

## WORKSHOP FOR MATHEMATICS TEACHERS ACADEMIC SUPPORT GROUP (ASG)

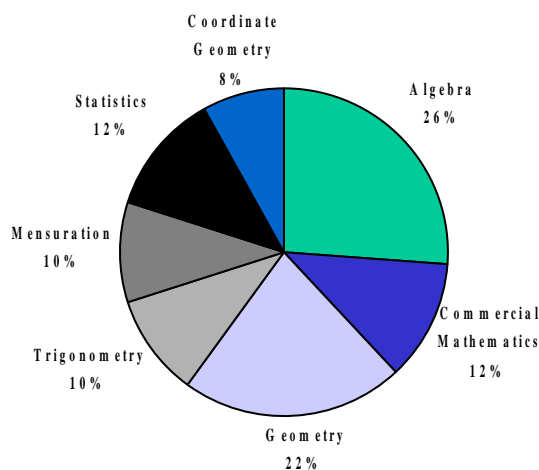
### PRESENT SITUATION

- Poor result of Mathematics is the cause of decline in Board result.
- Improvement in Mathematics result is essential for improvement of class X result.
- Responsibility for improvement lies on the Mathematics teachers.

### NEED OF THE HOUR

- To improve the result quantitatively i.e. increase the number of students passing.
- To pull up the students obtaining 20 marks or so to the pass marks level.
- To improve the result qualitatively i.e. enable students to clear competitive exams .

### WEIGHTAGE TO SUBJECT UNIT



### BLUE PRINT

**Time: 3 Hours**

**M.M 100**

CONTENT AREA		NUMBER OF QUESTIONS OF		
		3 Marks	4 Marks	6 Marks
I. Algebra	26 (8)			
1. Linear Equations	7 (2)	1	1	-
2. Polynomials	3 (1)	1	-	-
3. Rational Expression	3 (1)	1	-	-
4. Quadratic Equation	7 (2)	1	1	-
5. Arithmetic Progression	6 (2)	2*	-	-

<i>Sub Total</i>	26 (8)	6	2	-
II. Commercial Mathematics	12(3)			
1. Instalments	6(2)	2	-	-
2. Income Tax	6 (1)	-	-	1
<i>Sub Total</i>	12 (3)	2	-	1
III. Geometry	22 (5)			
1. Similar Triangles	9 (2)	1	-	1*
2. Circles	9 (2)	1*	-	1
3. Constructions	4 (1)	-	1	-
<i>Sub Total</i>	22 (5)	2	1	2
IV. Mensuration	10 (2)	-	1	1*
V. Trigonometry	10 (2)	-	1*	1
VI. Statistics	12(3)	-	3	-
VII. Coordinate Geometry	8 (2)	-	2	-
<i>Sub Total</i>	40 (9)	-	7	2
GRAND TOTAL	100 (25)	10	10	5

### Summary:

Number of Questions of 6 Marks: 5  
4 Marks: 10  
3 Marks: 10

### Weightage to Difficulty Level of Questions

S.No	Estimated Difficulty Level of Questions	Percentage of Marks
1	Easy	15%
2	Average	70%
3	Difficult	15%

### Scheme of Options

- All questions are compulsory i.e. there is no overall choice in the question paper.
- However, internal choices have been provided in two questions of 3 marks each, two questions of 4 marks each and two questions of 6 marks each.
- These choices have been given from within the same topic and in questions which test higher mental abilities of students.

**ALGEBRA**

Sub-Topic : Linear Equations in two Variables

Value Points :- 7 (3+4)

Type of Expected Questions	Marking Scheme	Common Mistakes committed by students	Points to be Emphasised	Rating/ Marks
1. Solve the Simultaneous linear equations	i. Solving the equation (any method) 2 ii. Writing answer as $x = \text{---}$ $y = \text{---}$ 1	i. In Elimination method, while subtracting the second equation from the first equation the students do not change the signs of terms of the second equation. ii. They do not write answer separately.	i. Should change the sign of terms of second equation from first while subtracting ii. Answer should be written separately as $x = \text{---}$ and $y = \text{---}$	Easy 3
2. Graphical Method	i. Preparing the tables for each equation $\frac{1}{2} + \frac{1}{2}$ ii. Plotting the graph correctly for each equation 1+1 iii. Writing the solution as answer as $x = \text{---}$ , $y = \text{---}$ 1	i. Students use separate Graph sheet for each equation ii. Do not write the solution as Answer iii. Some times students mark x axis as y axis & vice versa & so plot the points wrongly	i. Marking both the axis correctly ii. Finding the co- ordinates of point of intersection of the lines plotted iii. Finding the point of intersection of any plotted line with x- axis or y- axis correctly.	Easy 4

