

**CRITERIA II**  
**TEACHING- LEARNING AND EVALUATION**  
**2.4 Competency and Skill Development**

**2.4.4 Students are enabled to evolve the following tools of assessment for learning suited to the kinds of learning engagement provided to learners, and to analyse as well as interpret responses**

**Any other relevant information**



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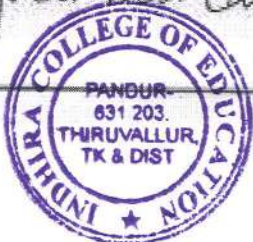
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# Test and Measurement.

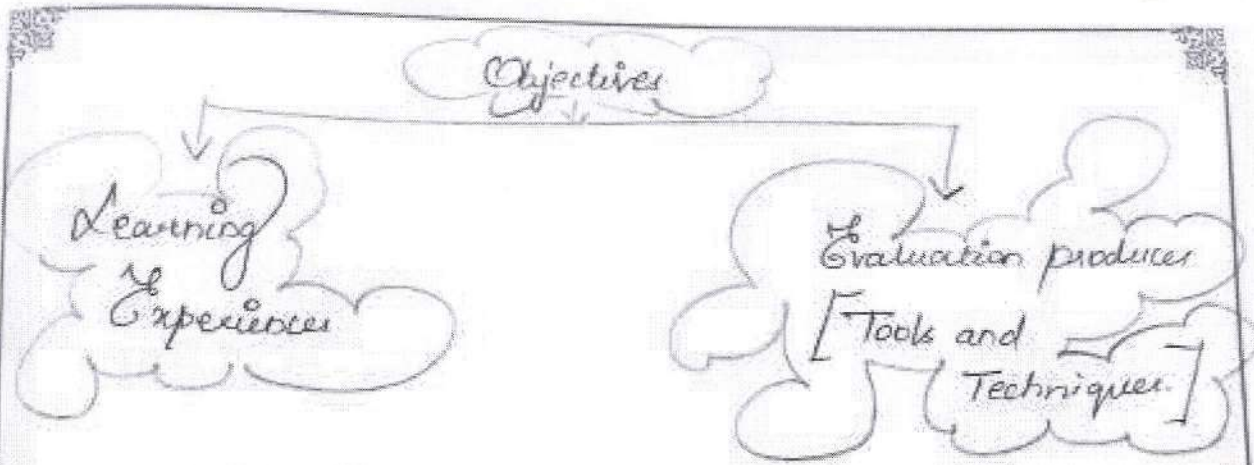
## Introduction:-

\* Evaluation is defined as a process of collecting evidences of behavioural changes and judging the directions and extents of such changes. This means that evaluation is free neither from instructional objectives nor from the teaching learning. In fact, it is intimately related to objectives and learning activities on the one hand and improvement of instruction on the other. The desired changes in children represent the purpose or end of instruction while the evaluation produces and learning experiences provided to children are the instruments or means related to these ends. The relationship between education objectives, learning experience and evaluation techniques can be diagrammatically represented as follows.

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- \* Triangular relationship between Objective, Learning experiences and evaluation. It is clear from the above triangular relationship that
- \* All the three steps are interrelated
- \* The Objectives of teaching constitutes a pivotal step on which both experiences and evaluation techniques are based.
- \* Evaluation is a natural step involved in teaching learning process.
- \* Evaluation based on objectives of teaching and learning experience evaluates the objectives also at the same time.
- \* Therefore, In Classroom, teacher Organizes.

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Suitable teaching learning activities in order to promote desired expected changes in behaviour.

\* The learning experiences offered in classroom are directly related to the pre-determined in functional objectives. Thus the teaching-learning activities are objective are not content or text book based.

\* Test :-

\* A test is a tool of measurement of an individual achievements on a particular academic subject or skill in the process of learning.

\* Measurement :-

It is the process of assigning a numerical quantity to an individual in performing the



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## \* Evaluation :-

Evaluation = Measurement + Value  
Judgement.

\* Evaluation is a process of an educational programme which includes not only subject matter achievements but also attitudes, ideas, way of thinking habits and all the changes that take place in the development of a personality.

