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| --- | --- | --- | --- | --- | --- | --- |
| **Class 9 (Optional Mathematics)** | | | | | |  |
| **Annual Lesson Plan 2081** | | | | | |  |
| **Area** | **Topics** | **1st term** | **2nd term** | **3rd term** | **4th term** |  |
| **Algebra** | Order Pair | All |  |  |  |  |
| Cartesian Product | All |  |  |  |  |
| Relation | All |  |  |  |  |
| Function |  | All |  |  |  |
| Polynomials |  | All |  |  |  |
| Sequence and Series |  |  | All |  |  |
| **Limit** | Limit |  |  | All |  |  |
| **Matrix** | Types of matrices | All |  |  |  |  |
| Operations of matrices | All |  |  |  |  |
| Transpose of Matrix | All |  |  |  |  |
| Multiplication of matrices by a Scalar |  | All |  |  |  |
| Multiplication of Matrices |  | All |  |  |  |
| **Coordinate Geometry** | Locus | All |  |  |  |  |
| Section Formula | All |  |  |  |  |
| Equation of Straight lines |  |  |  |  |  |
| * Parallel to axes |  | All |  |  |  |
| * Slope intercept form |  | All |  |  |  |
| * Intercept form |  | All |  |  |  |
| * Perpendicular form |  |  | All |  |  |
| * Reduction to standard form |  |  | All |  |  |
| * Point slope form and two points form |  |  |  | All |  |
| Distance between a point and a straight line |  |  |  | All |  |
| Area of triangle and quadrilateral using coordinates |  |  |  | All |  |
| **Trigonometry** | Measurement of Angles | All |  |  |  |  |
| Introduction to trigonometric Ratios | All |  |  |  |  |
| Trigonometric identities | All |  |  |  |  |
| Conversion of Trigonometric Ratios |  | All |  |  |  |
| Trigonometric Ratios of Standard Angles |  | All |  |  |  |
| Trigonometric Ratios of Different Angles |  |  | All |  |  |
| Trigonometric Ratios of Compound Angles |  |  |  | All |  |
| **Vector** | Magnitude and Direction of Vector |  |  | All |  |  |
| Operation of Vectors |  |  | All |  |  |
| Multiplication of Vectors by Scalar |  |  | All |  |  |
| Law of Vector Addition |  |  |  | All |  |
| **Transformation** | Reflection |  | All |  |  |  |
| Rotation |  |  | All |  |  |
| Translation |  |  |  | All |  |
| Enlargement or Reduction |  |  |  | All |  |
| **Statistics** | Partition Values | All |  |  |  |  |
| Q.D. and its coefficient | All |  |  |  |  |
| M.D. and its coefficient |  |  | All |  |  |
| S.D. and its coefficient |  |  |  | All |  |

**First Terminal Examination**

|  |  |  |  |  |  |  |  |  |
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| **S.N.** | **Contents** | **Working Hours** | **Knowledge**  **1marks** | **Understanding**  **2marks** | **Application**  **3marks** | **Higher Ability**  **4marks** | **Total No. of Questions** | **Total Marks** |
| 1. | Algebra | 10 | 1 | 1 | 1 | 1 | 4 | 10 |
| 2. | Matrix | 6 | 1 | 1 | 1 |  | 3 | 6 |
| 3. | Coordinate Geometry | 9 | 2 | 1 | 1 | 1 | 5 | 11 |
| 4. | Trigonometry | 13 | 2 | 2 | 3 |  | 7 | 15 |
| 5. | Statistics | 4 |  | 1 | 2 |  | 3 | 8 |
|  | Total No. of Question |  | 6 | 6 | 8 | 2 | 22 |  |
|  | Weightage | 42 | 6 | 12 | 24 | 8 |  | 50 |

**Second Terminal Examination**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S.N.** | **Contents** | **Working Hours** | **Knowledge**  **1marks** | **Understanding**  **2marks** | **Application**  **3marks** | **Higher Ability**  **4marks** | **Total No. of Questions** | **Total Marks** |
| 1. | Algebra | 10+12 | 1 | 1 | 1 | 1 | 4 | 10 |
| 2. | Matrix | 6+8 | 1 | 1 | 1 |  | 3 | 6 |
| 3. | Coordinate Geometry | 9+10 | 2 | 1 | 1 | 1 | 5 | 11 |
| 4. | Trigonometry | 13+10 | 1 | 2 | 3 |  | 6 | 14 |
| 5. | Transformation | 5 | 1 |  | 1 |  | 2 | 4 |
| 6. | Statistics | 4 |  | 1 | 1 |  | 2 | 5 |
|  | Total No. of Question |  | 6 | 6 | 8 | 2 | 22 |  |
|  | Weightage | 87 | 6 | 12 | 24 | 8 |  | 50 |

**Third Terminal Examination**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **S.N.** | **Contents** | **Working Hours** | **Knowledge**  **1marks** | **Understanding**  **2marks** | **Application**  **3marks** | **Higher Ability**  **4marks** | **Total No. of Questions** | **Total Marks** |
| 1. | Algebra | 22+6 | 2 | 2 | 2 | 1 | 7 | 16 |
| 2. | Limit | 8 | 1 |  | 1 |  | 2 | 4 |
| 3. | Matrix | 14 | 1 | 1 | 1 |  | 3 | 6 |
| 4. | Coordinate Geometry | 19+6 | 2 | 1 | 1 | 1 | 5 | 11 |
| 5. | Trigonometry | 23+5 | 2 | 2 | 3 |  | 7 | 15 |
| 6. | Vectors | 6 | 1 | 1 |  | 1 | 3 | 7 |
| 7. | Transformation | 5+6 | 1 |  | 1 | 1 | 3 | 8 |
| 8. | Statistics | 4+4 |  | 1 | 2 |  |  | 8 |
|  | Total No. of Question |  | 6 | 6 | 8 | 2 | 22 |  |
|  | Weightage | 128 | 6 | 12 | 24 | 8 |  | 75 |

