

[1]  
**HIGHER SECONDARY PRACTICAL EXAMINATION**  
**MARCH 2020**

**Total score: 40.**

**Time : 3 hrs.**

**HSE(II)**

**PHYSICS**

**General Instructions**

1. Two of the questions will be marked, one from section A and other from section B. Read those questions carefully and attempt both.
2. SI units should be used.
3. Scientific calculator can be used.

**Score Distribution**

<b><u>Score Distribution</u></b>	<b><u>Score</u></b>
1. Formula and Principle	: 5
2. Setting up of apparatus	: 2
3. Performance and recording of observation	: 6
4. Calculation and result in SI unit	: 4
5. Viva voce	: 1
Total for one experiment	: 18
Total for two experiments	: $18 \times 2 = 36$ .
6. Record book	: 4
Total	: 40

**SECTION A**

1. Find the volume of the given cylinder/rectangular block. Given **Vernier Calipers**.  
(Take 5 sets of readings)
2. A sphere of known mass is given along with **Vernier calipers**. Determine the diameter and hence volume. Also find the density of the sphere. (Mass of sphere = .....)
3. Determine internal volume of the given calorimeter. Hence find mass of water that can be taken in the calorimeter. You are supplied with **Vernier calipers**. Density of water  $1000 \text{ kg/m}^3$ .
4. With the help of **Vernier calipers**, find the density of the material of cylinder.  
(mass of cylinder = ..... kg)
5. A **screw gauge** and a meter scale are supplied. Determine the diameter of wire and hence find its volume.
6. Using **screw gauge**, determine the thickness of the glass plate and find its volume. Graph paper supplied.
7. Determine the volume of the given lead shot using **screw gauge**.

8. Using **spherometer** find the thickness of the glass plate and hence find its volume with the use of a graph paper.
9. Using **spherometer**, find the radius of curvature of the spherical surface (concave/convex) .
10. Using **common balance** determine the mass of the given body by sensibility method.
11. Using **principle of moments** determine the mass of the given body. (Take atleast 5 readings)
12. Find the mass of meter scale using **principle of moments**. (Take at least 5 readings)
13. Using **moment bar**, Find the relative density of the given body.
14. Find the relative density of the given body using **parallelogram law apparatus**.
15. Find the mass of the given body using **parallelogram law apparatus**. (Three set of known weights provided)
16. Using capillary tube and microscope, find the **surface tension** by measuring capillary rise.  
(Radius of the capillary tube = .....)
17. Draw the load - extension graph of a **helical spring**, for at least four different loads and determine the spring constant from graph.
18. Tabulate load extension for **helical spring** for at least four different loads and find spring constant by calculation. Also find the mass of the given body.
19. Using a **helical spring**, measure the period of oscillation with four different known masses and determine **spring constant** by calculation. Also find the mass of the given body.
20. Draw M-  $T^2$  graph for a **helical spring** with four readings. Determine spring constant from the graph.
21. Determine the **viscosity** by measuring the terminal velocity of glass beads through castor oil in a jar. Density of oil = ..... Density of glass bead = .....)
22. Find the specific heat of a solid or liquid by the **method of mixtures**.
23. Using the **law of friction**, find the coefficient of friction between a block and a horizontal surface.
24. Determine the period of oscillation for lengths, 70, 75, 85, 90 and 95 cm using **Simple pendulum**. Plot L -  $T^2$  graph, find acceleration due to gravity using graph.
25. Using **simple pendulum** determine the period of oscillation for 60, 65, 70, 85 and 90 cm. Find acceleration due to gravity by calculation.
26. Using **resonance column** apparatus, measure the resonating lengths for at least three tuning forks hence find velocity of sound at room temperature.
27. Compare the frequencies of two tuning forks using **resonance column** apparatus.
28. Using **sonometer**, determine the unknown frequency of the tuning fork if three other known frequencies are supplied.
29. Determine the Young's modulus of the wire using **Searle's apparatus**.
30. Study the **rate of cooling**, by drawing time - temperature graph. You are provided with Calorimeter, water and stopwatch, thermometer etc .

## SECTION B

1. Determine the resistivity of the given wire by **Ohm's law**. Diameter of the wire is to be taken with screw gauge.
2. By drawing current - voltage graph, find the resistance of given wire by **Ohm's law**. Also find the conductance.
3. Compare the resistance of two wires drawing current - voltage graph by **Ohm's law**.
4. Verify the law of combination of resistances in **series / parallel** using **Ohm's law**.
5. Determine the **resistivity /conductivity** of the given wire using **Metre Bridge**. Screw gauge is provided.
6. Verify the law of combination of resistances in **series / parallel** using **Metre Bridge**.
7. Compare the resistance of two wires using **Metre Bridge**.
8. Study the variations in the internal resistance of a primary cell with external resistances using **Potentiometer**.
9. Using **Potentiometer**, find the emf of Daniel cell, [ given emf of Leclanche cell = 1.45 V]
10. Compare the emf's of two cells using **Potentiometer**.
11. Find the focal length of **convex lens** by u - v method. Verify the result using distant object method. Also find power of the lens.
12. Find the focal length of **convex lens** by u - v graph. Take six sets of readings. Also find its Power.
13. Find the focal length of the given **convex lens** by drawing  $1/u - 1/v$  graph. Take six sets of readings.
14. Find the focal length of the given **concave lens** by keeping it in contact with convex lens.  
(Focal length of convex lens = .....)
15. Find the focal length of the given **concave mirror** by drawing u - v graph.
16. Find the focal length of the given **concave mirror** using  $1/u - 1/v$  graph. Take six sets of reading
17. Find the focal length of the given **concave mirror** using u - v method. Verify the result by normal reflection method.
18. Find the focal length of **convex mirror** using a convex lens.
19. Find the focal length of the **liquid lens**.
20. Determine the focal length of **liquid lens** and hence find out the refractive index of the liquid used.
21. Plot a graph showing the variation of angle of deviation 'd' with angle of incidence 'i' for given **prism**. From the graph, find the angle of minimum deviation.

22. Draw the path of a ray of light through a **prism** for six different angle of incidence and find the refractive index of the material of the prism. (Angle of prism = .....)
23. Draw the forward characteristics of a **p-n junction diode** and determine its static and dynamic resistances.
24. Draw the reverse characteristics curve of a **zener diode** and determine its reverse breakdown voltage.
25. Determine the frequency of alternating current using a **sonometer**.
26. Convert the given **galvanometer into an ammeter** of desired range.
27. Convert the given **galvanometer into a voltmeter** of desired range.
28. You are given with a transistor, two voltage sources, voltmeters, ammeters and rheostats. Connect the **transistor in common emitter** mode and draw the input and output characteristics curves.
29. Find the refractive index of the liquid using **concave mirror**.