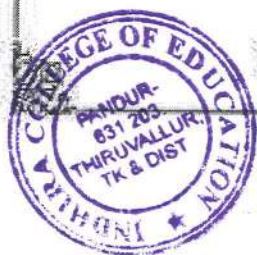
## \* Different types of tests :-

\* The teacher has to administer a variety of tools and techniques for evaluation. Tests and examinations constitute important ways to evaluate the students performance. Tests can be used for different objectives namely.

\* for measuring achievement

\* for diagnosis

\* for prediction



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Blue Print.

Subject : Mathematics  
Class : VII.

Marks : 50  
Duration : 1 1/2 hrs.

Objectives/ Content	Knowledge			Understanding			Application			Skill			Total	
	O	S	E	O	S	E	O	S	E	O	S	E		
Number System	6(1)	2(1)			2(1)	5(1)		2(1)						17
Measurement	6(1)		1*(1)		2(1)	2*(1)		2(1)		1*(1)		2*(1)		17
Algebra.	3(1)	2(1)			2(2)	3*(1)		2(1)		2*(1)				16
	15	4	1	1	8	10	-	6	-	3	-	2	1	50.
			20.			18				9			3	

\* Inside the bracket is Marks  
\* Outside the bracket is no. of Questions.



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\* Weightage of content.

S.No	Content	Marks (50)	Marks (100)
1.	Number System	17	34
2.	Measurements	17	34
3.	Algebra	16	32.
			100

\* Weightage of types of Questions.

S.No.	Question type	Marks 50	Marks 100
1.	Objectives	15	30
2.	Short Answer	20	40
3.	Essay.	15	30.
			100

\* Weightage of Objectives :

S.No	Objectives	Marks 50	Marks 100.
1.	Knowledge	20	40.
2.	Understanding	18	36
3.	Application	09	18
4.	Skills	03	6
			100



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# Frequency Distribution.

S. no	Class Interval	Tally	frequency
1	31-40		3
2	41-50		4
3	51-60		12
4	61-70		17
5	71-80		10
6	81-90		5
7	91-100		4
		Total	55



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## Arithmetic Mean

\* The mean is arithmetic average 'x' in the following frequency distribution each 'x' is multiplied by the corresponding frequency and the product  $fx$  is taken and is denoted as  $\Sigma fx$ : when we divide frequencies, we get the value of the arithmetic mean.

$$\text{Arithmetic Mean, } \bar{x} = \frac{\Sigma fx}{N}$$

Sr.	class Interval	Mid Point $x$	Frequency $f$	$fx$ .
01.	31 - 40	35.5	3	106.5
02.	41 - 50	45.5	4	182
03.	51 - 60	55.5	12	666
04.	61 - 70	65.5	17	113.5
05.	71 - 80	75.5	10	755
06.	81 - 90	85.5	5	427.5
07.	91 - 100	95.5	4	382.
Total				3632.5

$$\begin{aligned} \text{Mean } \bar{x} &= \frac{\Sigma fx}{N} \\ &= 3632.5 / 55 \end{aligned}$$

$$\bar{x} = 66.045$$

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## Median.

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\* Median is the score of the middle item of a given set of data arranged in ascending order.

\* The number of terms in each point is same

$$\text{Median} = l + \frac{(N/2 - cf)}{f} \times i.$$

Where

$l$  = lower limit of class interval

$N$  = Total frequency

$i$  = class interval

$f$  = frequency of the median

$cf$  = cumulative frequency of median class.



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Class Interval CI	frequency $f$	Cumulative frequency cf.
31-40	3	3
41-50	4	7
51-60	12	19
61-70	17	36
71-80	10	46
81-90	5	51
91-100	4	55

$$M_{\text{Median}} = l + \left( \frac{N/2 - cf}{f} \right) \times i$$

$$N/2 = 55/2 \quad l = 60.5 \quad f = 12 \quad cf = 19 \quad i = 10$$

$$N/2 \Rightarrow 27.5$$

$$\begin{aligned} \text{Median} &= l + \left( \frac{N/2 - cf}{f} \right) \times i \\ &= 60.5 + \left( \frac{27.5 - 19}{12} \right) \times 10 \end{aligned}$$

$$= 60.5 + 0.7 \times 10$$

$$= 60.5 + 7.08$$

$$\text{Median} = 67.58$$



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## Mode.