**Annual Examination**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **S.N.** | **Contents** | **Knowledge**  **1marks** | **Understanding**  **2marks** | **Application**  **3marks** | **Higher ability**  **4marks** | **Total No. of Question** | **Total marks** |
|  | Algebra | 2 | 2 | 2 | 1 | 7 | 16 |
|  | Limit | 1 | - | 1 | - | 2 | 4 |
|  | Matrix | 1 | 1 | 1 | - | 3 | 6 |
|  | Coordinate Geometry | 2 | 1 | 1 | 1 | 5 | 11 |
|  | Trigonometry | 2 | 2 | 3 | - | 7 | 15 |
|  | Vectors | 1 | 1 | - | 1 | 3 | 7 |
|  | Transformations | 1 | - | 1 | 1 | 3 | 8 |
|  | Statistics | - | 1 | 2 | - | 3 | 8 |
|  | Total No. of Questions | 10 | 8 | 11 | 4 | 33 | - |
|  | Total Marks | 10 | 16 | 33 | 16 |  | 75 |

**Internal Evaluation Scheme**

|  |  |  |
| --- | --- | --- |
| **S.N.** | **Criteria of internal Evaluation** | **Marks** |
| 1. | Participation (Attendance, Active Participation in Learning Activities) | 3 |
| 2. | Practical and Project Works | 16 |
| 3. | Terminal Examinations | 6 |
|  | Total Marks | 25 |

Note: The method of internal evaluation is same as in Compulsory Mathematics.

Model Question

First Terminal Examination-2081

Class-9 Time:2hrs F.M.:50

Sub: Optional Mathematics P.M.:17.5

Group-A [6x1=6]

1. Define inverse relation.
2. Write down the type of matrix .
3. Write down the coordinates of midpoint of line segment having end points of line segment and .
4. Define locus of moving point.
5. Express in terms of .
6. How many grades equal to one right angles?

Group-B [6x2=12]

1. For what values of p and q, and are equal to each other?
2. Construct a 2x2 matrix whose elements is in the form of .
3. Find the coordinates of a point which divides the line joining the points and in the ratio 4:5 externally.
4. Find the ratio of an angles and .
5. Prove that:
6. 12,17,2x+3,3x+5,36,43 are in ascending order. If its 50th percentile is 29, find the value of x.

Group-C [8x3=24]

1. Let , express the relation on A by
2. Set of ordered pairs ii. Tabulation method iii. Arrow diagram
3. If and , then prove that:.
4. Find the locus of a point which moves so that it is equidistant from the points and
5. Three angles of a triangle are and . Find all angles in degrees.
6. Prove that radian is a constant angle.
7. Prove that:
8. Find the third deciles from the following data:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Wages (Rs) | 35 | 45 | 55 | 65 | 75 |
| No. of workers | 50 | 54 | 85 | 45 | 30 |

1. Find quartile deviation.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Age (in years) | 10 | 12 | 14 | 16 | 18 |
| No. of people | 6 | 10 | 16 | 23 | 5 |

Group-D [2x4=8]

1. If and , then prove that the cartesian products
2. Find the coordinates of the points of trisection of the line segment joining the points and .

Model Question

Second Terminal Examination-2081

Class-9 Time:2hrs F.M.:50

Sub: Optional Mathematics P.M.:17.5

Group-A [6x1=6]

1. Define Cartesian product of any two non-empty sets.
2. Write any one example of scalar matrix.
3. Write down the coordinates of the centroid of triangle whose vertices are , and .
4. Write down the equation of straight lines parallel to x-axis and at a distance of ‘a’ units.
5. In a right-angled triangle ABC, , write the ratio of .
6. Write a property of reflection.

Group-B [6x2=12]

1. If is defined by and , then find the range of function.
2. For the matrix . Prove that .
3. In what ratio does X-axis divide the line joining the points and
4. Find the value of .
5. If degree and radian measure of an angle are D and C respectively, prove that .
6. Find the 20th percentile from the given data: 10,20,30,40,50,60,70,80,90.

Group-C [8x3=24]

1. If and find the value of m and c. Also, find
2. If and then find the product of and .
3. Show that the points and are collinear.
4. A cow is tied to a pole with a rope of length 14 m. If the cow grazes such that it describes a circle of radius 14 m, how far will it have moved when the rope traces an angle of at the pole?
5. Prove that: .
6. If then find the value of .
7. Reflect a trapezium PQRS with vertices and about the line to get the trapezium P’Q’R’S’. find the vertices of trapezium P’Q’R’S’. Also present both the trapeziums on the same graph paper.
8. Find quartile deviation.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Scores | 12 | 13 | 14 | 15 | 16 | 18 |
| Frequency | 5 | 5 | 5 | 6 | 1 | 1 |

Group-D [2x4=8]

1. If then find the value of a, b and c if and .
2. Find the equation of straight lines which passes through the points and sum of its intercept on the axes is 14.