

Guidelines for Higher Secondary Practical Evaluation 2022-2023 PHYSICS

Physics is an experimental science. A clear understanding of its principles can be made by doing the experiments by one's own hands. Hence experimental Physics is highly significant in the higher secondary level. In the Physics laboratory a systematic study of a phenomenon or a principle is conducted through scientific method.

A minimum of 14 experiments must be performed by each student with at least 7 experiments from each section A and B (First year and Second year)

Students must be provided ample opportunities to be familiar with the maximum number of apparatus and scientific principles through practical physics.

Performing experiments using the same apparatus / principle and recording them as different experiments should be avoided. Eg. (i) Find the volume of a given sphere using Vernier Calipers and (ii) Determine the density of a rectangular block using Vernier Calipers cannot be recorded as two separate experiments.

Physics Practical Log Book

The experiments performed by the student must be recorded in the log book. The student should be encouraged to draw the tabular column and write the aim and principle of the experiment before performing the experiment in the lab and the certified logbook should be submitted for practical examination. A single logbook should be used for first and second year. A minimum of 14 experiments should be recorded in the practical log book.

Scheme of Work

Year	Sub Section	Units as per NCERT textbook	Minimum number of experiments to be performed	Total periods required	Minimum experiment to be performed in the year
XI (Section A)	1	1,2,3	2	30	7
	2	4,5,6	2		
	3	7,8,9,10	1		

	4	11,12,13	1		
	5	14,15	1		
XII (Section B)	1	1,2,3	2	30	7
	2	4,5,6	1		
	3	7,8,9,10	3		
	4	11,12,13,14	1		

Higher Secondary Practical Examination

An External practical examination should be conducted at the end of HSE Second year for a maximum 40 scores. Certified log book should be submitted for the practical examination also. Duration of the examination is 3 hrs.

Score Distribution

Sl No.	Item	Score
1.	Principle and theory	5
2	Setting up of apparatus	2
3	Performance of the experiment	6
4	Result in SI units/ conclusion	4
5	Viva-Ascertaining the awareness of concepts	1
6	<i>Total marks for One Expt.</i>	<i>18</i>
7	Total marks for Two Expt.	36
8	Record	4
9	Total Score for Two Expt.	40

Two experiments should be done at the time of practical board examination, One experiment from XI (Section A) and other from XII(Section B). The total marks for practical board examination is 40.

EXPERIMENTS (Section A or XI)

1. Find the volume of the given cylinder/rectangular block. Given Vernier Calipers.
2. A sphere of known mass is given along with Vernier calipers. Determine the diameter and hence volume of the sphere.
3. Determine internal volume of the given calorimeter. You are supplied with Vernier calipers.
4. A screw gauge and a meter scale are supplied. Determine the diameter of the wire and hence find its volume.
5. Using a screw gauge, determine the thickness of the glass plate and find its volume. Graph paper supplied.
6. Determine the volume of the given lead shot using a screw gauge.
7. Using a spherometer find the thickness of the glass plate and hence find its volume with the use of a graph paper.
8. Using a spherometer, find the radius of curvature of the spherical surface (concave/convex).
9. Using common balance determine the mass of the given body by sensibility method.
10. Using the principle of moments determine the mass of the given body.
11. Find the mass of the meter scale using the principle of moments.
12. Using the moment bar, find the relative density of the given body.
13. Find the relative density of the given body using parallelogram law.
14. Find the mass of the given body using parallelogram law apparatus.
15. Using a capillary tube and microscope, find the surface tension by measuring capillary rise.
16. Draw the load-extension graph of a helical spring for at least four different loads and determine the spring constant from the graph.
17. Tabulate load extension for helical spring for at least four different loads and find spring constant by calculation.
18. Using a helical spring, measure the period of oscillation with four different known masses and determine spring constant by calculation.
19. Draw $M-T^2$ graph for a helical spring with four readings. Determine spring constant from the graph.

20. Determine the viscosity by measuring the terminal velocity of glass beads through castor oil in a jar.
21. Find the specific heat of a solid or liquid by the method of mixtures.
22. Using the law of friction, find the coefficient of friction between a block and a horizontal surface.
23. Determine the period of oscillation for lengths, 70, 75, 85, 90 and 95 cm of a Simple pendulum .Plot $L-T^2$ graph, find acceleration due to gravity using graph.
24. Find the period of oscillation of a simple pendulum lengths, 65, 70, 75, 85 and 90 cm. Using these values calculate the acceleration due to gravity at the place.
25. Using resonance column apparatus, measure the resonating lengths for at least three tuning forks hence find velocity of sound at room temperature.
26. Compare the frequencies of two tuning forks using resonance column apparatus.
27. Using a sonometer, determine the unknown frequency of the given tuning fork. Three tuning forks of known frequencies are supplied.
28. Using a Sonometer study the relation between length of a given wire and tension for constant frequency.
28. Study the rate of cooling by drawing a time-temperature graph. You are provided with a Calorimeter, water and stopwatch, thermometer etc.

EXPERIMENTS (Section B or XII)

1. To find the resistivity of a material of wire using Ohm's Law.
2. To find the resistance of a material of wire using Ohm's Law by plotting $V - I$ graph.
3. To find the change in resistance of a given material with length using ohm's Law.
4. To determine resistance of a galvanometer by half-deflection method and to find its figure of merit.
5. To convert the given galvanometer (of known resistance and of figure of merit) into an ammeter of desired range and to verify the same.
6. To convert the given galvanometer into a voltmeter of desired range and to verify the same.
7. To find the frequency of the ac mains with a sonometer.
8. To find the value of v for different values of u in case of a concave mirror and to find the focal length.
9. To find the focal length of a convex mirror, using a convex lens.

10. To find the focal length of a concave mirror by drawing a uv graph and to verify the result by normal reflection method.
11. To find the focal length of a convex lens by plotting a graph between u and v .
12. To find the focal length of a convex lens by plotting a graph between $1/u$ and $1/v$.
13. To find the focal length of a concave lens, using a convex lens in contact with it.
14. To determine angle of minimum deviation for a given prism by plotting a graph between the angle of incidence and the angle of deviation.
15. To calculate the refractive index of the material of the prism using the id curve.
16. To determine the refractive index of a glass slab using a traveling microscope.
17. To find the refractive index of a liquid by using (i) concave mirror, (ii) convex lens and plane mirror.
18. To find the focal length of a liquid lens.
19. To draw the I-V characteristics of a p-n junction in forward bias.
20. To draw the $I-V$ characteristics of a p-n junction in reverse bias.