -A

1. Find $\int \frac{1}{x^2-16} dx$
2. Find the slope of normal to the curve $y = \tan x$ at the point (0, 0)
3. If $P(A) = \frac{3}{5}$ and $P(B) = \frac{1}{5}$, find $P(A \cap B)$ if A and B are independent events
4. Find the differential equation representing the family of curves $y = mx$, where m is arbitrary constant.

Section- B

5. Find $\int \frac{1}{1+\tan x} dx$
6. In a hostel, 60% of the students read Hindi newspaper, 40% read English newspaper and 20% read both Hindi and English newspaper. A student is selected at random and was found to be the reader of Hindi newspaper. Find the probability that the selected student reads English newspaper.
7. Using the property of definite integral, evaluate $\int_0^{\frac{\pi}{2}} \frac{\sin x}{\sin x + \cos x} dx$
8. Probability of solving specific problem independently by A and B is $\frac{1}{2}$ and $\frac{1}{3}$ respectively. If both try to solve the problem independently, find the probability that exactly one of them solves the problem.

Section- C

9. Find $\int \frac{x^2}{x^4 - x^2 - 12} dx$
10. Find the particular solution of the differential equation $\frac{dy}{dx} = -4xy^2$, given that $y=1$ when $x=0$.
11. Given three identical boxes I, II and III, each containing 2 coins. In box I, both coins are gold coins. In box II, both are silver coins and in box III, there is one gold and one silver coin. A person chooses a box at random and takes out a coin. If the coin is of gold, what is the probability that the other coin in the box is also of gold?
12. Solve the differential equation $\frac{dy}{dx} - \frac{y}{x} = 2x$

OR

Solve the differential equation $\frac{dy}{dx} = \frac{x^2 + y^2}{2xy}$

Section- D

13. Find the area of the circle $4x^2 + 4y^2 = 9$ which is interior to the parabola $y^2 = 4x$
14. Using integration, prove that

$$\int \frac{1}{\sqrt{x^2 - a^2}} dx = \log |x + \sqrt{x^2 - a^2}| + c$$

15. Solve the following linear programming problem graphically:
Maximise $Z = 30x + 60y$
Subject to constraints, $2x + y \leq 70$, $x + y \leq 40$, $x + 3y \leq 90$, $x \geq 0$, $y \geq 0$
16. Show that the height of a closed cylinder of given volume and minimum surface area is equal to its diameter.

OR

Find the interval in which the function
 $f(x) = (x + 1)^2(x - 3)^2$ is increasing.

BLUE PRINT: Model Paper Second Term-2022-2023

SUB: MATHEMATICS

DURATION: 1 ½ HOUR

STD: XII ARTS & SCIENCE

MARKS: 40

S r. N o	Content area	OBJECTIVES																Tot al
		Knowledge				Understanding				Application				Skill				
	Type →	VSA	SA1	SA2	LA	VSA	SA1	SA2	LA	VSA	SA1	SA2	LA	VSA	SA1	SA 2	LA	
	Marks→	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
1	Integrals				14 (E)	1(E)	5(A V)	9(A V)			7(AV)							12
2	Application of Integrals												13(D)					4
3	Linear Programming																15 (A V)	4
4	Differential Equations					4(A V)		10(AV ,12 (AV)*)										7
5	Probability					3(E)	8(E)	11(AV)			6(AV)							8
6	Application of derivatives					2(A V)							16(D) *)					5
		4				20				12				4				40

KNOWLEDGE- 4 marks (10 %)

UNDERSTANDING- 20 MARKS (50%)

APPLICATION- 12 MARKS (30%)

EASY- 8 MARKS (20%)

AVERAGE- 24 MARKS (60%)

SKILL-

4 MARKS (10%)

DIFFICULT- 8 MARKS (20%)

Expected time for solving:

Form of question	Approx. time for each question in minutes	Number of questions	Total approx. time in minutes
VSA	03	04	12
SA1	04	04	16
SA2	06	04	24
LA	07	04	28

Total time : 80 minutes + 10 minutes for re-checking

DESIGN OF THE MODEL QUESTION PAPER FIRST BOARD EXAM 2022

CLASS : XII ARTS & SCIENCE

MAX.MARKS : 40

SUBJECT : MATHEMATICS

DURATION : 90 minutes

The weightage or the distribution of marks over different dimensions of the question paper shall be as follows.

1. Weightage to Learning Outcomes :

Sr.No.	Learning outcomes	Marks	Percentage of marks
1	Knowledge	10	25%
2	Understanding	22	55%
3	Application	8	20%
	Total	40	100%

- 2.Weightage to Content / Subject units

Sr.No.	Units	Marks
1.	Relations and Functions	05
2.	Inverse Trigonometric Functions	04
3.	Continuity and Differentiability	10
4.	Matrices	06
5.	Determinants	04
6.	Vectors	04
7.	Three-dimensional Geometry	07
	Total	40

3.Weightage to Forms of Questions

Form of questions	Marks for each question	Number of questions	Total Marks
MCQ	1	40	40

4.Weightage to difficulty level of Questions

Sr.No.	Estimated difficulty level of questions	Marks	Percentage
1	Easy	10	25%
2	Average	22	55%
3	Difficult	8	20%
	Total	40	100%

The expected time for difficult level problems would be as follows.

Form of questions	Approx. time for each question in mins	Number of questions	Total approx. time in mins
MCQ	2	40	80

5. 10% theory (4 marks) is to be included.

BLUE PRINT: Model Paper First Term-2022-2023

SUB: MATHEMATICS

DURATION: 1 ½ HOUR

STD: XII ARTS & SCIENCE

MARKS: 40

S.No	Content Area	OBJECTIVES			Total
		Knowledge	Understanding	Application	
1	Relations and functions	13(A)	3(A),9(A),22(A)	26(D)	5
2	Inverse Trigonometric Functions	6(E), 14(A)	2(A),27(A)	-	4
3	Continuity	15(E)	26(A),38(A)	23(A)	4
4	Differentiability	35(A)	20(A),29(A),40(A)	18(A),24(A)	6
5	Matrices	4(E),12(E),30(A)	1(E),10(E),16(E)	-	6
6	Determinants	19(A)	31(A)	7(A),34(D)	4

7	Vectors	-	5(E),17(A),32(A),36(E)	-	4
8	Three Dimensional Geometry	21(E)	8(A),11(A),33(D)39(D)	25(D),37(D)	7
		10	22	8	40

***** END *****

