

Total Pages-6

RNLKWC(A)/PHSHMI101P/SEM-I/2023

2023

B.Sc. (Honours)

B.Sc. First Semester End Examination - 2023

PHYSICS (Minor)

PAPER - PSHMI-01P

[Practical]

Full Marks : 20

Time : 2 hours

The figures in the right-hand margin indicate marks.

Candidates are required to give their answers in their own words as far as practicable.

Illustrate the answers wherever necessary.

Distribution of Marks:

(Experiment: 15 +LNB: 03 +Viva-voce-02)

Perform any one experiment

1. To study the vertical oscillation of a spring-mass system and to determine the gravitational acceleration 'g' and spring constant.(mass and total length of the spring wire and radius of the spring are to be supplied)

a) Working Formula.

4

(Turn Over)

(2)

- b) Data for radius of the spring wire by screw gauge
(Determine least count and take at least three readings). 2
- c) Data for the $m_L - T^2$ graph (for five different loads). 5
- d) Drawing $m_L - T^2$ graph. 2
- e) Calculation of g and spring constant from graph. 2
2. To determine the Moment of inertia of a Flywheel.
- a) Working formula. 3
- b) Data for the radius of the shaft by slide calipers
(determine vernier constant and take at least three readings). 1+2
- c) Data for length of the thread/height of the bottom of the hanger from ground by meter scale. 1
- d) Data for time of fall in case of three different loads. 3
- e) Data for number of rotations of the flywheel after it gets maximum speed by complete unwinding of the thread and before it stops for the above three loads.
- e) Data for number of rotations of the flywheel after it gets maximum speed by complete unwinding of the thread and before it stops for the above three loads. 3
- f) Calculation of the moment of inertia. 2

B.Sc. RNLKWC(A)/PHYSICS/PHSHMJ101P/SEM-I/2023

(Continued)

(3)

3. To determine the elastic constants of a wire by Searle's method (length and breadth / depth of the bars are to be supplied).
- a) Working formula for Y, η, σ . 4
- b) Data for the radius of the wire by screw gauge
(determine least count and take at least three readings). 1+2
- c) Data for the length of the wire between the bars by meter scale. 1
- d) Data for time periods of horizontal and vertical oscillation (T_1 and T_2) of the bars (three observations for vertical oscillation and three for horizontal ; 20 oscillations each observation). 5
- e) Calculation of Y, η, σ . 2
4. To determine the value of g using Bar Pendulum.
- a) Working formula 3
- b) Data for T vs. d graph. (d , the distance of the edge of holes which are far from the centre of the bar, is measured by meter scale ; measure time for at least 30 oscillations, with skipping first 30 oscillations for measuring T). 7

B.Sc. RNLKWC(A)/PHYSICS/PHSHMJ101P/SEM-I/2023

(Turn Over)

(4)

- c) Draw T vs. d graph. 3
- d) Calculation of g from T vs. d graph. 2
- 5. To determine the value of g using Kater's Pendulum.
 - a) Working formula. 3
 - b) Preliminary records of times of oscillations during adjustment of positions of the cylinders. 5
 - c) Data for final time periods T_1 and T_2 . 3
 - d) Data for the distances l_1 and l_2 . 2
 - e) Calculation of g. 2
- 6. To determine the Modulus of Rigidity of a Wire by Maxwell's needle. (Length of the wire is to be supplied).
 - a) Working formula. 3
 - b) Data for the radius of the wire by screw gauge (determine least count and take at least three readings). 1+2
 - c) Data for mass of solid and hollow cylinders by spring/ electronic balance.
 - d) Data for time periods for solid cylinders outside the needle and inside the needle (T_1 and T_2). [Measure time for at least 20 oscillations for measuring time periods, three observations for each of T_1 and T_2].

(5)

- e) Calculation of rigidity modulus. 6
- 7. To determine the Young's Modulus of a wire by Optical Lever method. (Length of the wire and length of the arm of the optical lever are to be supplied).
 - a) Working formula and rap diagram. 2+1
 - b) Data for the radius of the wire by screw gauge (determine least count and take at least three readings). 1+2
 - c) Distance between the mirror and the scale. 1
 - d) Data for load depression graph with the help of optical lever arrangement (for five loads). 5
 - e) Calculation of Y.
- 8. To measure the external diameter of a tube by slide calipers. screw-gauge and travelling microscope.
 - a) Data for vernier constant and zero error of slide calipers. 1
 - b) Data for diameter by slide calipers (at least 5 readings). 2.5
 - c) Data for least count and zero error of screw gauge. 2

(6)

- d) Data for diameter by screw gauge (at least 5 readings). 2.5
 - c) Data for vernier constant of microscope. 1
 - t) Data for diameter by microscope (at least 3 readings for each of horizontal and vertical diameter). 6
9. To determine coefficient of viscosity of water by capillary flow method (Poiseuille's method). (Radius of the bore and length of the capillary tube to be supplied)
- a) Working formula. 2
 - b) Data for h-v graph for six different h (Least count of measuring cylinder and stopwatch are to be noted). 6+1
 - c) Drawing graph. 2
 - d) Calculation of r_l from graph. 2
 - c) Calculation of maximum proportional error. 2

B.Sc. RNLKWC(A)/PHYSICS/PHSHMJ101P/SEM-I/2023