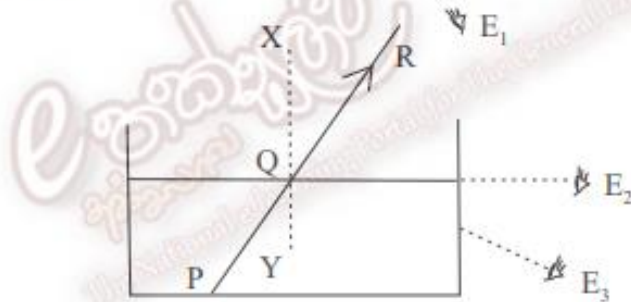


Geometrical Optics – 2

01.

- B. Below diagram shows a path of a light ray that emitted by an object at P, in a glass tank containing water.

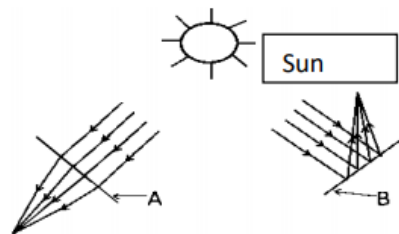


- Name the behaviour of the light ray.
- Name the angle of incidence using the letters given.
- It is observed that the ray QR travels along the water surface, when eye is kept E_2 and the position of object is adjusted. What is the special name used for the angle of incidence in this situation.
- If the light ray could be observed by keeping eye at position E_3 , name the behaviour of light at that instance.
- Draw ray diagrams to show above two situation.
- Depth of the liquid in a vessel is 50 cm. An object was kept in the bottom of that vessel. Apparent depth to the position of the object is 40 cm. Calculate the refractive index of the liquid.

02.

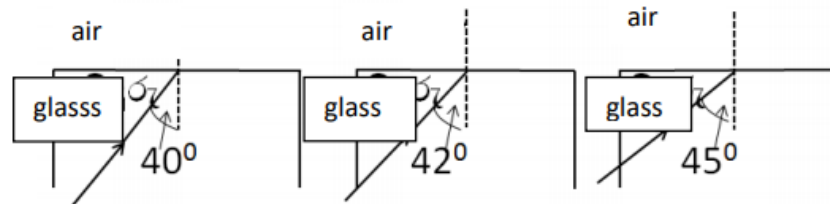
- C (1) State the Snell's law of refraction

- (2) Given below diagrams show the thing happened to the light rays of the sun, When light rays fall on two optic instrument



Geometrical Optics – 2

(3) The critical angle of glass is 42° . Copy the diagrams given below and complete the ray diagrams



Accordingly

D (1) To which group belongs to the musical instruments given below .

Drum , udakkiya , Rabbana , dawla

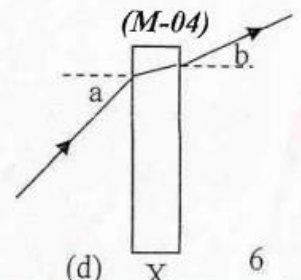
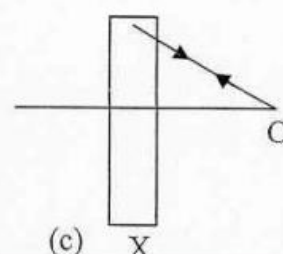
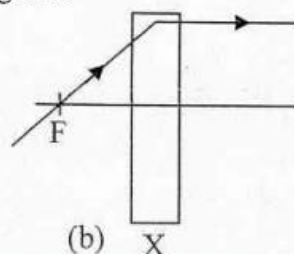
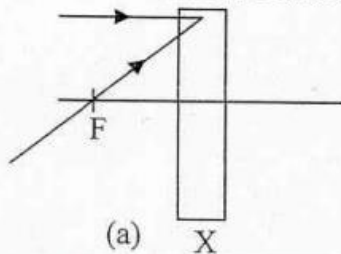
(2) The different strings of the violin produce different pitches even though strings having same tension. What is the reason for that?

(3) How does the frequency change when the length of vibrating string decreases.

03.

A) Light is the type of energy which gives sense of sight. We receive light mainly by the sun. When light rays fall on different surfaces reflection and refraction take place. In the lab we use mirrors, lenses, prisms and glass blocks to control the light rays.

