MOUNT ZION ISLAM HIGH SCHOOL
Date.....
ERNAKULAM

Instructional Material

IN

MATHEMATICS

FOR

Secondary Schools

(S. I. E.)

STATE INSTITUTE OF EDUCATION
KERALA.

1968

ST. MICHAEL'S ILAM HIGH SCHOOL
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This booklet is intended to serve as guide lines to the preparation of teaching notes according to the new approach, namely objective-based teaching. It is just a sample of the materials prepared by the participants of the various inservice training courses in Mathematics, conducted by the State Institute of Education.

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DECIMALS

The main broad objectives aimed at in teaching decimals are;

I. Knowledge

II. Understanding

III. Skill

IV. Application

Specific Objectives.

1. Knowledge of the symbol (*i. e.* decimal point) as the symbol that separates the integer from the fraction.

2. Knowledge of the decimal and decimal fraction. 2.3 is a decimal where as .23 is a decimal fraction.

3. Knowledge of decimal fraction as that particular kind of fraction with denominators 10 or powers of 10.

4. Knowledge of the four fundamental operations with decimals.

5. Knowledge of reading decimals in the accepted form. 4.35 is to be read as "four, point three, five". The word 'point' is to be used in Malayalam also.

6. Knowledge of recurring decimals with symbol.

7. The pupil understands that decimal fraction is only an extension of our natural number-system. *i. e.* an extension of our natural base-10 system of numerals to a way of writing numbers less than !

8. The pupil understands that decimal fraction is another way of representing common fraction. ·5 and $\frac{5}{10}$ are equal.

9. The pupil understands that zero is significant in a decimal, when it is written to the left of the digits after the decimal point.

10. Skill in converting fractions to decimals and vice versa.

11. Skill in the four fundamental operations with decimals.

12. Skill in comparing decimals.

13. Skill in estimating and checking the answers.

14. Skill in finding out the quotient up to a desired number of digits.

15. The pupil recognises life situations where decimals are used.

16. The child applies the knowledge of decimals in solving problems.

17. The pupil applies the knowledge of decimals and the four operations with them in everyday life.

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18. Understands and appreciates the symmetry in the names and place values between whole numbers and decimal fractions. With respect to the ones place, symmetrically located are the places with values 10^1 and $(\frac{1}{10})^1$ 10^2 and $(\frac{1}{10})^2$ etc. The pupil also observes that there is no symmetry with respect to the decimal point.

II. Testing Readiness.

The pupil knows

1. Place value of numbers. 7862 means 7000+800+60+2.
2. Place value of digits. The value of a digit is reduced to its one tenth as it goes to the right.
3. Four fundamental operations.
4. Fractions.
5. The structure of the metric system, especially coinage.

III Content Analysis

1. Concept of decimal — both as an extension of our number system and as another way of representing common fraction.
2. Conversion of fractions to decimals and viceversa
3. Four fundamental operations with decimals.
4. Problems involving decimals.
5. Comparison of decimals.
6. Rounding off of decimals.
7. Recurring and nonrecurring decimals.
8. Situations in life where decimals are applied.

IV The concepts to be developed

1. Place value in decimal fraction.
2. Significance of zero in a decimal fraction.
3. Recognising numbers, big and small, during comparison .56 is greater than .5397.
4. Finding out the quotient upto a desired number of digits.

V Lesson Planning

Unit 1. The idea of $\frac{1}{10}$

2. Introduction of one tenth place and the decimal point.
3. Introduction of hundredth place.
4. Extension beyond hundredth place.
5. Significance of zero in decimals.
6. Comparison of decimals.
7. Conversion of decimals to fraction and vice versa.
8. Addition.
9. Subtraction.
10. Multiplication of a decimal by 10,100 etc.
11. Division of a decimal by 10,100 etc.
12. Multiplication of a whole number by a decimal.
13. ,, a decimal by a whole number.
14. ,, ,, by a decimal.
15. Division of a decimal by a whole number.
16. ,, whole number by a decimal.
17. ,, decimal by a decimal.
18. Rounding off decimals.
19. Recurring decimals.

Unit 1. The idea of $\frac{1}{10}$ (obj. 15)

Motivatton through life situations & the history of decimals.

Take a strip 10" long which is divided into ten equal parts & other two strips each having a length of 5". Hold them side by side and ask 'how many small strips are there in a big one?' 2.

What fraction of the big one is a small strip ?

Use suitable strips and elicit $\frac{1}{4}$, $\frac{3}{4}$, $\frac{1}{5}$, $\frac{1}{10}$ etc.

Then, from a bundle of 10 sticks, take 1 and elicit $\frac{1}{10}$. After that $\frac{2}{10}$, $\frac{3}{10}$, $\frac{4}{10}$ etc may be elicited easily. Cut a stick into 10 equal parts and elicit $\frac{1}{10}$, $\frac{2}{10}$, $\frac{3}{10}$ etc.

Unit 2. Introducing tenth place & decimal point (obj. 1. 5. 7.)

Take two bundles of ten sticks & 5 single sticks. Let them say 25. Similarly 63, 85, 103 etc. are represented by sticks. They are able to say the place value of each number.

Take a bundle containing 100 sticks, a bundle of 10 and a single stick. What is the number? III. Write III on BB What is the place value of each 'I'. (Hold the sticks very near the number written on BB) '1' at the left is 1×100. '1' in the middle is 1×10. '1' at the right is 1×1. Write the corresponding placevalue above the number. A stick is one tenth of a bundle of ten and that is one tenth of a bundle of 100. Let children discover that each digit is one tenth of the digit on the left. III is

again represented by sticks and a $\frac{1}{10}$ stick is placed at the right of the single stick. Now it is 111 and $\frac{1}{10}$. To represent this small part (ie $\frac{1}{10}$) write another '1' after units' place. What can be its value? They will discover it is one tenth of unit's place. Write 'one tenth' above. Read the number. 111 and 1 one tenth. If we do not write the place value above, how will you recognise this new place? Let them suggest anything--putting a comma, a line, a hyphen or bracket to the right of the unit's place.

For convenience'sake, we put a point in order to separate the integer and the fractional part. This is the decimal point. 111 and $\frac{1}{10}$ may be written as '111.1' and read as 'one hundred and eleven point 1'.

The pupils should be given exercises to give place-value of digits in any decimal, say 12.5 and to write down the given numbers in decimal form

Unit 3. Introducing Hundredth place. (obj: 3.5.7,)

We can develop the concept by using our money system. Take coins of 1 paise, 10 P. and a few rupees. $\frac{1}{10}$ and $\frac{1}{100}$ may be elicited. P. 35, 47 etc are dealt with.

'Rs 2 and Paise 65' is to be written as 'Rs. 2.65'. This is to be read as 'Rs two point six, five'. Let them find out plenty of examples.

Handling materials is very important for the understanding of tenth place and hundredth place in relation to unit's place. Children may be asked to arrange strips to represent 5.28, 3.59 etc.

Exercises (1) to say the place value of given numbers.
(2) to write the numbers, given place value.

Unit 4. Extension beyond Hundredth place. (obj. 3,5.7)

If pupils have properly "understood tenthplace and hundredth place, it will not be difficult to extend the concept to thousandth and beyond. Here the use of materials become neither necessary nor possible. It is time that pupils rely on logic and symbolic notation.

Unit 5. Comparison of decimals. (obj. 12)

Children should be helped to see relationships among decimals using sticks.

12 tenth's	=	1 unit+2 tenths	= $\frac{12}{10}$
2.3	=	23 tenths	= $\frac{23}{10}$
1 tenth+4 hundreths	=	14 hundreths	= $\frac{14}{100}$
6 tenths	=	60 hundredths	= $\frac{60}{100}$
1.45	=	145 hundredths	= $\frac{145}{100}$

More relationships should be drawn by using suitable aids.

1.35	=	135 hundredths	= $\frac{135}{100}$
1.4	=	14 tenths	= $\frac{14}{10}$

Which is the big number? 1.4

Let them state the reason.

Give more numbers for comparison.

They should also understand that $\frac{5}{10}$ & .5, $\frac{23}{100}$ & .23 etc are the same. In decimals, we write the numerator only.

Unit 6. Conversion of decimals to fractions & vice versa. (obj. 8.10)

Ann reads in the news paper that .75 inches of rain fell during yesterday's storm. She says that this is the same as $\frac{3}{4}$ inches of rain. Is she right?

You can show that .75=$\frac{3}{4}$ by writing .75 $\frac{75}{100}$ and changing $\frac{75}{100}$ to lowest terms. If you divide both numerator and denominator of $\frac{75}{100}$ by 25, you get $\frac{3}{4}$.

From such situations, they are able to say, that .3 is 3 tenths which is $\frac{3}{10}$, .57 is 5 tenths 7 hundrenhs or $\frac{5}{10} + \frac{7}{100}$ or $\frac{57}{100}$ etc.

Here .75, .3, .57 etc are decimal fractions whereas 2.3, 5.72 etc are decimals.

Changing from common fractions will offer some difficulty. Common fractions are of two types:

(1) With denominators 10 or powers of 10.
(2) With some other number.

In the first case, conversion is not difficult, for they know that $\frac{7}{10}$ = .7, $\frac{83}{100}$ = .83 etc.

In the second case, the idea of dividing the numerator by the denominator should come. In $\frac{2}{5}$, 2 is to be divided into 5 equal parts. As 2 does contain 5, the units are changed into tenths and we get 20 tenths. Divide by 5, we get 4 tenths (*ie.* $\frac{4}{10}$) or .4. This idea can be extended to all common fractions.

Give as many exercises as possible.

Unit 7. The significance of zero. (obj. 9) The number 6 stands for 6 units. If you wish to move 6 one place to

the left, so that it stands for 6 tens, you have to write zero in units' place. Zero holds the units' place and keeps the 6 in tens' place. So, a zero in a number is sometimes called a place holder.

