

EXPERIMENT NUMBER –9

STUDENT'S NAME- RAJDEEP JAISWAL

D.O.P – 6TH MAY 2021

UID- 20BCS2761

CLASS/GROUP- CSE 26-B

SEMESTER- 2ND

SUBJECT- QUANTUM AND SEMICONDUCTOR PHYSICS LAB

AIM:- TO CALCULATE THE VELOCITY OF ULTRASONIC SOUND THROUGH WATER MEDIA.

Theory: - Ultrasonic interferometer is a simple device which yields accurate and consistent data, from which one can determine the velocity of ultrasonic sound in a liquid medium

APPARATUS REQUIRED:-

- ULTRASONIC INTERFEROMETER
- SAMPLE LIQUIDS
- HIGH FREQUENCY GENERATOR
- SCREW GUAGE

PROCEDURE:-

1. Insert the quartz crystal in the socket at the base and clamp it tightly with the help of a screw provided on one side of the instrument.
2. Unscrew the knurled cap of the cell and lift it away. Fill the middle portion with the experimental liquid and screw the knurled cap tightly.
3. Then connect the high frequency generator with the cell.
4. There are two knobs on the instrument- "Adj" and "Gain". With "Adj", position of the needle on the ammeter is adjusted. The knob "Gain" is used to increase the sensitivity of the instrument.
5. Increase the micrometer setting till the anode current in the ammeter shows a maximum.
6. Note down the micrometer reading.
7. Continue to increase the micrometer setting, noting the reading at each maximum. Count any number of maxima and call it as n . Subtract the reading at the first maximum from the reading at the last maximum. This will make the measurement accurate

APPARATUS SET-UP:-



OBSERVATION TABLE:-

| S.NO | N th ORDER MAXIMA(MM) | DIFFERENCE(D) (MM) | VELOCITY= $\lambda * F$ = $2D(M/SECOND)$ |
|------|-------------------------------------|-----------------------|---|
| 1. | 0.6 | 0.24 | 1440 |
| 2. | 0.84 | 0.26 | 1560 |
| 3. | 1.1 | 0.24 | 1440 |
| 4. | 1.34 | 0.25 | 1500 |
| 5. | 1.59 | 0.25 | 1500 |
| 6. | 1.84 | 0.248 | 1488 |



OBSERVATIONS:

LEAST COUNT OF THE MICROMETER: 0.01 M FREQUENCY OF THE ULTRASOUND USED (F):
 $3 * 10^4$ HZ DENSITY OF WATER, = 99.458 KG/M^3

RESULT:-

THE VELOCITY IS 1488 M/SEC

LEARNING OUTCOMES:-

Measure the wavelength of ultrasonic waves in a medium.

Measure the velocity of ultrasonic waves in medium.

Explain the characteristics of ultrasonic waves



EVALUATION COLUMN (To be filled by concerned faculty only)

| Sr. No. | Parameters | Maximum Marks | Marks Obtained |
|---------|---|---------------|----------------|
| 1. | Post Lab Quiz Result. | 5 | |
| 2. | Worksheet completion including writing learning objectives/Outcomes.(To be submitted at the end of the day) | 10 | |
| 3. | Student Engagement in Simulation/Demonstration/Performance and Controls/Pre-Lab Questions. | 5 | |
| 4. | Total Marks | 20 | |