

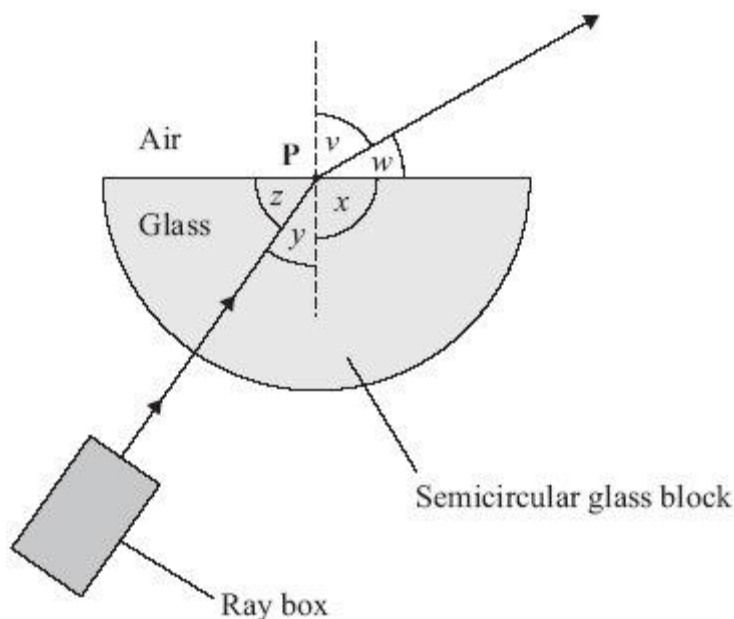
Name of the Student: _____

Max. Marks : 19 Marks

Time : 19 Minutes

Q1.

A student uses a ray box and a semicircular glass block to investigate refraction.



(a) What is the vertical dashed line called?

(1)

(b) Which angle, v , w , x , y or z , is the angle of refraction?

(1)

(c) Why has refraction taken place?

(1)

(d) In an investigation, a student always aims the light from the ray box at point **P**. She moves the ray box to give different values of angle v . She records angle y for each of these values. The table shows her results.

Angle v measured in degrees	Angle y measured in degrees
----------------------------------	----------------------------------

30	19
40	25
50	31
60	35
70	39
80	41

The student studies the data and comes to the following conclusion.

Angle y is directly proportional to angle v .

Her friend says that this conclusion is **not** correct.

- (i) Use data from the table to explain why the conclusion is **not** correct.

(2)

- (ii) Write a correct conclusion for the experiment.

(1)

- (iii) Why is your conclusion only valid when angle v is between 30° and 80° ?

(1)

(Total 7 marks)

Q2.

When sound waves reach a material, some of the energy of the sound is reflected and some is transmitted through the material.

- (a) Complete the sentence.

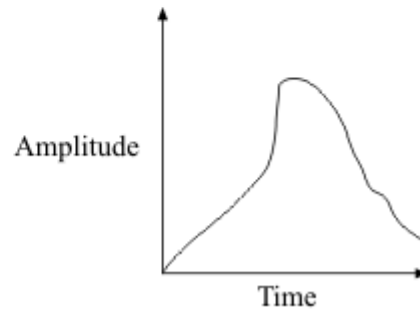
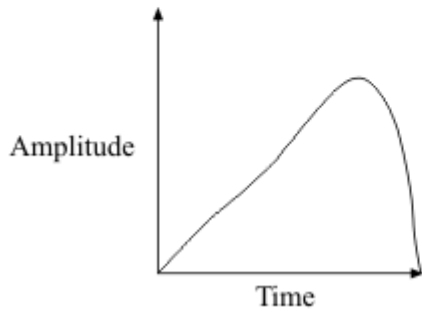
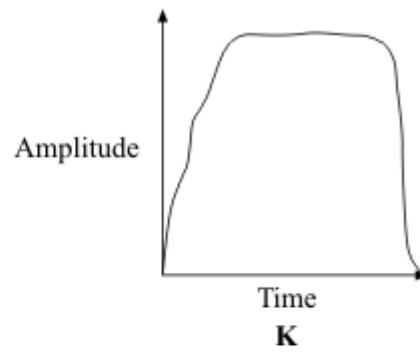
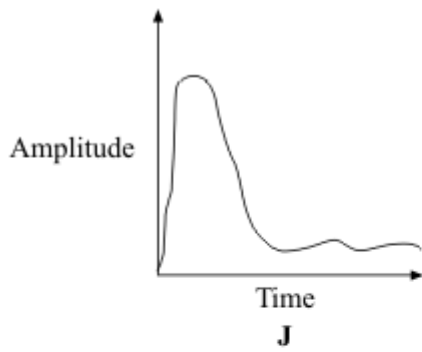
Sound waves are caused by _____

(1)

- (b) The graphs **J**, **K**, **L** and **M** represent the sound energy reflected from a surface.