Write down 6 in the decimal form 6.0. It's value is not changed. Write one more zero. 6.00. No change. 6, 6.0, 6.00 are the same. Similarly, 2.5 and 2.50 are the same. 7.82 and 7.82000 are the same. What do you infer? A zero is significant in a decimal when it is put after the digits.

What is the value of .5? $\frac{5}{10}$ $.05=\frac{5}{100}$; $.005=\frac{5}{1000}$; The value changes. Zero is the place holder in these cases.

What do you understand from these?

Zero is significant in a decimal fraction, if it is written between the decimal point and the digits.

Unit 8. Addition (obj. 4. 11. 16. 17)

The important points to be remembered in teaching addition are given below.

The pupil who has really mastered the fundamental operations with whole numbers, should have little difficulty in extending them to numbers involving decimal fraction. In adding whole numbers, we write the numbers with the places aligned, ie. ones under ones, tens under tens and so on. No new principle is involved in adding decimals. Simply align places when the numerals are written. Be sure to keep the decimal point in a line one under the other. The decimal point in the answer must also be kept in line. Remind them to keep columns straight.

2. You can write the numbers as shown at A; but the work is easier if you place two zeros after 10 as in B. They use the zeros if they understand that 10 and 10.0 and 10.00 have equivalent values.

A	B
10.	10.00
5.98	5.98

3. While adding the digits in the decimal places, if the sum reaches a whole number, the whole-number portion should be written left of the decimal point and the remaining to the right of the point.

4. Arrange the unit according to gradation.
Give graded questions to work out.
Include problems also.

Unit 9. Subtraction (obj. 4. 11. 16. 17)

Always use Additive method.

Proceed as in the case of addition. Keep the decimal points in a line under one another.

Find out suitable situation for introduction.

Babu's tempature was 102.7° when he was ill. When he is well, his temperature is 98.6°. What was the rise in Babu's temperature?

Find out how much is to be added to 98.6 to get 102.7 ie. 102.7—98.6.

In subtracting a decimal from a whole number, it is easier to subtract when the whole number is written in decimal form.

4,00—
.26

Here also, give graded exercises and problems.

Unit 10. Multiplication by 10, 100 etc. (obj. 4. 11. 16. 17.) Suitable situations are to be given.

.7 litre of milk is consumed in my house everyday. Find the quantity of milk consumed in 10 days.

$$.7 \times 10$$

From such examples, draw the conclusion. ie. while multiplying by 10, the digits are shifted one place to the left.

Multiplying by 100 is equivalent to multiplying by 10×10. So, to multiply first by 10 and the product so got by ten again Here, the digits are shifted two places to the left.

Through discussion, lead pupils to generalisation. 'To multiply a number by 10, 100, 10000 etc. the digits are shifted as many places, to the left, as there are zeros in the multiplier'.

Unit 11. Division by 10,100 etc. (obj. 4. 11. 16. 17) Proceed as before. Let them discover that 'while dividing by 10, the digits are shifted one place to the right and by 100, two places to the right. Find out the generalisation from several examples. 'To divide by 10, 100, 1000 etc., the digits are shifted as many places to the right as there are zeros in the divisor.'

Units 12; 13; 14. Multiplication (4. 11. 13. 16. 17)

1. How much would I have to pay for 3 metres of plastic ribbon at Rs. .39 per metre?

As children deal with such problem situations, involving a whole number times a decimal, and as they estimate

products, they come to see that the product contains as many number of decimal places as in the multiplicand.

2. Let children think out solution for situations involving the multiplication of a whole number by a decimal. .2×45. Let them find out the number of decimal places, themselves

3. Children are able to say situations involving multiplication of a decimal by a decimal.

.3 × .3

By using common fractions, $\frac{3}{10} \times \frac{3}{10} = \frac{9}{100}$

This may be written as .09

One place in multiplier one place in multiplicand, two places in the product.

.3 ×
.3
.09

4. Zero difficulties should be dealt with separately.

When the number of decimal places to be pointed off is greater than the number of figures in the product, put as many zeros to the left of the product, as are needed to point off correctly

.16
.03
.0048

5. By examining the above cases, let them generalise the rule. 'To multiply decimals, multiply as with whole numbers. Then beginning from the right, point off as many decimal places in the product, as there are decimal places in the multiplier and the multiplicand together.

6. There are two ways for checking and estimating the answers.

(a) Using common fractions

(b) Using place valne knowledge. (i e products of tenths and hundredths is thousandths.)

Estimation is an essential step in the multiplication of decimals. Compute answers mentally, using numbers that mean about the same as those in the question.

7. Graded questions are given.

Units 15. 16 17. Division. (obj. 4. 11 13: 16. 17)

Through familiar life situations, the different types of computations are dealt with. The main points to be remembered are,

1. $\frac{28.8}{4\,8}$. Multiply the numerator and denominator by 10. $\frac{288}{48}$. Then divide.

Here we make use of the rule that multiplying both the divisior and the dividend by the same number, does not change the value of the quotient.

2. Zero involving cases are taught.

To avoid remainders in division, annex zeros after the decimal point of the dividend and continue to divide.

Present certain zero difficulties in the division of decimals.

3. The following generalisations may be arrived at:

(a) Make the divisor an integer.

(b) Shift the decimal point of the dividend accordingly and divide

4. Always estimate the results.

5. A number of exercises and problems are given.

Unit 18. Rounding off decimals. (obj. 14)

Suppose we are dividing 8.223 by 15.

$$8.223 \div 15 = 0.5482$$

It is impossible to complete the operation. The answer extends to 0.5482.

When we are unable to complete the operation, we stop after finding out the result upto a desired number of places. In the above example, suppose we have to find the answer correct to two decimal places. 0.54 may be suggested as the answer.

But 0.54 is less than the correct answer by 0.00082. Suppose we take the answer to be 0.55. Then the answer is 0.0018 more than the correct answer. 0.55 is nearer to the answer. So, that is more acceptable.

Take more examples. By examining them, let them suggest the rule.

1. Quotient is carried to one more place than is wanted in answer.
2. If the last figure of the decimal is less than 5, drop it. If the last figure is 5 or more, drop it and make the figure before it one larger.

Give plenty of exercises.

Unit 19. Recurring decimals (obj. 6)

Certain common fractions when converted to decimals, do not terminate, but instead give repeating decimals $\frac{1}{3}, \frac{4}{9}, \frac{7}{11}, \frac{4}{27}$ etc. are given for conversion.

$\frac{1}{3} = .3333 \ldots$ $\quad \frac{2}{3} \ \frac{6}{9} = .66666 \ldots$

$\frac{4}{9} = .4444 \ldots$ $\quad \frac{8}{9} = .888 \ldots$

$\frac{7}{11} = .63636363 \ldots$ $\quad \frac{5}{9} = .555 \ldots$

$\frac{4}{27} = .148148148 \ldots$

The same figure or group of figures are recurring. These are called recurring decimals. The other decimals are nonrecurring. In order to show recurrence, the symbol " — " is used above the digits which repeat.

Thus, $\frac{1}{3} = .\overline{3}$

$\frac{7}{11} = .\overline{63}$

$\frac{4}{27} = .\overline{148}$

There are certain other interesting recurring decimals.

$\frac{8}{9} = .\overline{8}$ $\quad$ $\frac{2}{3} = .\overline{6}$

$\frac{1}{9} = .\overline{1}$ $\quad$ $\frac{5}{9} = .\overline{5}$

$\frac{4}{33} = .\overline{12}$ $\quad$ $\frac{16}{99} = .\overline{16}$

$\frac{19}{37} = .\overline{513}$ $\quad$ $\frac{1}{99} = .\overline{01}$

VI Aids to be used.

graph paper—graph board—Coins—8″ sticks—Metre Scale—Place value Pockets—Place value slide—Odometre-Strips of 100, 10 & 1—Paper cuttings—decimal fraction board—decimal fraction strips—Hundreth board.

VII Motivation.

Teacher should find out situations in everyday life, where decimals are used. eg:-One reads from a newspaper items like,

(1) Budget expenditure for education in Kerala is 40.3 crores

(2) Mr. x won the 100ms dash His time was 10.3 seconds.

(3) We had heavy rains yesterday and it was 18.4 cms

(4) Rice requirement of Kerala this year is 2.78 lakhs of tons

(5) Our population increases by 3.3 lakhs every year

(6) 78.7 acres have been acquired for the site of the college

(7) Height of an Indian is about 165.8 cms.

Other situations where decimals are used:—

(1) In a science book: the body temperature of a healthy man is 98.6° F.

(2) Rs. 28.75 has been spent on buying books.

These are some of the items which an adult or pupil comes across in everyday life. The teacher can find out a number of other examples.

History of decimals will be very interesting for the pupils.

As in the case of assigning place value to numbers, and the introduction of zero, Indians were the people who first used digits to the right of units place. The original notation was very queer. 18.73 was written as 18' 7" 3" or 18⌊73 or 18_{73}. Even today people write 18·73, 18.73, 18_{73}, 18,73 etc.

Such motivational situations are to be found out and presented wherever necessary

VIII Activities

1. Students are given some experience in reading decimal fractions aloud, writing them from dictation and applying them to coins, odometres, and rulers calibrated in a tenths of a centimetre.

2. Measure St. lines, edges etc.

3. Draw st. lines, rectangles & circles and mark .1, .2, .3 etc.

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4. Ask them to mark .1, .2, .3 etc. in a graph paper. Let them shade small squares in graph paper to represent 3.5, 2.9 etc.

5. Cardboard strips are cut according to size. Ask pupils to bring any number, say, 7.3. They will bring 7 big ones and 3 small ones. Take 3 big ones and 6 small ones and ask them to record it.

7. In the place value pocket, let them place cards and say 5.6, 7.2 etc.

8. Let them make a decimal fraction board.

IX. Mental Sums

1. What is the value of each figure printed in bold figures.

3.43, 10.15, 326.05, 5.0064

2. Decimal equvalents of fractions that usually come across. $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{10}$, $\frac{1}{3}$, $\frac{1}{8}$, $\frac{3}{10}$, $\frac{7}{10}$, $\frac{3}{4}$.