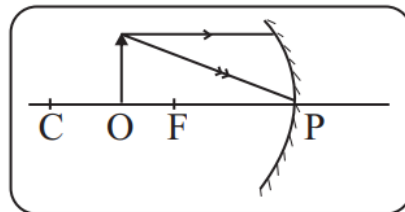
i) Write the optical instrument which must be used inside the box 'X' to control light rays as mentioned in the figures.



Geometrical Optics – 2

- ii) Why is that light ray which comes to the centre of curvature of a convex mirror, will be reflected in the same path. (M-02)
- iii) Construct the image of an object which is to be kept as $u = r$ in front of a concave mirror, using two rays. (M-02)
- iv) Simple microscope is use to observe the objects which can be seen by our naked eyes, but which are not clear to the naked eye.
- (a) Draw the ray diagram to show how images are formed by a simple microscope. (M-02)
- (b) Write 2 characteristics of the image formed. (M-02)

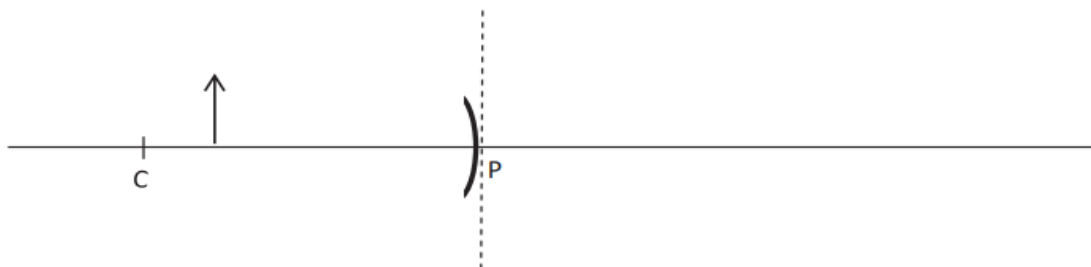
) Two light rays falling on a certain type of mirror is shown in the diagram.



- (i) What type of curved mirror is this ? (1 mark)
- (ii) According to the information given, draw the reflected rays on the answer script. (2 marks)
- (iii) Which law of light reflection was used to draw above reflected rays. (1 mark)
- (iv) State one instance, in which this type of mirrors are used practically. (1 mark)

04.

B) The pole of a curved mirror is named as P and the center of curvature as C in the following diagram

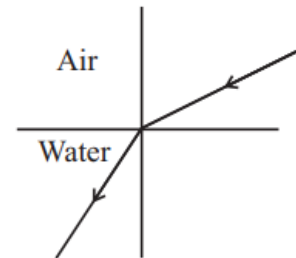


- i. This curved mirror is belonged to which type? (01 m.)
- ii. If the distance between P and C is 20cm, what is the focal length of the mirror ? (01 m.)
- iii. As shown in the diagram ,if the object is placed 15cm from the P draw a ray diagram to show the location of the image. (02 m.)

Geometrical Optics – 2

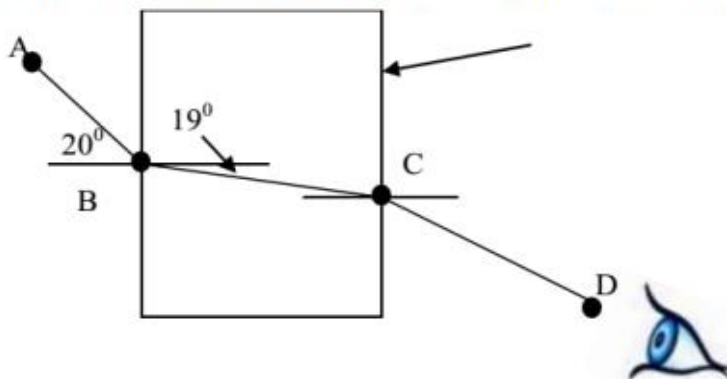
- iv. Supply following information regarding the image. (03 m.)
- a. size
 - b. Upright/Inverted nature
 - c. Real/Virtual nature

- (C) (i) Copy the diagram in your answer script and mark the angle of incidence and angle of refraction. (Use standard english letters) (02m.)
- (ii) State an expression for the refraction index. (02m.)
- (iii) An object is kept 25cm away from a concave lense of 10cm focal length. Draw a ray diagram to show the formation of the image. (02m.)
- (iv) What is the reason for writing the word "AMBULANCE" as inverted laterally in ambulance vehicle? (02m.)