The graphs are all drawn to the same scale.

Which graph shows the greatest total sound energy output from the surface?



Graph _____

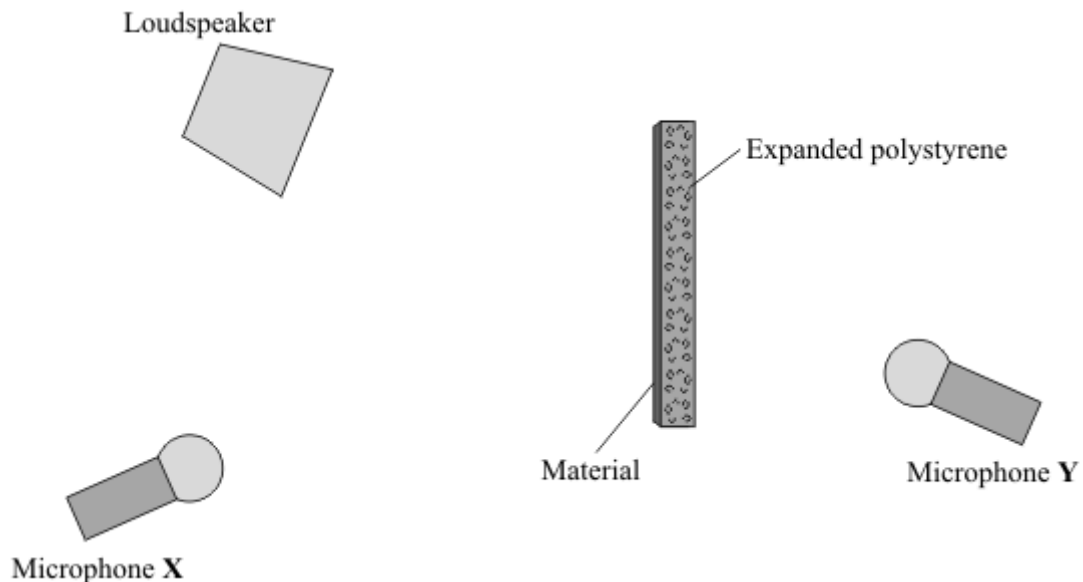
(1)

- (c) The proportion of the sound energy which is reflected or transmitted depends on the material which receives the sound.

A student investigates different materials.

The diagram shows how a student sets up her equipment.

- (i) Using a pencil and ruler to draw on the diagram, show how microphone X receives reflected sound.



(2)

- (ii) The student tests four materials. Each sheet of material is 1 mm thick. This has been glued onto a block of expanded polystyrene.

Why does the student use the same size of expanded polystyrene block and the same

sound level for each test?

(1)

(iii) The table shows the readings for the sound level transmitted to microphone Y.

Soundlevel from loudspeaker in arbitrary units	Surface material	Soundlevel transmitted to microphone Y in arbitrary units
60	paper	39
60	plaster	18
60	cloth	31
60	wood	15

[A] Which surface material transmits the smallest proportion of the sound?

(1)

[B] What proportion is this?

(1)

(d) People living in a flat have very noisy neighbours who are always playing loud music.

Suggest **one** practical idea to reduce the amount of noise transmitted into the flat through the walls and explain how your idea will work.

(2)

(Total 9 marks)

Q3.

After a person is injured a doctor will sometimes ask for a photograph to be taken of the patient's bone structure, e.g. in the case of a suspected broken arm.

(i) Which type of electromagnetic radiation would be used to take the photograph?

(ii) Describe the properties of this radiation which enable it to be used to photograph bone structure.

(2)
(Total 3 marks)