3. ·1+·3, ·2+·9, ·3+·05, 2+·5, 2·3+·42, 2·6+3·1 etc.

4. 2·5 — 2·3, 3·6 — 2, ·5 — ·3
4 — 1·5, 3 — ·5, ·86 — ·83, 5—·25, ·6 — ·75 etc.

5. 4 × ·3, ·1 × ·2, ·4 × ·2,
10 × 1·5, 23·569 × 10, 28·34 × 100 1000 × 5·3 etc.

6. ·6 ÷ ·2, 2 ÷ ·1, 6 ÷ ·2, ·8 ÷ 2,
3·6 ÷ 10, 1·84 ÷ 10, 3·7 ÷ 100, 205·45 ÷ 100 etc.

7. Correct the following to 3 decimal places.
43·8754, 28·7326, 0·04732

X Supervised Study questions:

Give graded questions of gradually increasing difficulty. Pupils must be able to do all questions with the least help from the teacher An example is given below.

ADDITION

1.	2 +	5·0 +	6·3 +
	3	9·0	2·5
	—	—	—

Write down in columns and add:

2.	4.2+2.0,	3.0+6.8,	8.9+1.0
3.	3.0+4,	5.6+7,	6+8.3
4.	3.6+0.2,	0.4+0.3.	0.8+0.1
5.	0.5+0.12,	0.7+0.26,	0.4+0.33
6.	.2+3,	.4+ .2,	.5+.3
7.	0.8+0.03,	0.7+0.06,	0.9+0.08
8.	2.31+1.45,	3.72+5.16,	6.44+2.53
9.	5.20+2.74,	4.60+3.27,	8.70+1.25
10.	4.52+3.30,	5.64+2.30,	6.85+3.10
11.	3.08+4.81,	2.05+6.72;	4.08+3.61
12.	3.81+2.06,	5.94+1.03,	6.52+3.07
13.	3.57+4.00,	4.62+5.00,	8.39+1.00
14.	2.00+3.64,	6.00+2.78,	5.00+3.89
15.	0.54+0.23,	0.62+0.34.	0.53+0.26
16.	0.50+0.26,	0.60+0.37,	0.40+0.36
17.	0.42+0.20,	0.76+0.20,	0.84+0.10
18.	0.04+0.52,	0.06+0.72,	0.05+0.34

19.	0.64+0.03,	0.72+0.06,	0.54+0.03
20.	0.40+0.20,	0.50+0.20,	0.60+0.30
21.	0.06+0.02,	0.04+0.03,	0.05+0.04
22.	2.31+0.46,	4.42+0.35,	5.54+0.25
23.	0.71+3.27,	0·43+5.26,	0.52+4.35
24.	4.31+ .45,	6.72+ .16,	5.34+ .53
25.	.63+4.25,	.26+3.63,	.87+5.12
26.	0.03+ .05,	.06+0.01,	0.07+ .02
27.	2.5 + 3.7,	4.4+2.9,	5.6+ 3.8
28.	2.5 + 3.5,	4.6+2.4,	5.7+ 3.3
29.	0.8 + 0.4,	0.6+0.7,	0.8+ 0.9
30.	0.7 + 0.3,	0.8+0.2,	0.5+ 0.5
31.	.6 + .8,	.7+ .4,	.9+ .7
32.	3.08+2.46,	6.02+1.29,	7.03+2.84
33.	4.82+3.09,	3.74+4.08,	6.54+2.07
34.	4.60+3.54,	7.40+1.86,	5.70+2.95
35.	2.76+3,50,	4.68+3.70,	5.66+2.90
36.	1.50+3.70,	4.50+2.90,	5.60+3.60
37.	5.07+3.06,	4 09+2·08,	7.06+3·09
38.	3.28+4.36,	2 17+3·49,	5.29+2.48
39.	2.84+3 62,	1.73+4.82,	5.64+2.93
40.	4.25+2.65,	3.54+4·16,	5.28+3.47
41.	5.21+2.81,	4.63+3.42,	7.54+1.53
42.	3.65+2·85,	2.73+4·67,	5.84+3.76
43.	3.27+2·73,	4.52+3.48,	3.16+5.84
44.	6·84+2.59,	4·63+3.48,	3.76+5·86
45.	2.87+0.63,	6.34+0·86,	.28+0.92
46.	0·85+2.45,	0.63+7·87,	0.46+6.94
47.	0·59+0.79,	0 86+0.97,	0.94+0.28
48.	4·98+ .64,	6.87+ ·56,	7·69+ .68
49.	.39+2.75,	·84+6.78,	.67+3.84
50.	.85+ ·46,	.73+ .59,	.65+ ·78

Then add 3 decimal fractions (.3+.2+.1) and continue the process as above. Similar questions should be prepared for other items also.

XI. Diagnostic Test

Types of errors that usually come across, should be analysed. Then prepare questions for every unit as to find out the weakness of children.

An example (on Multiplication) is given below Prepare similar tests.

A	.8 X 10	2.3 X 10	10X 4.3
	0.52 X 10	3.47 X 10	10X .32
B	3.2 X 100	.5 X 100	.35X 100
	4.37 X 100	100 X .27	2.45X 100
C	2 X .4	4 X .21	3X 2.3
	6 X 4.3	5 X 7.2	4X 6.25
	8 X .06	14 X .07	6X .019

D

.2 X 3	3.2 X 4	3.12 X 3
2.02 X 4	3.06 X 3	0.04 X 3
.004 X 2	3.002 X 3	.007 X 5
2.008 X 4	3.40 X 6	4.62 X 2
4.30 X 12	3.87 X 15	7.25 X 16

E

.3 X .3	2.4 X 3.2	4.5 X .3
.8 X 7.4	12.4 X 6.3	7.1 X 11.2
.32 X .2	.5 X .37	6.6 X 4.52
5.48 X 0.4	5.1 X 5.03	9.02 X 4.7
6.2 X 7.01	7.6 X 0.02	.09 X 9.7

.5 X .013	.026 X .4	.12 X .31
2.32 X .41	.08 X .06	.37 X .48
3.56 X 4.28	.02 X .040	.502 X .08
2.007 X .05	4.350 X .07	.812 X .36
.24 X .372	3.57 X .235	.125 X .634

XII Remedial teaching

Use the results of diagnostic tests as the basis for remedial teaching. Kinds of errors are to be noted. Plan for remedical activities as needed.

1. Place value—Have pupils make their own place value chart to use if to read and write other decimal fractions.

2. Addition—Write down the numbers in columns. Write them one below the other so that the decimal points fall on a st. line.

3. Subtraction—Continue additive method.

4. Multiplication—Rules should be well established. Be sure they understand reasons for placement

5. Division—Emphasize proper placement of quotient figures (i. e. above the dividend) and reasons for place-

ment. Be sure pupils understand that annexing zeros after the decimal point does not change the value of the numbers.

XIII. Programme for the gifted

1. Without performing any paper and pencil computations, make rough mental estimates of the approximate values of the following products & quotients.

38.47 x 6.24,	253.19 x 19.41
85.72 x 12.15,	26.06 x 0.486
0.09495 x 51.54,	281.6 ÷ 71.12
165.3 ÷ 85.10,	47.364 ÷ 24.336
19.528 ÷ 0.493.	0.7238 ÷ 0.0352

2. Magic Squares.

Each row, each column, and each diagonal must add upto the same total. Find out the magic total and put the missing numbers in these squares. (The bold figures are not to be given)

.88	**.11**	.66
.33	.55	.77
.44	.99	.22

1.65

.37	.86	**.51**
.72	.58	.44
.65	.30	.79

1.74

.86	.70	1.50
1.66	1.02	.38
.54	1.34	**1.18**

3.06

3. Number systems with other bases.

(a) **Binary system** The only digits in the Binary system are '0' and '1'. So simple is this system that even

counting is confusing. The first eight Binary numerals are,

(1)	1	(5)	101
(2)	10	(6)	110
(3)	11	(7)	111
(4)	106	(8)	1000

(b) Quinary System. The first widely used base or scale was the quinary. The five fingers of the hand formed a convenient matching device for counting or tallying objects. Some South-American tribes have been observed to count by hands, i.e. "1, 2, 3, 4, hand, hand and one, hand and two" and so on.

The quinary system uses to 5 symbols. 0, 1, 2, 3, 4. The first few numerals are,

(1)	1	(6)	11
(2)	2	(7)	12
(3)	3	(8)	13
(4)	4	(9)	14
(5)	10	(10)	20

(c) Duo-decimal System. This system uses 12 as the base. The number of inches in a foot, ounces in the pound, units in a dozen, hours around the clock and months in a year etc. are examples. This base may be divide dinto several integral fractional parts.

This system contains a dozen digits. The symbol T (dek) is used for 10 and the symbol E (el) for 11. One dozen is expressed by '10' and may be called 'do'. A dozen dozens (144) is expressed by '100' and may be called 'gro' for gross.
Counting was, "1, 2, 3, 4, 5, 6, 7, 8, 9, T. E, 10".

(d) **Vegesinal System.** This system—a scale of 20-was used in prehistoric times. The Aztecs of Mexico had an elaborate system of numerals, using 20 as the base.

(e) **Sexagesinal System.** Babylonians embloyed the number '60' as the base. It still exists in the division of degrees, hours and minutes into 60 parts. It is probable that '60' came into use because it has so many integral divisors (2, 3, 4, 5, 6, 10, 12, 15, 20, 30) which made working with fractional parts easier.

XIV Evaluation : objective based questions.