\* The Mode is strictly defined as the frequency on the scale of measurements with maximum frequency is a distribution. It is a point of maximum concentration on the scale of values usually it is the item of the variable which occurs the largest number of items.

$$\begin{aligned} \text{Mode} &= 3 (\text{Median}) - 3 (\text{Mean}) \\ &= 3 (67.58) - 3 (\text{Mean}) \\ &= 202.74 - 132.01 \end{aligned}$$

$\text{Mode} = 70.72$

- \* Mean = 66.045
- \* Mode = 70.72
- \* Median = 67.58



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C.I	f	Mid point $x$	$x = x - \bar{x}$	$f(x)$	$ f(x) $
31-40	3	35.5	-30.595	30.595	91.785
41-50	4	45.5	-20.595	20.595	82.38
51-60	12	55.5	-10.595	10.595	127.14
61-70	17	65.5	-0.595	0.595	10.115
71-80	10	75.5	9.405	9.405	94.05
81-90	5	85.5	19.405	19.405	97.025
91-100	4	95.5	29.405	29.405	117.62
Total					620.115

$$M.D = \frac{\sum |fx|}{N}$$

$$= \frac{620.115}{55}$$

$$= 11.274818$$

$M.D = 11.274818$



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## Standard Deviation.

\* The Standard deviation is the most reliable and stable index of variability. This concept was introduced by Karl Pearson in 1893.

$$S.D \Rightarrow \sigma = \sqrt{\frac{\sum fd^2}{N} - \left(\frac{\sum fd}{N}\right)^2 \times i}$$

C.I	f	Mid pt $x_i$	$d = \frac{x - \bar{x}}{i}$	$d^2$	$fd$	$fd^2$
31-40	3	35.5	-3	9	-9	27
41-50	4	45.5	-2	4	-8	16
51-60	12	55.5	-1	1	-12	12
61-70	17	65.5	0	0	0	0
71-80	10	75.5	1	1	10	10
81-90	5	85.5	2	4	10	20
91-100	4	95.5	3	9	12	36
					7	121

$$S.D = \sqrt{\frac{\sum fd^2}{N} - \left(\frac{\sum fd}{N}\right)^2 \times i}$$

$$S.D = \sqrt{\frac{\sum fd^2}{N} - \left(\frac{\sum fd}{N}\right)^2 \times i}$$

$$= \sqrt{\frac{12083.122}{55} - \left(\frac{7}{55}\right)^2 \times i}$$

$$S.D = 13.56239.$$

Q.D < Mean Deviation < S.D.

$$9.8125 < 11.27 < 13.56239.$$



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## Correlation Coefficients.

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\* The term Correlation is used to indicate the relationship between two such variables in which with changes in the values of one variable the value of the other variables also change.

\* A.M. Tuffe defined Correlation as "An Analysis of the co-variation of two or more variables."

In other words Correlation of express the extent to which changes in one variable are accompanied by or are dependent upon changes in a second variable.

## Rank Correlation.

\* If the variable  $x$  and  $y$  cannot be measured in an interval scale but can be simply rated or ordered (i.e.) when Ordinal scale of measurement is used.



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\* Then we have to compute what is known as Spearman's Rank Correlation Co-efficient  $\rho(rho)$ .

$$\therefore \rho = 1 - \left( \frac{6 \sum d^2}{N(N^2 - 1)} \right)$$

Where,

$d$  = difference in ranks of a pair values of  $x$  and  $y$ .