05.

(A) The following test has been done to test the refractive index of glass.



Geometrical Optics – 2

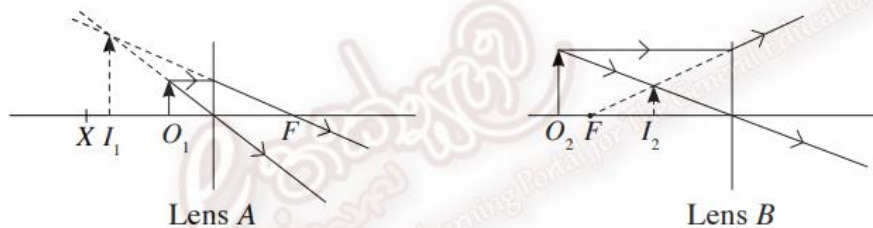
A , B , C and D are places where pins are fixed,

$$\sin 1 = 0.3250$$

$$\sin 2 = 0.3420$$

- (i) Which is represented by the lines A – B.
- (ii) Write a formula to find refractive index.
- (iii) Find the refractive index of the glass using the above formula or any other method?
- (iv) Explain briefly the method of placing pins in C and D.

(B) Diagrams show an image of an object formed by a converging lens and diverging lens.

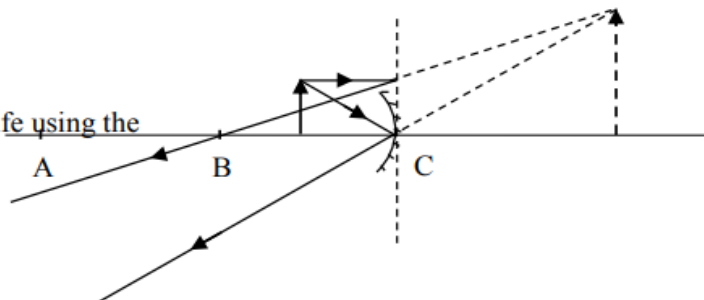


- (i) Select the converging lens from A and B.
- (ii) (a) State whether the images I_1 and I_2 are real or virtual.
(b) How did you decide whether they are real or virtual?
- (iii) Where is the object placed in front of lens A to get the image given?
- (iv) Name a practical instance where lens A forms an image as shown in the diagram
- (v) Write **two** properties of the image formed when the object O_1 is placed at X.

06.

(B) The ray diagram shows the formation of an image by an object placed in front of a mirror.

- i) Name A, B and C of the ray diagram.
- ii) Write two characteristics of the image formed as in the ray diagram.
- iii) Write two applications in day to day life using the phenomenon in the ray diagram



Geometrical Optics – 2

07.

A. Given below are some optical instruments. Answer the questions using them.

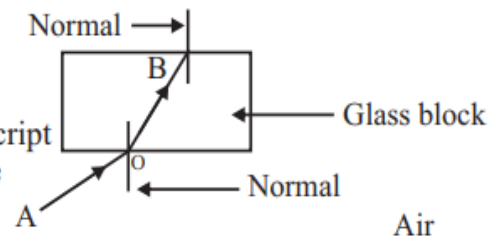
Concave mirror	Bi-convex lens	Plain mirror
Convex mirror	Bi-concave lens	Glass block

(i) Name the relevant optical instrument that can be used to get images in following instances.

Instance	Optical Instrument/ Instruments
(a). Real, inverted, magnified image formed on the same side of the object	
(b). Virtual, upright, magnified image formed on the same side of the object	
(c). Always Virtual, upright, diminished images formed on the side of the object	
(d). Virtual, upright, images formed equal to the same size of the object	

(ii) Draw the ray diagram for the image forming in (i)(a) instance.

(iii) Following diagram shows how a light ray refracted from air to glass .



(a) Draw the ray diagram to show how the OB ray refracted to air at the point B by copying the diagram on to your answer script

(b) Which property of glass and air is used in drawing the above ray diagram.

(iv) Write the refractive laws of light.