Choose the correct answer from the following:—

1. If '2' represents two hundreds in 72345, decimal point will come between.

(a) 7 and 2
(b) 2 and 3
(c) 3 and 4
(d) 4 and 5

2. .6 is exactly equal to

(a) $\frac{6}{10}$
(b) .67
(c) .7
(d) $\frac{2}{3}$

3. 10.56 is expressed as

(a) $10+\frac{5}{10}+\frac{6}{10}$ (b) $10+\frac{56}{100}$
(c) $10+\frac{5}{100}+\frac{6}{100}$ (c) $\frac{1056}{10}$

4. .358979, .35898, .3589702, .358908, .0035898. The smallest of these numbers is,

   (a) ·35898
   (b) .358908
   (c) .0035898
   (d) .358979

5. 1.7+2.37+3+.002=

   (a) 2.59
   (b) 7,072
   (c) 4.372
   (d) 7.27

6. Difference between 5 and 2.39 is

   (a) 2.61
   (b) 3.61
   (c) 3.39
   (d) 2·34

7. 2.4 × .5=

   (a) 12.0
   (b) 1.20
   (c) .120
   (d) 120

8. 2.250 ÷ 25=

   (a) 2.10
   (b) 90
   (c) 9
   (d) .09

MATHEMATICS

UNIT PLAN

Unit . . . . Percentage Std VI

No of periods . . . 15

Previous knowledge

Four fundamental operations, Faactions, decimals.

INTRODUCTION

Measurements are more relative than absolute. For comparison, it is good to have a common standard. Fractions can be compared by bringing them to the same denominator. Hundred is a convenient base for comparison. The idea of percentage is an extension to the idea of fraction. Percent is a particular form of fraction like ratio and decimal. A knowledge of the idea of percentage is important in solving trade problems which have a bearing on practical life.

CONTENT ANALYSIS

Terms

1. Percent—representing the rate

2. Percentage—is the number which is obtained by multiplying the base by the rate percent.

Symbol

% for representing percent

Concepts

(1) X % means X hundredths.
(2) Hundred is a convenient base for comparison
(3) Percent as 'fraction', 'ratio', decimal and rate
(4) Whole, one, half and other numbers in terms of percentage
(5) Percentage is a ratio, the value of which may be less than, equal to or greater than unity.

Facts:—

(1) Percent is a fraction.
(2) The fractional equivalent of a percentage may be less than, equal to or greater than .

When a number is compared with a larger number, the smaller number is less than 100% of the larger number.

When a larger number is compared with a smaller number, the larger number is greater than 100% of the smaller number. When two equal numbers are compared, one number is 100% of the other. 200% of a number is twice the number and so on.

Principles:—

(1) A fraction remains unaltered when the numerator and denominator are multiplied by the same number.

(2) Fractions can be compared by reducing them to a common denominator.

Processes :—

(1) To express a fraction as a percentage

(2) To express a given number as a percentage of another number.

(3) To express a decimal as a percentage.

(4) To express a percentage as a fraction and as a decimal.

(5) To express any rational number as a percentage.

(6) To find a given percentage of a certain number.

(7) To find the whole when certain percentage of a number is given.

(8) Given 'a' % of a number, find 'b' % of the same.

Generalisation :—

Pupils are to be led to make the following generalisations.

(1) To express any number as a percentage, multply by '100' and then affix the symbol %

(2) Given a percentage of a given number, to find the whole, divide by the fractional equivalent of the percent.

OBJECTIVES

1. The child acquires knowledge of
   (1) the terms 'percent', 'percentage'
   (2) the symbol %
   (3) the concept of percentage
   (4) Processes listed under 'processes'

Specifications

1. The child recalls and recognises the above (4)
2. The child acquires understanding of
   (1) the concept of percentage
   (2) the processes listed above.

Specifications

(1) The child explains the meaning of the symbol % and the concept 'percentage'.

(2) The child illustrates the above through examples.

(3) The child translates verbal statements into symbolic language.

(4) the child detects errors and corrects them.

(5) The child identifies relationships between fractions, decimals and percentages.

(6) The child makes rough estimates relating to percentage.

(7) The child compares and discriminates closely relating concepts relating to percentage.

3. The child applies his knowledge and understanding of all the above to unfamiliar situations.

(1) Judges the sufficiency or insufficiency of given data.

(2) establishes relationships

(3) generalises

(4) suggests alternate methods and selects the most appropriate method.

4. The child acquires skill in
   (1) computing—does oral and written calculations correctly and with speed and case.
   (2) representing percentage graphically
   (3) reading and interpreting graphs.

5. The child develops interest in 'Mathematics'
   (1) expresses measurements in life situations as percentages.
   (2) collects graphs representing percentages.
   (3) helps students weak in mathematics.

OBJECTIVE-BASED ACTIVITIES

1. Give the following questions as pretest:-

(a) Fill in the blanks suitably.

$\frac{1}{3} = \frac{\ldots\ldots}{6}$

$\frac{2}{10} = \frac{\ldots\ldots}{5}$

$\frac{7}{10} = \frac{\ldots\ldots}{30}$

$\frac{5}{25} = \frac{1}{\ldots\ldots}$

$\frac{12}{18} = \frac{2}{\ldots\ldots}$

Write on the B. B.

Symbolic form of fraction

John takes 5 games out of 7
Gopal takes 4 games out of 7

Both won. But, who is the better player? Ask 'How do you write the above statements in short form?' [$\frac{5}{7}$, $\frac{4}{7}$]

Takes another example

Fractions with the same denominator

Mary gets 20 marks out of 50 for the first term. She gets 25 out of 50 for the second term. Has Mary progressed?

Ask to express each in symbols.

Take the example

In a school 15 pupils passed out of 40.

In another school 28 passed out of 80.

Ask 'which school has produced the better result?

Is the total number the same?

One denominator a multiple of another

How do you write these statements $\left[\frac{15}{40}, \frac{28}{80}\right]$

Ask 'How will you bring the first fraction to the denominator '80'

Give the following exercise (knowledge-recalls)

Express the following fraction as fraction with '18' as the denominaior (knowledge-recalls)

$\frac{1}{3}, \frac{5}{6}, \frac{4}{9}$

Write on the B. B.

Different denominators

Out of 16 girls in the class 12 passed

Out of 24 boys in the class 16 passed

Ask 'How do you compare?' $\frac{12}{16}, \frac{16}{24}$

Lead the pupils to give the answer after equalising the denominator.

Give the following exercise

Write the following fractions with a common denominator (Knowledge-recalls)

$\frac{4}{5}, \frac{5}{6}, \frac{7}{12}, \frac{21}{30}$

Ask 'What do you do to compare the values of these fractions?'

Lead the pupils to give the general method and also the principle under lying it.

Ask 'How do you compare two fractions if their denominators are different?'

'Is it advantageous to write fractions always with the same denominator?'

'Which number will you select as the denominator?'

Out of different numbers suggested by pupils, lead them to realise the advantage of taking '100' as the common denominator.

Write on B. B. After eliciting from the pupils a few fractions with '100' as denominator.

$\frac{7}{100}$, $\frac{20}{100}$, $\frac{25}{100}$, $\frac{175}{100}$

Ask the pupils to write the numerators alone without the denominator because it is common in all cases.

Demonstrate on B B.

$\frac{7}{100}$ = 7 hundredths, $\frac{20}{100}$ = 20 hundredths, and soon.

Tell that all these numbers have a common denominator '100'. In order to express the common denominator we may write 7 percent or 7%, etc. Lead the pupils to see that % is short form for 'per hundred' or hundredths.

Symbol
%
percent

2. Write the following on the B. B.

$\frac{17}{100}$, $\frac{23}{100}$, $\frac{56}{100}$

Ask the pupils to read (knowledge-recalls) Tell the pupils that it is written in symbolic language as.

17%, 23%, 56%, 150%

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Ask the pupils: (1) to read

75%, 26%, 87%

(2) to express in symbolic language

$\frac{27}{100}$, $\frac{85}{100}$, $\frac{73}{100}$, $\frac{65}{100}$, $\frac{125}{100}$, $\frac{250}{100}$

(3) to express as a fraction (knowledge-recalls)

25%, 32%, 87%

(4) Fill in the blanks with appropriate numbers (understanding-identifies)

$\frac{27}{100}$	. . . %
. . .	18%
. . .	26%
$\frac{63}{100}$	. . . %
. . .	67%

3. Ask the pupils to write $\frac{7}{10}$ with denominator 100.

Express it in symbolic form

Give other examples of the same type.

$\frac{4}{20}$, $\frac{5}{25}$, $\frac{3}{5}$

Give the following questions

Express the following as %

$\frac{9}{10}$, $\frac{13}{20}$, $\frac{7}{25}$, $\frac{17}{50}$

$\frac{1}{2}$, $\frac{1}{4}$, $\frac{3}{4}$

(knowledge—recalls)

4. Write the following on the B. B.

$\frac{13}{20}$

Ask 'what do you do to express $\frac{13}{20}$ as a percent' ?

Conversion to fraction to %

'How do you get '5' $\left[\frac{13 \times 5}{20 \times 5}\right]$ $\left[\frac{100}{20}\right]$

Give other examples

Express $\frac{14}{40}$ as a percent

Demonstrate by proper questions

$$\frac{14}{40} = \frac{14 \times \frac{100}{40}}{40 \times \frac{100}{40}} = \frac{\frac{14}{40} \times 100}{40 \times \frac{100}{40}} = \frac{\frac{14}{40} \times 100}{100}$$

$$= \frac{14}{40} \times 100\% = 35\%$$

Take other examples and lead the pupils to generalise that to convert a fraction a percentage, it has to be multiplied by '100' and to supply the symbol (%) to the product obtained.

Give the following exercises

Express the following as percent

(knowledge—recalls)

$\frac{3}{10}$, $\frac{11}{40}$, $\frac{3}{70}$, $\frac{16}{25}$, $\frac{14}{30}$

$\frac{17}{35}$, $\frac{17}{60}$, $\frac{14}{75}$, $\frac{13}{56}$, $\frac{8}{7}$

Fill in with appropriate quantities

$\frac{2}{10}$	...%
.....	30%
$\frac{3}{20}$	...%
.....	55%
$\frac{125}{100}$	...%
.....	175%

Decimals to percent

Ask 'How would you express .7 as a percent?'