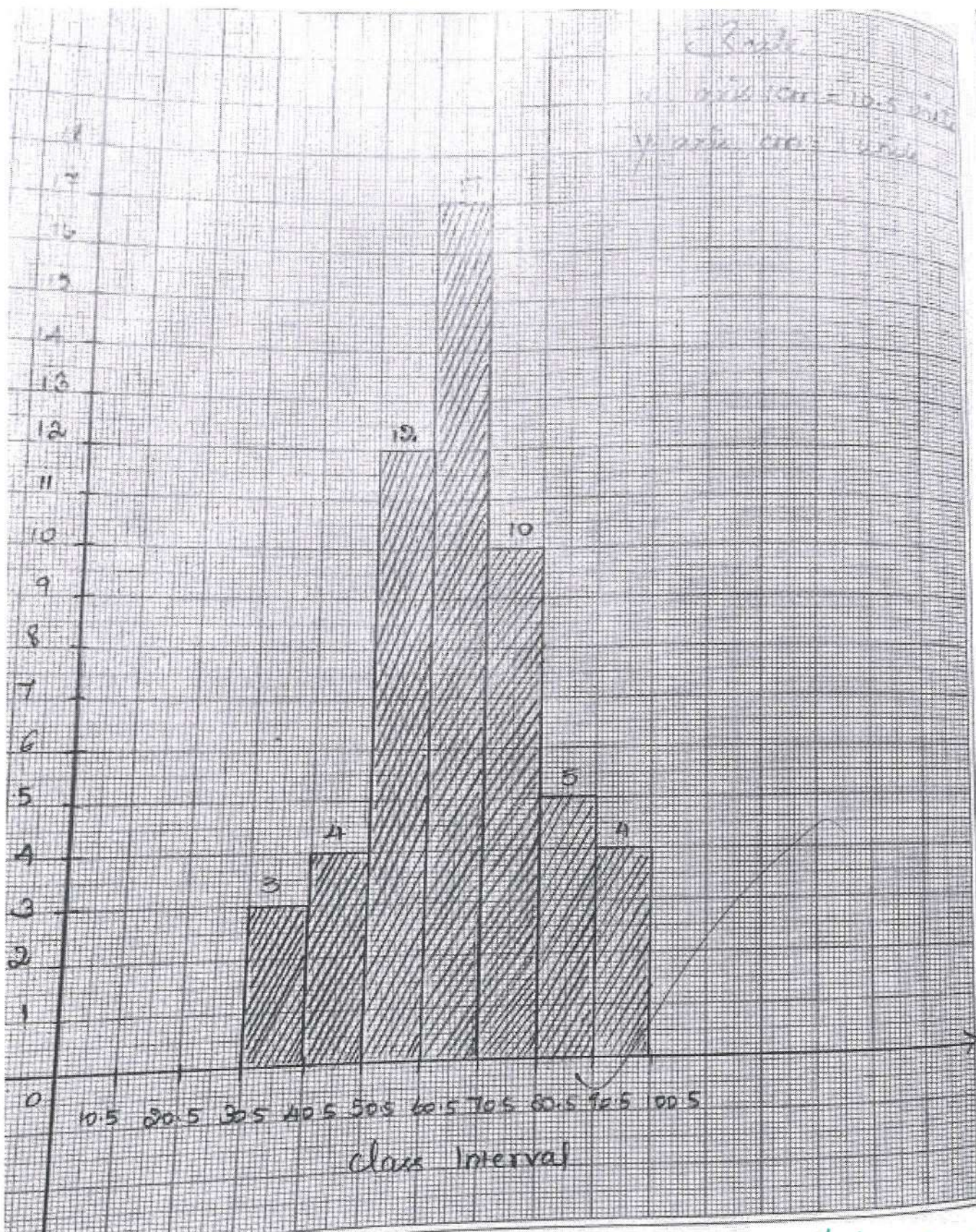
$N$  = Total Numbers of pairs.

$\rho$  = Non-parametric measure of correlation.



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## Graphical Representation

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Histogram :-

\* One of several methods of presenting a frequency distribution. Histogram is the most popular and widely used graph. The statistical meaning of histogram is that it is a graph that represents the class frequency in a distribution by vertical adjacent rectangles.

