

IT MATHS LAB PRACTICAL EVALUATION 2022-23

GUIDELINE FOR LAB WORK AND PRACTICAL EVALUATION OF MATHEMATICS

I. INTRODUCTION

Numerical skills and other Maths related skills are inherent in a child. These skills can be nourished by activity based learning and learning by doing. This system is practised in schools of Kerala with regard to learning of Mathematics. Learners are also getting the opportunity to learn Maths using free software like GeoGebra up to standard X. At the Higher Secondary level, where the abstract thinking is boosted, the scope of IT enabled Mathematics learning can be extended to enhance the learning process. Considering this, SCERT has prepared guidelines for introducing the concept of 'IT Maths Lab' at Higher Secondary level. This guideline was approved by the 50th State Curriculum committee and the Director Higher Secondary Education requested SCERT to initiate steps to implement the IT Maths Lab.

Accordingly, as per G. O (Rt) No. 522/2019/Gen. Edn. Dept, Trivandrum, dt. 08/02/2019 Govt. of Kerala has decided to implement IT Maths Lab from the academic year 2019-20 onwards. As per this government order, the existing IT labs in Schools are to be utilised for the functioning of IT Maths Lab. Separate IT Maths Lab is not essential. For enriching the Labs and to function the IT Maths Labs from 2019-20 onwards, the funds such as High-tech School Programme, Plan fund, MP/MLA/Local body can be utilised. The free software such as GeoGebra, Python, LibreOffice Calc ... will be provided free of cost by KITE.

Details of IT Maths Lab:

- For the proper functioning of the IT Maths Lab, a detailed Maths Lab Manual has been prepared.
- The Lab activities are prepared based on Textual content areas of Higher Secondary Maths – Class 11, Class 12.
- For the first year, there are 16 Lab tasks based on Class 11 Syllabus.
- For the second year, there are 24 Lab tasks based on Class 12 Syllabus.
- Each Lab consists of 2 or 3 activities and some additional activities.

Evaluation of Performance of students in IT Maths Lab:

- The continuous and comprehensive evaluation of the learner can be done through the activities done in the IT Maths Lab.
- The performance of the learner in IT Maths Lab can be evaluated as a part of Practical Evaluation of the learner.

The details are discussed below:

II. SYLLABUS FOR PRACTICAL:

Learning outcomes associated with some of the topics in Higher Secondary Maths syllabus are better transacted if it is discussed in the Lab. So IT Maths Lab is conceived as a transaction

method. Hence the Lab meant for each year should be discussed in the year itself. The additional activities in each Lab are meant for exceptional students and are not compulsory in regular Lab classes.

During the last academic year as schools were closed due to covid 19 pandemic, it is understood that we couldn't make it possible to carry out all the assigned lab works. Also NCERT rationalised the content in Mathematics textbooks of Plus One and Plus Two. Some of the topics dropped by NCERT are part of the lab activities. In this circumstances, it is decided to modify the list of IT Maths Labs for this academic year. For the IT Maths Lab Practical Examination in February / March 2023, the following labs with the corresponding activities are to be completed

Lab 0 is compulsory

From the labs given below it is mandatory to do 12 labs, by selecting at least 5 from each standard (Plus 1 & Plus 2).

PLUS ONE

1. Lab 0 Basic Concepts
2. Lab1 Value of functions
3. Lab 2 Shifting of Graphs
4. Lab 4 Trigonometric Functions
5. Lab 8 Straight lines (Activity 8.1, 8.3 and 8.4)
6. Lab 9 Conic Sections (Activity 9.3 , 9.4 and 9.5)
7. Lab10 Circle and Parabola
8. Lab12 Basics of 3D (Activity 12.1 , 12.3 and 12.4)
9. Lab13 Limits (Activity 13.1, 13.2 and 13.3)
10. Lab16 Miscellaneous (Activity 16.1, 16.2 and 16.4)

PLUS TWO

1. Lab18 Functions (Activity 18.1 , 18.2 and 18.3)
2. Lab19 Invertible Functions (Activity 19.1 , 19.2 and 19.3)
3. Lab 20 Inverse Trigonometric Functions 1 (Activity 20.1, 20.3 and 20.4)
4. Lab 24 Continuity
5. Lab 26 Increasing and Decreasing Functions
6. Lab 29 Maxima and Minima (Activity 29.1 and 29.2)
7. Lab 32 Application of integrals (Activity 32.1 and 32.2)
8. Lab 34 Vectors

III. EVALUATION AT HIGHER SECONDARY LEVEL:

The evaluation pattern of Mathematics at the Higher Secondary Level is as follows:

YEAR	TE	CE	PE	TOTAL
First Year	60	20	--	80
Second Year	60	20	40	120

For the Continuous Evaluation, the activities of IT Maths Lab may also be considered along with other items prescribed for CE from the first year itself. The Details of Practical Evaluation is explained below.

IV. PRACTICAL EVALUATION (PE)

In Practical Evaluation the students are tested only on the basis of Mathematical concepts. Necessary software knowledge will be given as a hint in the evaluation question. The following are the guidelines for conducting PE.

- The questions should be strictly based on the syllabus prescribed for practical work in each year.
- The examination will be of 3 hours duration and maximum score is 40.
- Practical examination should be conducted in batches. The maximum number of students in each batch may be limited to 20.
- Students should attend the PE with the Practical Observation Book. It should compulsorily include 12 Lab works, at least 5 from each year, duly signed by the concerned teacher. The same should be verified and counter signed by the external examiner at the time of PE.
- The questions should be taken from the question pool finalised by DHSE.
- For the practical examination, 6 questions will be given to each student out of which he/she has to answer only 4, selecting at least 1 from each year. Each question carries a maximum score of 8. Hence the students can get a maximum score of 32 from 4 questions. The questions will be randomly selected by the external examiner from the question pool given by DHSE.

*The scoring indicators for a question of PE is as follows:
8 score (each question)*

Indicators	Score
Analysing the problems	1
Choosing the appropriate method	1
Recording the procedure	3
Problem solving skill	2
Generating output	1

- The Practical Observation Book will be evaluated by the external examiner. The maximum score is 4.
- A Viva voce will be conducted for each student based on the questions answered. It should be a casual interaction with the student during the evaluation to check whether he/she has clarity in concept / process of the questions that he/she answered in the practical examination. Students can get a maximum score of 4.

Scoring indicators for Viva-voce are as follows
Viva voce (4 score)

Indicators	Score
Content knowledge	1
Clarity of concept	1
Logical sequencing of idea	1
Communication skill	1

- The score sheet should be filled in by the external examiner. The format of score sheet is given below.

Sample Score Sheet

Sl No.	Register Number	Question No.1 Score (8)	Question No.2 Score (8)	Question No.3 Score (8)	Question No.4 Score (8)	POB Score (4)	Viva voce Score (4)	Total Score (40)
1								
2								
3								

- Name and Designation of external Examiner:

.....

Date of Exam:.....

Signature:.....

- The final score sheet should be send to DHSE as per instructions given by the Directorate of General Education.