.7 x 100 = 70%

1. Express the following as percent
   .76, .63, .05, .2 (Knowledge—recalls)
2. Express the following percentage as decimals (Knowledge-recalls)
   63%, 20%, 2%, 8%
3. Fill in with appropriate quantities

.4	....%
.75	....%
....	25%
....	87%
1.25	....%
....	150%

4. Fill in with appropriate quantities

$\frac{18}{100}$	18%	·18
$\frac{73}{100}$	.....	.....
.....	.....	·72
$\frac{3}{5}$	.....	.....
.....	2%	.....

5. Ask 'What will be 70% of 80'

Lead the pupils to say

To find a certain % of a given number $80 \times \frac{70}{100}$

Give more examples of the type

Give the following exercise

(knowledge–recalls)

Calculate

1. 8% of 75
2. 20% of 60
3. 30% of 80
4. 5% of 25
5. 2% of 18
6. $2\frac{1}{2}$% of 20
7. 5·3% of 30
8. 70% of ·8

6: Ask.

Give the fractional equivalent and simplify

	1%	$[\frac{1}{100}]$
Whole part	10%	$[\frac{1}{10}]$
	50%	$[\frac{1}{2}]$
	100%	[1] whole.

What is the percent equivalent of

Whole (1)	100%
half ($\frac{1}{2}$)	50%
one fourth ($\frac{1}{4}$)	25%
one eighth ($\frac{1}{8}$)	$12\frac{1}{2}$%
twice (2)	200%
1	100%
2	200%
3	300%
$4\frac{1}{2}$	450%
2.7	270%

Express the following number as percentage

(knowledge—recalls)

$\frac{3}{4}$, 2.2, 5.6, .2, $\frac{5}{8}$

Express the following as decimals.

71%, 112%, 1.2%, 12%

Ask

Ratio-percent A team played 20 games and won 13 of them. What percent of the games played did it win ?

Lead the pupils to say $\frac{13}{20} \times 100\% = 65\%$

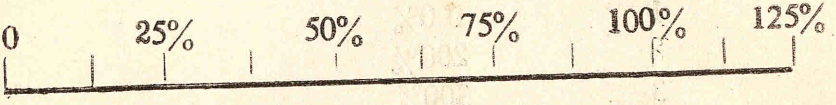
alternative method $\frac{13}{20} = 20)\overline{13.00} = 65\%$

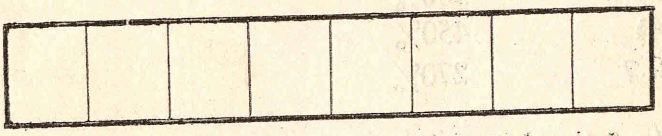
$$\begin{array}{r} .65 \\ 20\overline{)13.00} \\ 120 \\ \hline 100 \\ 100 \end{array}$$

The pupils should be laught to ask themselves the following

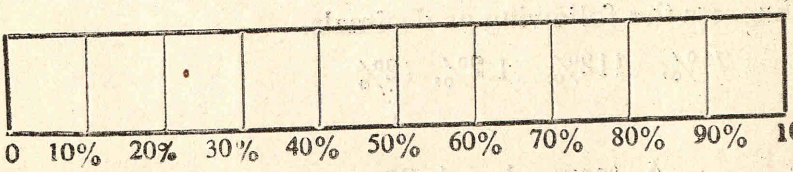
What number is to be compared ?
With what number is it to be compared ?
Could the answer be more than 100%
Must the answer be less than 100%

Visual aids: (Illustration)





A



B

The pupils may be given exercises where in they are asked to draw charts and graphs to depict percent.

7.

Ask 1. '10% of a number is 5'

Given a certain % to find the whole

What will be 1% of it $[\frac{5}{10}]$

,, 100% = $\frac{5}{10} \times 100$

= $5 \times \frac{100}{10}$

Lead the pupils to understand that

$5 \times \frac{100}{10} = 5 \div \frac{10}{100} = 5 \div 10\%$

2. 11% of a number is 16. What is the whole?

11% of the number is 16

1% ,, $\frac{16}{11}$

100% ,, $\frac{16}{11} \times 100$

(ie) $16 \times \frac{100}{11}$

(ie) $16 \div \frac{11}{100}$

(ie) $16 \div 11\%$

Continue giving examples

Lead the pupils to generalise that given a certain % of a number, the whole can be got by dividing it by the fractional equivalent of the percentage.

Give the following exercises

(1) 15% of a number is 16 find the whole?

(2) 20% of a number is 28 find the number?

(3) 18% ,, 20 ,,

(4) 12% ,, 60 ,,

(5) 50% ,, 320 ,,

8.

given x% of a number find y% of the same

Ask 1. Given 10% of a number what will be 30% of the number?

2. Given 12% of a number what will be 4% of the same?

3. 20% of a number is 30. What will be 15% of the same?

20% of the number = 30

1% ,, = $\frac{30}{20}$

15% ,, = $\frac{30}{20}$ x 15

Lead the pupils to generalise and also to suggest alternative method.

Give the following exercises

(1) If 4% of a number is 16, find 5% of the same.
(2) If 6% of a number is 15, find 8% of the same.
(3) If 12% of a number is 30, find 15% of the same.
(4) If 16% of a number is 25, find 17% of the same.
(5) If 125% of a number is 5, find 80% of the same.

MISCELLANEOUS EXERCISES

(1) What does 40% mean?

(a) 40 (b) 40 out of every 100 (c) 40 hundreds. (d) 0.40% (knowledge—recognises)

(2) What does 25% mean?

(a) 2500 (b) 25 (c) $\frac{1}{25}$ (d) 25 hundredths (knowledge—recognises)

(3) Express the following in decimals

30%, 200%, 125%, 3.5%, 4%

(knowledge—recalls)

4. Change to common factors expressed in lowest terms.

75%, $37\frac{1}{2}\%$, 40%, 5%, $66\frac{2}{3}\%$

(knowledge-recalls)

5. Change to percent.

$\frac{1}{4}$, $\frac{5}{8}$, $\frac{3}{20}$, $\frac{6}{25}$, $\frac{7}{50}$

(knowledge-recalls)

6. Fill in the gaps with suitable numbers

(a) 4% of 60 = ...
(b) 32% of 95 = ...
(c) $\frac{1}{2}\%$ of 480 = ...
(d) 15% of 80 = ...
(e) 102% of 560 = ...
(f) $1\frac{1}{2}\%$ of 920 = ...
(g) 70% of 25 = ...
(h) 300% of 55 = ...

(knowledge–recolls)

7. Fill in the gaps with suitable members.

(a) 4 = ...% of 16
(b) 15 = ...% of 6
(c) 15 = ...% of 45
(d) 12 = ...% of 8
(e) 12 = ...% of 40
(f) 70 = ...% of 35

(understanding–identifies)

8. Fill in with appropriate numbers.

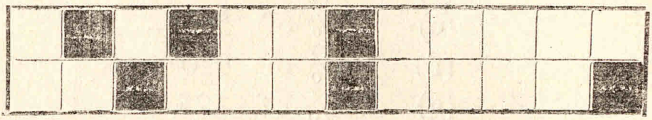
(a) 5% of ..... = 80
(b) 110% of ..... = 55
(c) 15% of ..... = 75

(d) Rs. 66 = 110% of.....
(e) 3%..... = 60
(f) 600 = 150% of.....
(knowledge–recalls)

9. The price of a bicycle is Rs. 359. The sale tax is 2%. How much is the tax?
(knowledge–recalls)

10 A tank holds 200 litres when full. There are 160 litres in the tank. What percent of the tank is filled.
(knowledge-recalls)

11. (a)



What percent of the figure is shaded?
(b) What percent of the figure is not shaded?

12. During a strike in a spinning mill eightyfive percent of the men did not work. Explain mathematically what this means. (understanding-explains)

13. The sale-tax (in a certain shop) is 3% of the selling-price. Explain what it means. How much more would you have to pay for a saree marked Rs. 25.
(Understanding-Explains)

14. Two boys standing in a street corner make a list of the kinds of Cars that passed. Out of 74 Cars 16 were 'Ambassodors'. What percent of the total is this?
(Knowledge-recalls)

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15. .28 clerks were working in a store. Because the store had too many orders, 5 more were appointed. What percent of the original number is the present number?

(Understanding– identifies)

16. A milk society states in its bills "Add 5% of your bill if not paid before the tenth of this month'. Mrs A's bill is for Rs. 40.30. Through carelessness, she did not pay the bill until 15th. How much extra did she have to pay? How much did she have to pay in all?

(Applicati on—establishes relationship)

17. A store allows 2% reduction for cash sales. If you buy things amounting to Rs 46 and make the payment in cash, how much will you have to pay?

(Application – establishes relationship)

18. The daily-wages of the workers in a cashewnut factory was increased from Rs. 3.20 to Rs. 4. What is the percentage of increase?

(understanding—identifies)

19. The sales records of a certain company was Rs. 20560 in October and Rs. 22880 in November. What was the percent of increase of the November sales over October sales.

(knowledge – identifies)

20. A man paid Rs 600 for a radio. After 10 years he sold it for Rs 150. Find the percentage of decrease in the price.

(understanding—identifies)

21. A man was driving 60 k.m. an hour. On coming to a curve in the road, he slowed down to 40 k.m./hr. What was the percentage of decrease in the speed.

(understanding—identifies)

UNIT TEST

UNIT. PERCENTAGE STD VI TIME 40 mts.

DESIGN Max. Marks 25

Table. 1. Weightage to content

Sl. No.	Sub-topic	Marks	% of marks
1	Conversion of fraction and decimal to percentages and vice-versa.	9	36
2	To find a% of a given number, to express one number as a percentage of another.	8	32
3	Give a% of a number to fin the whole. Given a% of a number, to find b% of the same.	8	32
			100

Table 2. Weightage to objectives

Sl. No.	objectives	Marks	% of marks
1	Knowledge	15	60
2	Understanding	5	20
3	Application	3	12
4	Skill	2	8
			100

Table 3. Weightage to forms of Questions

Sl. No.	Form	No. of Questions	Marks	% of marks
1	Objective type	12	6	24%
		5. 5 x 2	10	
2	Short answer type	6. 6 x 2	6	64%
3	Essay type	1	3	12%

Table 4. Weightage to difficulty level

Sl. No.	Difficulty level	No. of Qus.	Marks	% of marks
1	Easy	7	6	24
2	Average	14	15	60
3	Difficult	3	4	16

Scheme of section: Section A containing objective type questions
Section B containing short answer and essay type questions.

