IN TEACHING THE SUBJECT OF PHYSICAL PROPERTIES OF SOUND THE IMPORTANCE OF TECHNICAL CAPITALITY

Irgashev Suyundik Uktamovich [1]
Ahmadjonova Saltanat Zafar qizi[2]
[1]*Assistant of the Termiz branch of the Tashkent Medical Academy*
[2] *A student of the Termiz branch of the Tashkent Medical Academy*
Irgashev_2019@bk.ru

Abstract: This in the article Medicine higher education in organizations Medical and biological physics education quality and efficiency increase for electron development (manuals) development that it was made and from him Foy dalanik Acoustics. Physical properties of sound to learn property and features and transversely and The determination of the speed of propagation of longitudinal waves is described and their study in the process apply experience test results given.

Key words: Acoustics, mechanical wave, transversely wave, longitudinally wave, electron no work (manual), virtual laboratory, technical captaincy, technology, Physical properties of sound.

From innovative technologies Acoustics in the use of medical and biological physics. Phenomena of physical properties of sound study, ie experience process sizes (values) get possible didn't happenor difficult has been laboratory their workdone increase enable will give. Below of medical and biological physics "Acoustics" department learning for created «Physical properties of sound topics according to virtual laboratories» named electron job lama (manual) of possibilities and features describing "Sound of waves spread speed determination" on the subject virtual laboratory work and sound phenomena, ie transversely and longitudinally the waves learning according to results analysis was brought. Communication of the window common appearance In Figure 1 came up. Electron development (manual) ofpossibilities: laboratory work in execution one from the mirror use; from experience received sizes at the base absolute and relative errors calculation; experience fulfillment evaluation and him done on the date storage Electronic development (manual) "Physical properties of sound" on the subject laboratory work in execution features:

- wave type choose (transverse or longitudinal);
- vibration frequency by changing full vagina spreading observation ;
- environment resistance by changing of the wave spreading observation;
- longitudinally and transversely of waves in the spread graph images observation;
- laboratory work in execution (experimentally) determined magnitudes

(values) to the table straight away input ;

- from experience received sizes based on absolute and relative errors automatic count
- given to assignments answer to give

Teacher and of students electron from manuals using the subject learning in training time distribution (in percent) as follows designation to the goal according to: organizational part – 3%, knowledge control make-15%, entry and demonstrative part-10%, students with electron manual based on work (tasks on the computer execution) – 65%, generalization , home task to give pampering–7% Activator stage in students computer literacy develops and from the computer use culture is formed .

Vibrations in the environment spread to the process wave says . Longitudinal wave in the style of spread out , man ear acceptance (16 Hz from 20000 Hz up to has been in frequency) of vibrations elastic in the environment spread sound vibrations or sound says . Frequency - n , speed - v, of sound vibration period – T, wave length - λ, sound wave energy , Umov vector – M, harmonic spectra of sound physical are characteristics . Hearing of intuition characteristic while height , size and are timbres . Sound height sound of vibrations to frequency depends on the frequency how much big if , the sound that's all high will be Sound (wave) hardness sound wave to the energy (of the environment in vibration of particles shift to the amplitude), energy of flow density (Umov vector) depends on :

$$U = \varepsilon v \qquad (U_{mov} \text{ vector})$$

this formula, U is the sound intensity or power , ε-energy of flow volume density, v– volume speed Sound power how much big if , the sound so much hard will be Timbre is it to hear of intuition quality characteristic mainly of sound harmonic spectrum with is characterized . Sound speed to the temperature depends , that is temperature increase with sound speed increases this as follows to write can

$$v_t = v_0 \sqrt{1 + \alpha t}.$$

This here α=0.004 K - volumetric of expansion thermal coefficient , $V_0 - 0\,^0 C$ in sound speed , then above formula the following to look will come .

$$V_t = V_0 \sqrt{1 + 0.004 t}.$$

Given in temperature sound speed knew without , the sound is at $0\,^0 C$ speed to find can

$$V_0 = \frac{v_t}{\sqrt{1 + 0.004 t}}.$$

Given in temperature sound speed to determine , in the pipe steady wave harvest in being happen to be acoustic resonance method using wave the length measure with done is increased . Sound generator , telephone , metal from the pipe consists of has been device using steady wave harvest to do can On the flute steady wave from the

phone to the plug going right wave with , from the cork of the returned (reflection , sound) wave from joing harvest will be (picture 1)

Figure 1. Standing wave harvest to be This in the picture, T is a phone , C is a stick with together moving P – plug . Stable wave harvest of being necessary condition , in the tube the air column and steady wave of length multiple in relation to be That is from the phone to the point has been distance - quarter wave of length odd to the number is equality .

$$L=(2n+1) \lambda/ 4;$$

In this case, n is desired whole the number

That's right and returned wave intersected to the points nodes is called , amplitude maximum has been to the points bubbles is called Bubbles amplitude double will be , that is, to 2A equal to will be

That's it basically steady wave harvest to be conditions satisfactory each how in distances sound sharp increases . to this event acoustic resonance says . Two next door points , that is bubbles between distance half wave to the length equal : $l= \lambda/2$ where $\lambda= 2 \cdot l$.

TASKS

1. Connect the sound generator to the network and select the desired frequency (600, 800, 1000 and 1200 Hz)

2. Slowly move the plug away from the phone and mark the sharp points (bubbles) on the stick with chalk.

3. Between signs $l_1; l_2; l_3; \dots$ measure the distances on a ruler and write their values in the table.

4. Calculate the wavelength according to the following formula: $\lambda=2 \cdot l$

Calculate the speed of sound at a given temperature according to the formula $V_t= \lambda \cdot \cdot \nu$

6. $\overline{v_t};$ ☐ Calculate the magnitudes.

7. Actual value of W:

☐ will be

8. Calculate the speed of sound at 0 ☐ $^{0 C}$ using the formula.

9. Record the measurement points in the table.

10. Received the result in the app with Table 1 given compare and conclusion take it out

Table 1

No	n, Hz	l (m)	λ(m)	V_t (m/s)	ΔV_t (m/s)	D, %
1						
2						

3					
4					
Average					

Conclusion: the organization of such laboratory work in a virtual form is the optimal solution for carrying out laboratory work where it is not possible to obtain results due to the lack of laboratory equipment. The crisis related to the lack of tools and equipment in the organization of laboratory work in HEIs can be solved by organizing laboratory work in these ways. These methods are also of interest to students.

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