**ALGEBRA**

Sub-Topic : G.C.D. &amp; L.C.M. OF Polynomials

Value Points – 3 (1)

Type of Expected Questions	Marking Scheme	Common Mistakes committed by students	Points to be Emphasized	Rating/ Marks
1. Find the G.C.D. and L.C.M.	i. Factorization of polynomials 1+ 1 ii Writing G.C.D. and/or L.C.M. 1	i.. While splitting the middle term they do not write signs (+ or -) correctly	i. Splitting of the middle term for factorization	Easy 3

2. Finding the constants a and b if G.C.D. is given	i. Factorisation of G.C.D 1 ii. Finding value of 'a' 1 iii. Finding value of 'b' 1	i. While using remainder theorem they do not substitute the value of x in the equation correctly , e.g. for an equation $x^2+x-12$ if x-3 is a factor, then value of x should be substituted as $(3)^2 + (3) - 12$ instead of writing directly as $9+3-12$	i. Proper use of remainder theorem i.e. if $f(a)=0$ , then $(x - a)$ is 'a' factor of $f(x)$ ii. Enough practice should be given on using remainder theorem for finding a & b	Average
3. Based on formula G.C.D. $X \cdot L.C.M = p(x) \cdot X \cdot q(x)$	i. Writing the formula correctly 1 ii. Simplifying & getting correct answer 2	i. Do not write the formula correctly ii. Do not write the answer in simplified form	i. Enough practice should be given to use the formula correctly ii. After factorisation the answer should be in lowest form	

ALGEBRA

Sub-Topic : Rational Expressions

Value Points – 3 (1)

Type of Expected Questions	Marking Scheme	Common Mistakes committed by students	Points to be Emphasised	Rating/ Marks
Reduce to the lowest form	i. Factorisation of Polynomials 2 ii. Writing the answer in simplified form 1	They do not write the answer in simplified form i.e. lowest term	i. Answer should be written in lowest terms ii. Practise should be given in factorisation of polynomials by splitting the middle term	Average

ALGEBRA

Sub-Topic : Quadratic Equations

Value Points – 7 (3+4)

Type of Expected Questions	Marking Scheme	Common Mistakes committed by students	Points to be Emphasised	Rating/ Marks
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1. Solve the equation	i. Writing the values of a, b, c 1 ii. Writing the formula and substituting the values of a, b, c correctly 1 iii. Simplifying and arriving at correct answer 1	i. Do not write + or – signs with the values of a, b and c ii. Do not write the value of sq. root of discriminant (D) correctly	i. Substituting the correct values of a, b, c in $D = b^2 - 4ac$ ii. Finding the square root of the number	Average
1. Word Problem on Quadratic equation or linear equation (internal choice)	i. Assuming variables $\frac{1}{2}$ ii. Forming the Equation 1 iii. Arriving at Quadratic equation 1 iv. Factorisation 1 v. Writing the answer $\frac{1}{2}$	i. Students are unable to even form the equations	i. They must be given enough practice in forming the equation	Difficult

## ALGEBRA

Sub-Topic : Arithmetic Progression (AP)

Value Points – 6 (3+3)

Type of Expected Questions	Marking Scheme	Common Mistakes committed by students	Points to be Emphasised	Rating/Marks
1. Finding the nth term	i. Use of correct formula 1 ii. Correct substitution of values 1 iii. Finding the required term 1	i. They do not use the formula correctly ii. Calculation mistakes iii. In writing the nth term they forget to subtract one from n e.g. for finding 20th term they write $a_{20} = a + 20d$ instead of $a_{20} = a + 19d$	i. Learning and application of the correct formula ii. Short method should be used to find the nth term if sum to n terms is given	Easy 3
Finding the Sum of n terms i.e. $S_n$	i. Writing 'a' and 'd' from the given A.P. 1 ii. Writing the formula of $S_n$ 1 iii. Finding $S_n$ as solution 1	Sometimes they use last term 'l' as 'n'	Stress should be given on the application of correct formula	Easy 3

COMMERCIAL MATHEMATICS

Sub Topic: Instalments

Value Points: 6 (3+3)

Types of expected questions	Marking Scheme	Common Mistakes committed by students	Points to be Emphasised	Rating/ Marks
1. Finding the amount of instalment 2. Finding the rate of interest 3. Finding the total amount paid or sum borrowed	Question will usually involve three steps 3	i. Incorrect use of Instalment formulae  ii. Calculation mistakes	i. Practice to be given in calculations ii. Instalment question will contain 3 or 4 instalments iii. In questions involving compound interest maximum number of instalments would be three	Easy 6

COMMERCIAL MATHEMATICS

Sub Topic: Income Tax

Value Points: 6 (1)