Scheme of option: Nil.

UNIT TEST IN MATHEMATICS

TOPIC. PERCENTAGE CLASS: Std. VI

MAXIMUM MARKS: 25 TIME: 40 Mts.

BLUE PRINT

OBJECTIVES	Knowledge			Understanding			Application			Skill			Total
Sub-topics	E	S	O	E	S	O	E	S	O	E	S	O	
(a) Conversion of fractions & decimal into percentage	3 (3)		2 (4)			1(1)			1(2)				9
(b) and vice versa.	2 (1)												

(a) To find a given % of a certain number.							
To express one number as a percentage of another.	2(1)	1(2)	2(2)	1(2)		2(1)	8
Given a certain % age of a number, to find the number.							
Given a % of a number to find b % of the same	4(2)	1(2)		3(1)			8
							25
TOTAL		15	5	3	2		

E Essay S Short answer O Objective type.

General Instructions.

A. This paper has two sections, Section A and Section B.

B. Section A is to be attempted first.

C. The maximum time allowed for Section A is 10 mts, but if you finish it earlier, hand over this section to your teacher and pass on to section B.

D. Section A will be taken back at the end of 10 mts. The Teacher on duty will collect it from your desk.

SECTION A

Time: 10 mts. Max: marks 6

A. All questions are compulsory

B. Read the questions carefully before trying to answer it

C. Answers have to be written on the question paper itself in the space provided

D. No steps are required in answering the questions

E. Do not waste time on the question about the answer of which you are not sure. Pass on to the next.

F. In each of the questions from 1 to 12, there are four or five answers marked A, B, C, D and E. Only one of these answers is correct. The letter

indicating the correct answer should be written in bold letters in the right hand margin within the brackets.

G. Each question of this section carries $\frac{1}{2}$ mark.

SECTION A

1. $\frac{60}{100}$ is

A	B	C	D	E
600%	60%	6%	.6%	.06%

( )

2. 3.5% is

A	B	C	D	E
350	35	3.5	.35	.035

( )

3. 10% of Rs. 50 is

A	B	C	D	E
Rs. 5	Rs. 10	Rs. 100	Rs. 60	Rs. 500

( )

4. $\frac{2}{5}$ is

A	B	C	D	E
2%	20%	5%	50%	40%

( )

5. A medicine has 0.2% of certain drug in it. The quantity of drug in 100 oz. of the medicine is

A	B	C	D	E
.2 oz	2 oz	20 oz	.02 oz	.002 oz

( )

6. $\frac{\frac{13}{14} \times 100}{100}$ is

A	B	C	D	E
$\frac{1300}{1400}\%$	$\frac{13}{14}\%$	$\frac{13}{14 \times 100}\%$	$\frac{13 \times 100}{14}\%$	$\frac{13}{1400}\%$

( )

7. 5% of a number is 16 $12\frac{1}{2}\%$ of the same is

A	B	C	D	E
$\frac{16 \times 12\frac{1}{2}}{5}$	$\frac{5 \times 12\frac{1}{2}}{16}$	$\frac{16}{5 \times 12\frac{1}{2}}$	$\frac{5}{16 \times 12\frac{1}{2}}$	$\frac{16 \times 100 \times 12\frac{1}{2}}{5}$

( )

8. In a book 20% of the pages are pictures. There are 110 picture-pages. The total number of pages in the book is

A	B	C	D	E
$\frac{110 \times 20}{100}$	$\frac{110 \times 100}{20}$	110×20	$\frac{100 \times 20}{110}$	$\frac{110 \times 100}{80}$

( )

9. 42% means

A	B	C	D	E
42	.42%	42 hundreds	42 out of 100	4200

( )

10. In a class of 30 pupils 24 are present today. The % of absentees is

A	B	C	D	E
$\frac{6}{30}$	$\frac{6 \times 100}{30}$	$\frac{30}{6}$	$\frac{6 \times 100}{24}$	$\frac{24 \times 100}{6}$

( )

11. Sale tax of stationary articles is 3 % of the price marked. The price to be paid is . . . . of the price marked.

A	B	C	D	E
3%	103%	97%	$\frac{103}{100}$	$\frac{100}{97}$

( )

12. 0.5% means

A	B	C	D	E
0.5 of 1%	.05	.5 x 100	5% of 1	.5% of 100

( )

SECTION B

[Figures at the right hand side indicate marks]

13. Express 7.45% as a common fraction in its simplest form 1

14. Express $\frac{3}{8}$ as a percent 1

15. Express $2\frac{1}{2}$% as a fraction and as a decimal 2

16. Arrange in asendin order of magnitude.
$\frac{17}{20}$, 80%, .79 1

17. In std VI A, 30 pupils secured pass mark in mathematics. If it is $62\frac{1}{2}$ % of the total number, what is the total number in the class 2

18. Gun powder contains 15% sulphur and 10% carbon. Find the weight of carbon to be mixed with 3. kgms of sulphur. 2

19. The back wheel of a machine makes 600 turns in a minute while the front wheel makes 144 what % of the speed of the second wheel is the speed of the first? 2

20. A paper-cutting reads 'the number of people in our town today is 500% of what it was in 1920' Explain it in another way. 1

21. For a test in mathematics, in std VII A the marks are awarded out of 25 and in std VII B for a similar Mathematics test, the marks are awarded out of 40. John studing in std VII A got 15 marks and his brother Abraham studying in std VII B got 20 marks. Which boy secured better marks in Mathematics. 1

22. Articles are sold at a reduction of 20%. How much will a house wife pay for an article marked Rs.35? 1

23. In the given graph paper an area has been out lined. Shade 20% of the out lined area. 2

24. A boy getting 36% of the total, fails for want of marks. His friend getting 47% has 12 marks more than the minimum for pass. What is the maximum mark? What is the minimum for pass? 3

QUESTION-WISE ANALYSIS OF THE TEST

SECTION

No.	Objective	Specification	Sub-Topic	Form	Estimated difficulty: Definiteness Level		Marks	Time
1	Knowledge	Recognises	Conversion	O	D	C	½	½
2	,,	,,	,,	O	D	C	½	½
3	,,	,,	To find a fixed%	O	D	C	½	½
4	,,	,,	Conversion	O	D	C	½	½
5	,,	,,	To find a%	O	D	B	½	1
6	,,	,,	Conversion	O	D	A	½	1
7	,,	,,	find b%, given a%	O	D	B	½	1
8	,,	,,	find whole given a%	O	D	B	½	1
9	Under-standing	Descriminates	Conversion	O	D	B	½	1
10	,,	Translates	To find a%	O	D	B	½	1

11	Under-standing	Translates	To find a%	O	D	B	½	1
12	,,	Discriminates	Conversion	O	D	A	½	1
13	Knowledge	Recalls	,,	S.A.	D	C	1	1½
14	,,	,,	,,	S·A·	D	C	1	1½
15	,,	,,	,,	S A.	D	B	2	2
16	,,	,,	,,	S.A.	D	B	1	2
17	,,	,,	find a% given b%	S.A.	D	B	2	3
18	,,	,,	,,	S:A:	D	B	2	3
19	,,	,,	To find a fixed %	S.A.	D	B	2	3
20	Under-standing	Explains	Conversion	S.A.	D	B	1	1½
21	,,	1dentifies	find a fixed%	S.A.	D	B	1	2
22	,,	,,	,,	S.A:	D	B	1	1½
23	Skill	Draws neatly	,,	S.A.	D	C	2	2
24	Application	Establishes relationship	find a% given b%	S.A.	D	A	3	5

* A stands for difficult, B for average, C for easy.

SECTION A

SCORING KEY

Qn. No	1	2	3	4	5	6	7	8	9	10	11	12
Key	B	E	A	E	A	D	A	B	D	B	C	A

SECTION B

SCHEME OF VALUATION

Qn. No.		Value points	Marks	Total
13	(1)	7·45% is equal to $\frac{7.45}{100}$ or ·0745	$\frac{1}{2}$	
	(2)	$\frac{149}{2000}$	$\frac{1}{2}$	1
14	(1)	$\frac{3}{8}$ = $\frac{3}{8}$ x 100%	$\frac{1}{2}$	
	(2)	= $37\frac{1}{2}$% or 37·5%	$\frac{1}{2}$	1
15	(1)	$2\frac{1}{2}$% = $\frac{2\frac{1}{2}}{100}$	$\frac{1}{2}$	
	(2)	= ·025	$\frac{1}{2}$	
	(3)	= $\frac{1}{40}$	1	2
16	(1)	$\frac{17}{20}$ = 85%, .79 = 79%	$\frac{1}{2}$	
	(2)	79%, 80%, 85%	$\frac{1}{2}$	1
17	(1)	$\frac{30 \times 100}{62\frac{1}{2}}$	1	
	(2)	48 pupils	1	2

18 Weight of carbon = $\frac{3}{15}$ x 10 = 2 k.gms 2

or

(1) Total wt. of gun powder = $\frac{3}{15}$ x 100 1
= 20 k·gms

(2) Wt. of carbon = $\frac{20 \times 10}{100}$ 2 k.gms 1 2

19 (1) Speed of Ist wheel in terms of IInd wheel = $\frac{600}{144}$ x 100 1

(2) = 416.66% 1 2

20 Population of today = $\frac{500}{100}$ times or 5 times 1 1
= $\frac{500}{100}$ $\frac{1}{2}$ a mark

21 (1) % of marks obtained by John = $\frac{15}{25}$ x 100
= 60% $\frac{1}{2}$

(2) ,, by Abraham
= $\frac{20}{40}$ x 100 = 50%
John gets better marks $\frac{1}{2}$ 1

22 Amount to be paid = $\frac{35 \times 80}{100}$ = Rs. 28 1

or

(1) Reduction = $\frac{35 \times 20}{100}$ = Rs. 7 $\frac{1}{2}$

(2) Amount to be paid = Rs. 35—Rs. 7
= 28 $\frac{1}{2}$ 1

23 (1) Neatness 1

(2) Accuracy 1 2

24 (1) Difference in marks = 10 + 12 = 22 $\frac{1}{2}$

(2) Difference in % = 11 $\frac{1}{2}$

(3) Max: Marks $\frac{22}{11}$ x 100 = 200 1

(4) 36% of Maximum = 200 x $\frac{36}{100}$ = 72

or

47% of Max : = 200 x $\frac{47}{100}$ = 94 $\frac{1}{2}$

(5) Minimum marks = 72 + 10 = 82

or

94—12 = 82 $\frac{1}{2}$ $\frac{3}{19}$

AVERAGES

The main objectives aimed at in teaching averages are:

I. (a) Knowledge
   (b) Understanding
II. Skill
III. Application.

Specific Objectives:

The pupil.