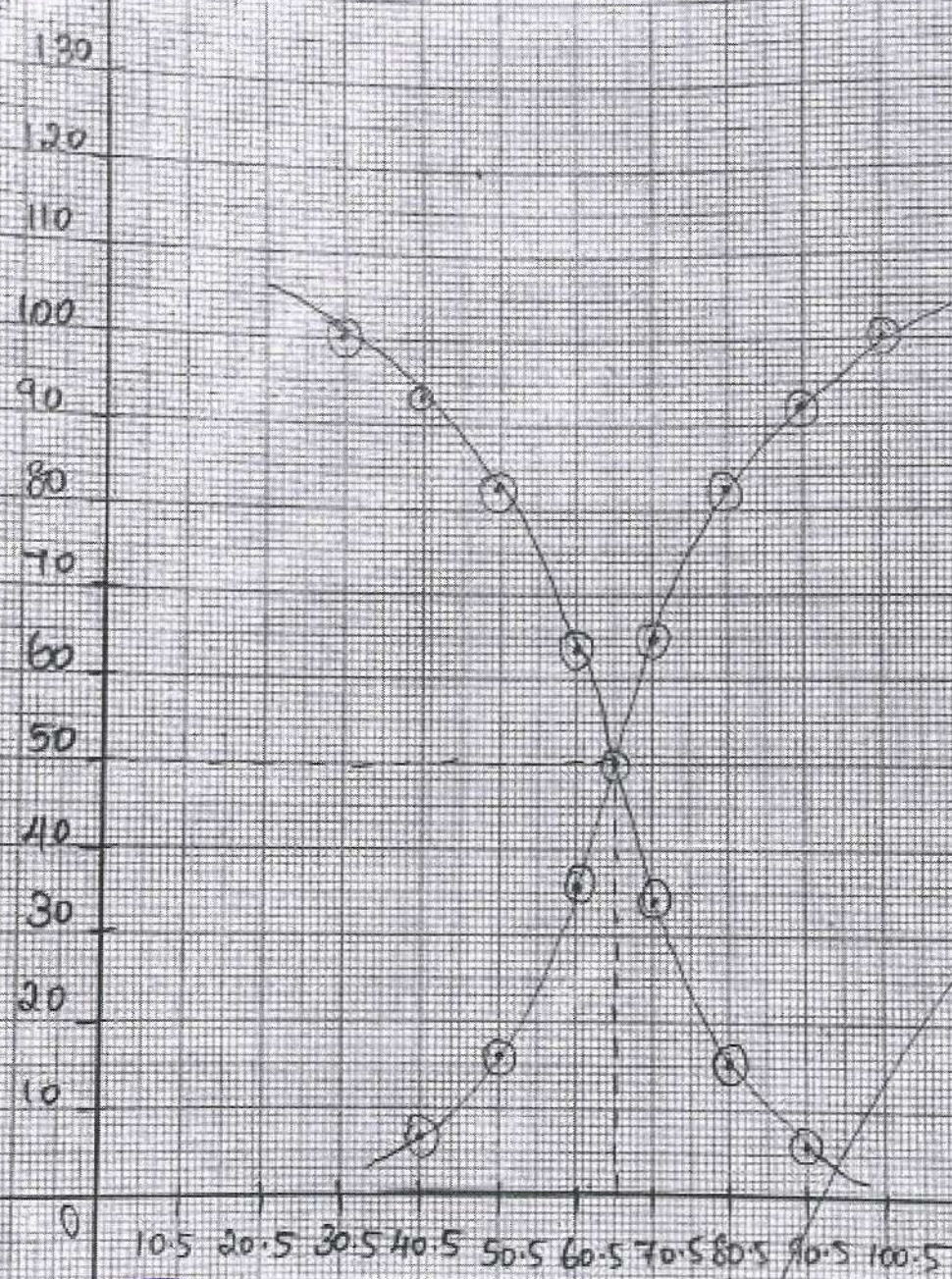
Class	Interval	Frequency
31-40	30.5 - 40.5	3
41-50	40.5 - 50.5	4
51-60	50.5 - 60.5	12
61-70	60.5 - 70.5	17
71-80	70.5 - 80.5	10
81-90	80.5 - 90.5	5
91-100	90.5 - 100.5	4
Total		55



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20.11.2022  
 20.11.2022  
 20.11.2022



class Interval

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Q Give Curve.

\* Q Give refers to the cumulative percentage frequency graph. We have to take cumulative percentage frequencies on y-axis. Mark the exact upper limit of the class interval on the x-axis. The plotted are joined smoothly to get an S-shaped curve on the x-axis and follow the steps described above, we get more than Ogive.

\* Cumulative percentage of any cumulative frequency can be obtained by multiplying the  $\frac{100}{N}$  i.e.  $100/N \times C-f$ .

C.I	f	Cf of Lower	%	Cf of higher frequency	%
30.5-40.5	3	3	5.4	55	100
40.5-50.5	4	7	12.7	58	94.54
50.5-60.5	12	19	34	48	87.27
60.5-70.5	17	36	65	36	61.45
70.5-80.5	10	46	83	19	34.54
80.5-90.5	5	46	99	9	16.3
90.5-100.5	4	51	100	4	7.7



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\* Conclusion:-

\* From this record, we have been learn about the types of test and measurements of the standard students achievements in their academic year in the schools. Then, we calculate the frequency, mean, Median and mode of the students. It is very useful to find the subject knowledge among the students.

*[Handwritten signature]*

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