Types of expected questions	Marking Scheme	Common Mistakes committed by students	Points to be Emphasised	Rating / Marks
1. Find the total income tax to be paid  2. Find the tax to be paid in the last month	i. Usually the question will have major 6 steps of calculations  6	i. Calculation mistakes ii. Advance Tax is multiplied by 12 Instead of 11 iii. Education CESS is applied after subtracting the advance tax iv. Education CESS is subtracted instead of adding	i. Student should be taught to subtract correctly for e.g. $* 190000$ $\frac{10000}{80000}$ (wrong) $190000$ $\frac{10000}{180000}$ (right) ii. Education CESS to be calculated on the total tax due	Easy 6

GEOMETRY

Sub-Topic : Similar Triangles

Value Points – 9 (3+6)

Type of Expected Questions	Marking Scheme	Common Mistakes committed by students	Points to be Emphasised	Rating/ Marks
1. Problem on Similar triangles	i. Correct figure $\frac{1}{2}$ ii. Proof $2 \frac{1}{2}$	i. They do not draw the figure correctly ii. Proofs are not relevant to the figure	i. Correct use of relevant similar triangle theorem	Difficult
2. Theorem with rider	i. Figure, given, to prove, construction $\frac{1}{2}$ each ii. Proof $2$ iii. Rider $2$	i. Sometimes the students write the theorem without drawing the figure, hence get no marks ii. Proof is not relevant to the figure iii. They do not show the angles in the figure mentioned in the proof	i. They should draw the figure first. ii. Explanation should be given according to the figure drawn	Theorem part is easy 4

GEOMETRY

Sub-Topic : Circle

Value Points – 9 (3+6)

Type of Expected Questions	Marking Scheme	Common Mistakes committed by students	Points to be Emphasised	Rating/ Marks
1. Problem based on circle	i. Correct figure $\frac{1}{2}$ ii. Proof $2 \frac{1}{2}$	i. They do not draw the figure correctly ii. Proofs are not relevant to the figure	Correct use of relevant theorem in circle	Difficult
2. Theorem with rider	i. Figure, given, to prove, construction $\frac{1}{2}$ each ii. Proof $2$ iii. Rider $2$	i. Sometime they write the theorem without drawing the figure ii. Proof is not relevant to the figure	i. They should draw the figure first. ii. Explanation should be given according to the figure iii. Both the theorem would be out of 10 starred theorem, so repeated practice of writing the theorem is required with correct figure	Theorem part is easy 4

## GEOMETRY

\_Sub-Topic : Constructions

Value Points – 4(1)

Type of Expected Questions	Marking Scheme	Common Mistakes committed by students	Points to be Emphasised	Rating/ Marks
Construction	i. Correct construction 3 ii. Writing the steps of construction 1	i.They do not construct angles with the help of compass ii.They do not draw angle correctly iii. They do not draw neat figures	i. They should use sharpened pencils ii. Enough practice should be given for all the constructions in the class itself iii. Angle should be constructed with the help of compass only iv. Use of protractor (D) is not allowed	Easy 4

## MENSURATION

Value Points: 10 (4+6)

Type of expected questions	Marking Scheme	Common Mistakes committed by students	Points to be Emphasised	Rating/ Marks
1.Conversion of solids  2. Mixed figure  3.Frustrum	<b>For 4 marks question</b> i. Formula and substitution of values 1 ii. Solving the problem 3 <b>For 6 marks question</b> iii. Formula and substitution of values 1 iv. Solving the problem 5	i. Same units are not used ii. Solve the question without drawing the figure iii. Units are not specified with the answers iv. Students use wrong formula v. Make calculation mistakes	i. All the formulae are to be learnt by heart ii Area unit to be specified as square of the unit and the volume be as cube of the unit	Difficult

TRIGONOMETRY

Value Points: 10 (4+6)

Type of expected questions	Marking Scheme	Common Mistakes committed by the students	Points to be Emphasised	Rating/ Marks
1. Proving of identities	Solution usually involves 4 steps. Each step carries 1 mark	i. Do not use of the basic identities correctly e.g. $\sin^2 = 1 - \cos^2$ ii. Make mistakes in using correct T- ratios during simplification	Students should be made to learn the basic identities thoroughly	Difficult
2. Complementary angles (Internal choice in Q1 & 2)	i. Correct change of complementary angles 2 ii. Solution 1 iii. Answer 1	i.. They write $\sin 55^\circ = \sin (90^\circ - 55^\circ)$ ii. Wrong values are substituted for $\sin 30^\circ$ , $\sin 60^\circ$ etc.	i. Comp. angles to be applied directly. $\sin 55^\circ = \cos (90^\circ - 55^\circ)$ ii. Values of T- ratios of $0^\circ, 30^\circ, 60^\circ, 45^\circ, 90^\circ$ are to be memorised.	Easy 4