I. (a) 1. Knows that the term 'average' represents Arithmetic mean and that it is one of the several averages.

2. Knows how to calculate the average of a given set of numbers integers, fractions decimals and algebraic quantities.

3. Knows the processes of finding

(a) the average, when the total and the number constituting the group are known.

(b) the average of the whole group when the average of all the parts are known.

(c) the average of the part, when that of the whole and of the remaining part are known.

(d) the total when the average and the number constituting the group are known.

(e) the number constituting the group when the total and the average are known.

(f) One of the numbers in a group when the average and all the numbers except the number to be found are known.

(b) 4. Understands that the terms like 'speed' 'better yields etc. are basically terms relating to averages.

5. Understands that 'average' represents the group as it is the typical value in the group.

6. Understands the concept of averages with its various implications.

II. 7. Develops skill in calculating Arithmetic mean by the trial average method.

8. Develops skill in finding the average of numbers in Arithmetic progression by mere inspection.

III. 9. Applies the knowledge of the process involved in average and its concept in solving problems.

10. Recognises life situations where average can best be used for representing the group and also the limitations of its use.

11. Applies the knowledge of averages in comparing groups.

Testing Readiness.

Knowledge of the four fundamental operations with integers fractions decimals ond algebraic quantities

CONTENT ANALYIS

Averages

The idea of average in a lavman—mode the most common value in the group as representing the group mode as a means of comparing two groups—use of mode in industry—Median—the middle value as typical of the group. Average or Aritmetic mean as representing the group. Average for comparing groups—Finding the average of a given set of numbers. The relation between average, number constituting the group and the total average of percents—Average (AM) is more reliable than any particular value as when the length of a table is measured by several persons. Properties of A. M.

1. Its value is depending upon the value of each and every member of the group unlike the mode and median.

2. Average can be, fractional or integral,

3. Average lies between the lowest and the highest values.

4. Average may or may not be equal to a number in the group.

5. When each one of a set of numbers is increased or decreased by a certain number, the average also is increased or decreased by the same number.

Terms and statements implying average used in daily life. Situations in life where average is applied and its

imitations. Trial average method numbers in A. P. Estimating the average of a group of numbers. The relation of the avercge of the whole group to the average of the parts.

The average of speeds or Harmonic mean

Programme for the gifted

The relative advantages of the several averages—which average to use in a particular situation? eg. comparing the income of 2 village on one of which there are millioners. Terms and statements implying average—More properties of Arithmetic mean. The sum of the deviations from the average on either side (that of values less than it and greater than it) are equal. When each number in a group are multiplied or divided by the same number the average also is multiplied or divided by the same number. If we imagine equal weights are placed on a straight uniform rod weights at points corresponding to the numbers whose average is to be found, the rod will balance at the point which indicates the average of those numbers—the lowest and the highest numbers being represented by weights at the two extremes of the rod.

Finding the median when there are even number of numbers in the group. Finding A. M. from a frequency table (without introducing the idea of arbitrary mean and deviations as the pupil need not be familar with negative numbers) Advanced problems for calculating A. M.

Teaching Point	Objectives & specifications	Learning activities	Evaluation
The idea of average in a lay man-mode the most common value in the group as representing the group.	K (recognises)	Situations can be given where one number occurs most often, so that the pupils can easily see that the most common value is a special characteristic of that group. Thus for example the yield of eggs from the poultry farm for several consecutive days can be given (the total number of eggs being the same on most day) and the pupil asked to say how many eggs are usually obtained each day. Questions like: How many cocoanuts do we get from a cocoanut tree? How much rice will a person eat in one meal?, What is the life span of a balsom plant? etc. will help the discussion of the idea of mode in a lay man.	What is the quantity of milk that your cow yields daily? How much will a porter earn daily? The daily profit of a shop keeper for a fort-night is as follows Rs. 10, 10, 11, 10, 10, 10, 8, 10, 10, 10, 10, 9, 10, 10, 10. If he is asked what his daily profit is, what will be his reply?

1	2	3	4
Mode as a means of comparing two groups.		Let children compare and say in which of the two divisions pupils are generally older (The mode age must be easily perceptible in each division) Let him say why he has chosen the particular division. Similar situations-marks for 2 classes or groups such as two benches of pupils where the individual values repeat-which group is better? The price per litre of milk sold by different vendors in 2 districts enumerated. In which district is the milk cheaper? Several situations where pupils are required to compare two groups have to be presented. The situations must in general be taken from the immediate environment of the pupils.	Is this means of comparison always possible? There are 40 pupils in the 6th Standard Adivn. and 45 in B divn. The number of children at different ages in the 2 divisions are as follows. A B 10 year old 1 8 11 year old 35 6 12 year old 14 31 40 45

1	2	3	4
Use of mode in industry.	K (recalls)	The use of the idea of mode in making ready made dresses, shoes etc can be presented to the children.	On the whole in which division are the children older?
Median, the middle value as typical of the group.	K (recalls)	When a set of marks is given and the pupils are asked to enumerate the upper half and the lower half of the group of scores, let them suggest that this can easily be done by writing the scores in ascending or decending order. Let them say that the score which is mid way is neither in the Upper group or in the lower group and so it represents the typical or the ordinary performance.	What is the typical height of a boy in the class. What can you say about the number of scores in a group so that finding the median more is possible?

1	2	3	4
Average Arithmetic mean)	K (recalls)	Fo find the A. M. of a set of numbers–situations to be given where Arithmetic mean is to be calculated. The pupils themselves must arrive at the general rule for finding the A.M. Interesting assignments like find the average number of absentees in the class during the last month, find the average number of units of electricity consumed (per month) in your home considering the record of the past months, find the average weight of 12 year old boys in the class (if a weighting machine is available) etc. can be given.	Find the average of 5, 0, 4, 7 What is the average of a, b, c, d, e find the average height of pupils sitting in a bench find the average number of words per line in your English text book (taking a sample page) How will you find the average age of pupils in your class? Find the average of x, 2x, 6x.

1	2	3	4
Average for comparing groups.	K (Compares) A (Establishes relationship.)	Given the total monthly income and the number of members of 2 families one a family of coolies and the other a family of officials, (all the members in the 2 families being employed), the pupils are asked to say which the family of coolies is. Even though the gross income in the family of coolies should be given bigger, the average income must be less. Several examples must be given where the pupils will have to compare the grops by finding the average. Only the total and the number of numbers need be given in such examples. Thus the total amount spend by two batches of boys going to the same place may be given and the pupils may be asked to find which batch had the more expensive trip-the amount spend by each of the	Compare 2 divisions for their performance in a mathematics test and judge which division is better. Two boys Ram and Ganesh are the top ranking boys in the class. It was decided to give the prize to the boy who showed the best performance in Mathematics tests for the three terms. Ganesh could not appear for the 2nd term test as he had been to the N. C. C. Camp. The marks obtained by them are as follows.

1	2	3	4
		members of the 2 batches need be given only in later examples so that the pupils can easily suggest that the total expenditure is to be obtained for comparing the 2 batches. Let the pupils themselves suggest that the total expenditure has to be divided by the number of members in the batch to get an index of the expenditure for comparison.	Ram 75 80 82 Ganesh 90 — 70 To whom should the prize be given.
Average as more reliable than a particular value.		Let several children measure the length of the table or desk and let these be tabulated. Which value can be taken as giving the length of the table? Let the pupils see that average of these values will be the most reliable value.	

1	2	3	4
The relation between average, the number constituting the group & the total.	U (identifies relationship)	When the total and the average are known the number constituting the group will have to be found by the pupils. In otherwords any two of the three quantities is given the other must be found out. (It is desirable to generalise the relationship among the three by the formula $a=\frac{s}{n}$, so that the children can easily get one when the other two are known.)	The percapita income and the total income of a country being give to find the approximate population of the country.
Properties of A. M.	(K) recalls	Situations are to be given where the average is, fractional (including decimals (as well as intergal. Let the pupils see that average may or may not be a number of the group. Let him also see that it lies between the lowest and highest values.	
	(A) draws conclusions.	Let the pupils discover that when the same number is added to all the members of a group the average also is increased by the same num-	What other operation can be done o- each of the memben so that you can find

1	2	3	4
		ber. If the same number is substracted from all, the average also is decreased by the same number.	a similar change in the average too?
Average depends upon all members unlike median & mode.	(U) identifies relationship.	Examples can be presented where the median and mode are unaffected if some members in the group are eliminated. But the fact that A.M. is depending upon each and every member of the group can be made clear.	
Terms and statements implying average used in daily life.	(U) illustraes.	Let the pupils give examples of terms and statement used in daily life where average is implied. Appropriate statements given in a newspaper can be taken up for discussion. Terms like speed, density yield per acre, cost of living index, per capita-income imply average.	Do the following statements imply average. If so which? explain— 1. Your plot being more fertile is more yielding than mine. 2. He is under weight.