TRIGONOMETRY

Type of expected questions	Marking Scheme	Common Mistakes committed by the students	Points to be Emphasised	Rating/ marks
height & Distance	i. Correct figure 1 ii. Solving the problem 4 iii. Writing the answer 1	i. Angle nearer to $90^\circ$ is smaller than the angle farther than $90^\circ$ ii. Angle of depression is not marked in the figure if it is mentioned in the question iii. Unit of distance is not changed, if required in the question	a. Students should be told that angle of depression is equal to angle of elevation b. If in a question angle of depression is mentioned it should be marked in the figure c. Angle nearer to $90^\circ$ should be greater than the angle farther than $90^\circ$ d. Questions would not involve more than two right angled triangles e. Answer should be marked with proper unit as it carries one mark	Easy part is figure 1 mark

STATISTICS

\_Sub-Topic : Mean

Value Points – 4(1)

Type of Expected Questions	Marking Scheme	Common Mistakes committed by the students	Points to be Emphasised	Rating/Marks
1. Finding the mean for discrete or continuous data	i. Writing correct value of $\bar{x}$ , $\sum f_i x_i$ $1\frac{1}{2}$ ii. Finding sum of $f_i x_i$ 1 iii. Correct formula $\frac{1}{2}$ iv. Finding mean correctly $\frac{1}{2}$	i. They do not write the formulae ii. Calculation mistakes in finding the values of $\bar{x}$ , sum of $f_i x_i$	i. They should learn the formulae ii. Lots of practice should be given for calculating $\bar{x}$ and totalling	Easy 4
1. Finding the missing frequencies	i. Forming equations in missing frequencies 2 ii. Solving the equations and finding the missing frequencies 2	They add the value of 'p' along with the data e.g. if sum of $f_i x_i$ is $250+10p$ , they write it as $260p$	i. They should be properly guided and given enough practice ii. Any method of finding the mean can be adopted	

STATISTICS

\_Sub-Topic : Pie Chart

Value Points – 4(1)

Type of Expected Questions	Marking Scheme	Common Mistakes committed by the students	Points to be Emphasised	Rating / Marks
Reading the Pie chart	i. Finding the data using the central angle 4	They divide the central angle with the data and multiply with $360^\circ$	Central angle of the pie chart should be divide by $360^\circ$ and multiplied by the data	Easy 4
Drawing the Pie chart with the given data	i. Finding the Central angles from the given data 2 ii. Drawing the Pie chart correctly 2	i. They do not make correct central angles specially when it is obtuse or more than $180^\circ$ ii. They spend more time in beautifying the pie chart	i. They should be guided to make acute angles first ii. Beautification is not required iii. They should name the region correctly in the chart	

## STATISTICS

Sub-Topic : Probability

Value Points – 4(1)

Type of Expected Questions	Marking Scheme	Common Mistakes committed by students	Points to be Emphasised	Rating /Marks
Finding the probability	i. Total outcomes 1 ii. Favourable outcomes 2 iii. Finding probability	i. They do not write the total outcomes of the event ii. They do not write the formula iii. They do the counting of outcomes in case of cards wrongly e.g. in case of cards numbered from 15 to 30, they count it as 15 instead of 16	They should be given enough practice to write total outcomes, favourable outcomes, the formula and then the probability	Easy 4

## CO-ORDINATE GEOMETRY

Value Points – 8 (4+4)

Type of Expected Questions	Marking Scheme	Common Mistakes	Points to be Emphasised	Rating / Marks
1. Finding a point on x-axis equidistant from two points 2. Showing the points are collinear 3. Proving a quadrilateral to be a Rectangle, square, parallelogram etc	i. Formula 1 ii. Solution 2½ iii. Writing answer ½	i. They do not write formula correctly ii. Make Mistakes in calculation iii. They do not find Sq. root correctly	i. More practice should be given for writing and applying the formula correctly ii. The students should learn to calculate square root correctly	Easy 4
Finding the value of 'k' when three points are collinear using section formula	i. Taking ratio p : 1 and finding the ratio 3 ii. Finding the value of 'k' 1	i. They use distance formula instead of section formula for doing this question which involves lengthy calculations	i. They should use section formula for doing this question.	Average 2

## **TOPICS TO BE EMPHASISED**

1. Finding the mean (Statistics)
2. Finding the missing frequencies (Statistics)
3. Reading & Plotting PIE - CHART (Statistics)
4. Use of Distance and Section Formula (Co -ordinate Geometry)
5. All Starred Theorems (Geometry)
6. Graphical Solution of Linear Equations (Algebra)
7. Instalments (Commercial Mathematics)
8. Income Tax (Commercial Maths)
9. Factorisation – by splitting the middle term
10. Constructions (6)
11. Complementary Angles (Trigonometry)

**Wow!! Getting 65% in Mathematics is SO EASY!!**