1	2	3	4
		Let the pupils see that the idea of mode is implied when we say that the Indians are taller than Japanese. Let pupils give more statements where the idea of average is implied.	3. The life span of an elephant is 120 years. 4. The porter gets about Rs. 3 per day. 5. About 60000 children are being born in India every day 6 About 60 persons take meals from the Hostel daily. 7. The density of population in Ambalapuzha is less than that of Pathanamthitta. 8. She is tall for her age. 9. The cost of living index for Kozhikode is greater that for Trivandrum.
	(J) detects errors	Let pupsls see that average in not implied in statements like. 1. He is the representative of the group of 6th standard pupils. 2. The old man divided his property equally among his five children.	

1	2	3	4
Situations in life where average is applied and its limitation.	(U) explains the implied concept	A bunch of bananas is bought for a certain price at 15 ps. per banana. The child should be able to say that this does not mean that the big bananas at the top can be got for 15 ps. Funny examples such as that of the person who tries to cross a river by walking across when he hears that the average depth is only 3 ft (1 meter) etc. can be given to bring home to the pupils the limitations of the use of the average.	
Trial average method.	(U)identifies relationship (A) generalises	When the numbers are given, the average of the excess, can be added to the common base–let the pupils themselves discover the rule. Let the children see that the median will give the average of a set of numbers in A. P. This gives a method of finding the A· M. of a set of Nos. in A. P. by inspection.	Find the average of the following numbers by inspection. 236.2 236·5 236·8 236.1 236.4 How will you find the average of 8, 13, 18, 23, 28, 33,38, 43, 48, 53, 58, 63, 68, 73

1	2	3	4
	(U)estimates	Ability to estimate average from any given set must be developed. It can be atleast said that it is between the greatest and the least number.	
Average of the whole group when those of the parts are known.	(U) identifies relationship	Average marks of boys and that of girls in a class being given to find the average marks for the whole class. Let the problem be analysed and let the pupils themselves suggest that the total marks for the whole class must be obtained first and that it should be divided by the strength of the class.	The average mark of a set of 50 pupils is 38. If 2 boys with marks 45 and 55 are transferred to another division. What is the average marks of the boys in the class at present.
The average of the part when that of the whole and the remaining part or parts are known.	(U)identifies relationship	The average age of the whole class given and the average age of children who leave the class also being given to find the average of the remaining boys.	The speeds for the onward and return journeys are respectively 'a' Kms per hour and 'b' kms per hour. Find the expression for the average speed for the whole trip.

1	2	3	4
Harmonic mean—the average of speeds.	(U)discriminate between closely related concepts.	Let the children see that speed is actually an average. The speeds for the onward and return journies being given, let children find that the average speed does not depend upon the distance between the 2 places.	

See the examples given below:

Rahim bought a bunch of 20 bananas (ഏത്തക്കുല). When his friend enquired about the price, Rahim replied "I got it at 10 paise per banana".

Rahim's friend wondered "I never thought Rahim was so foolish. It is indeed very cheap to get the big bananas at the top of the bunch at 10 paise each. But he ought not to have bought the small ones at the bottom at the same price. Rahim should have bought only those at the top. Was Rahim foolish? Explain Rahim's reply to his friend.

When a man is told that the average depth of the river is only 3 feet he attempts to walk across. Is his act wise? Explain.

Activities. Laboratory methods used:

1. Find the average number of words per line in your English text book (taking a sample page)
2. Find the average number of absentees in your class during the last month.
3. Find the average age of pupils sitting in one bench.
4. Let five of you measure the length of the teacher's table and find its average length.
5. Find the average marks in mathematics for the division in an examination.
6. Compare two divisions for their performance in a mathematics test and judge which division is better.
7. Find the average weight of the twelve year old boys (if a weighing machine is available)

8. Find the average number of units of electricity consumed (per month) in your home, considering the record for the past 6 months.
9. Average height of a group (say, those sitting in a bench) of boys.

Mental sums:

The calculation involved must be made easy by giving small numbers. All principles can be tested through these sums. Questions of the types given below can be used in plenty.

1. Find the average of 3, 4 and 8.
2. Find the average of x, 2x, 6x.
3. If the sum of a few numbers is 12 and the average of those numbers is 3, how many numbers were there?
4. If a bus covers 80 miles in 4 hours, what is the average speed of the bus?
5. The average amount as pocket money of a group of 5 children is Rs. 2. Two boys whose pocket money totalled one rupee, left the group. What is the average amount of the remaining children?
6. There are 12 boys and 8 girls. The average of the boys is 3 years and that of the girls is 8 years. Find the average age of the whole set.

Similarly other types of questions.

Supervised study questions.

Here give very graded questions of gradually increasing difficulty. The increment in difficulty between two

consecutive questions must be so small that the student must be able to attack each problem without the help of the teacher.

The idea is that the pupil must be able to proceed at his own pace and cover all the problems with the least help from the teacher.

Diagnostic Questions·

Just as a doctor diagnoses and locates the cause of the malady in the patient and gives remedial treatment, the teacher also has to locate the exact area of weakness in the pupil (i.e. find out his misconceptions) and give remedial teaching:

1. Find the averate of 4, 3, 6, 7 (may go wrong for not knowing the process)
2. Find the average of 5, 0, 4 (not considering 0 as a number)
3. Are the data given in the following sufficient for finding out what is required ? If not state what additional data are required:
   (a) The average marks in mathematics for A division is 50 and for B division is 60, to find the average mark for the 2 divisions (not knowing that averages cannot be averaged).
   (b) The average speeds for the onward and return journey (from A to B and from B to A) are 18 k.m. per hour and 12 k·m. per hour respectively. Find the average speed for the whole journey·

   (not knowing that averages cannot be averaged)

4. A student got 50%, 50%, 40%, 70%, 90% and 60% marks respectively in English, Malayalam, Hindi, Science, Mathematics and Social Studies. What is the average percentage of mark that he gets? (not knowing that percentage can be averaged when they have equal bases).

5. Examine the data given for school.

Standard	Strength	Attendance	Percentage
6	40	36	90
7	70	28	40
8	100	70	70
9	90	90	100
10	20	10	50

The percentage of attendance for each standard is given. Find the average percentage of attendance for the whole school.

(not knowing that percentage cannot be averaged if they have unequal bases)

Also problems to test whether the student has any mis-conceptions regarding the various processes involved in average (Objective 3)

Programme for the gifted.

Only very brilliant children need be given the additional materials as indicated in this section.

1. Let them verify that average is the point of balancing on a uniform rod with weights placed in appropriate positions.

2. Let them be taught the method of finding the average from a frequency table, after constructing a frequency table from raw data.
3. Familiarise them with the formula and the short cut for finding the average, by choosing the arbitrary mean when the data is in the form of a frequency table.
4. Let them be told how industry makes use of the averages in making shoes, ready made shirts and other commodities, how doctors have made the table of normal weight for each age and so on.
5. Let them be given a chance to explain the flaw in finding the average of percentages directly from the fourth column in question 5 (under diagnostic questions).

6. Let them be told that in finding the average of the speeds we actually make use of the Harmonic mean (ie. the reciprocal of the A. M. of the reciprocals) Harmonic mean is yet another type of average. Thus in diagnostic question 3 (b) the average speed is $\frac{2}{\left[\frac{1}{18} + \frac{1}{12}\right]}$

Objective based questions

Frame questions to test each objective listed in the beginning. Some samples are give blow.

Objective tested 9.

1. When Govind got his progrgss card he sent a copy for information to his father employed in Delhi. Govind's

father could not read how much his son scored in social studies because it was not legibly written. But soon he found out by calculation the correct marks in social studies and entered the marks against social studies.

The copy that Govind had sent is given below with the column against social studies kept blank.

PROGRESS CARD

Name K. Govind.

Standard. IV Class No. 14

School. M. G. P. P. School.

Subject	Marks I term	Marks II term	Marks III term	Remarks
English	62%			
Malayalam	70%			
Social Studies				
Mathematics	94%			
Science	75%			
Rank	10			
Average marks	72			
Attendance	90%			

Signature of Guardian Signature of Headmaster

The marks that Govind's father entered against Social studies is

(a) 90%
(b) 72%
(c) 59%
(d) 0%

Objective tested 9

Joseph and Ram start on bicycles at 5 p m Joseph goes at a average speed of 10 kilometres per hour. At 5.30 p m. Joseph was one kilometre ahead of Ram at 6 p. m. both were moving side by side. The average speed in k.m. per hour of Ram from 5.30 p.m to 6 p.m. is

(a) 4
(b) 5
(c) 6
(d) 8
(e) 10
(f) 12

Objective tested 3

3. The total rain fall in one year in a place was 60 cm. The average monthly rainfall for all months except July was 3 cm find the rain fall in July.

A. 20 c. m.
B. 27 c. m.
C. 57 c. m.
D. 5 c. m.

Objective tested 6.

4. If X and Y are two positive numbers such that X is less than Y then their average will be.

(a) never between X and Y.
(b) greater than both X and Y.
(c) equal to either X or Y.
(d) less than both X and Y.
(e) less than Y and greater than X.

Objective tested 4.

5. Mohan goes to school from his home in a car at the speed of 1 kilometre per minute and returns by same route to his home at the speed of 2 kilometres per minute. What is his average speed for the journey in kilometers per hour ?

(a) 80
(b) 90
(c) $1\frac{1}{3}$
(d) $1\frac{1}{2}$
(e) since the actual distance travelled is not given the average speed cannot be found.

Objective tested 2.

6. To find the average attendance for the class in the month of September, we have to

(a) add up the number present an each day (as recorded in the attendance Register) and divide it by 30 the number of days in September.
(b) add up the number present on each day and divide it by the strength of the class during the month.
(c) add up the number present on each day and and divide it by the number of working days for the month.
(d) add up the number present on each day and divide it by the number of pupils present on the last day in September.
(e) find the number of pupils present in the middle of the month, that is the 15th September.

ISLAM HIGH SCHOOL

KUZHUVIPURAM ISLAM HIGH SCHOOL
Date.....
ERNAKULAM

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