CH - HUMAN EYE.

Eye :-

The human eye is one of the most valuable sense organs that enables us to see the world around us

Different Parts of Human eye.

1. Sclera:-

• It is a tough outer coat that Protects the entire eyeball

Choroid :-

• It is a vascular layer of the eye.
• It Contains blood vessels that nourish the inner parts of eye.

Cornea :-

• It is the font position of eye.
• It is a convex in shape and bulges outside.
• Light enters the eye through the Cornea.

Iris :-

• It is a dark muscular diaphragm located just behind the Cornea.

• It regulate the amount of light entering the eye by, adjusting the Size of pupil.

Pupil :-

- It is hole in middle of iris.
- Size of pupil decreases or increases depending upon the intensity of light entering the eye.
- when High intensity of light = Size of pupil decreases.
- when Low intensity of light Size of pupil increases.

Eye lens

- It is made up of transparent jelly like substance, which is made up of proteins.
- It is held in position by ciliary muscles and suspensory ligaments (ciliary zonles).

ciliary muscle :

- The ciliary muscle and suspensory ligaments adjust the focal length of eye so that we can see distant and near by objects clearly.
- The ability of eye to focus on distant and nearby objects by changing the focal length is called accommodation.

Aqueous humor

- It is a vis cous liquid filled in area b/w cornea and eye lens.
- It prevents the eye from collapsing due to changes in atmospheric pressure.

Retina

- It delicate membrance having a large no. of light sensitive cells.
- The light sensitive cells get activated upon illumination. and generate electrical signals.
- The light sensitive cells are of 2 types.

1. Rods - Cells that respond to intensity of light.

2. Corns - Cells that respond to color of object.

Macula:

- It is a tiny area in retina which is responsible for clear and sharp vision. (sharp vision)

Fovea Centrails:

- Here maximum number of cones are present.

- An inverted real image of object is formed on retina.

- The electrical signals generated by cells are sent to brain through the optic nerve.

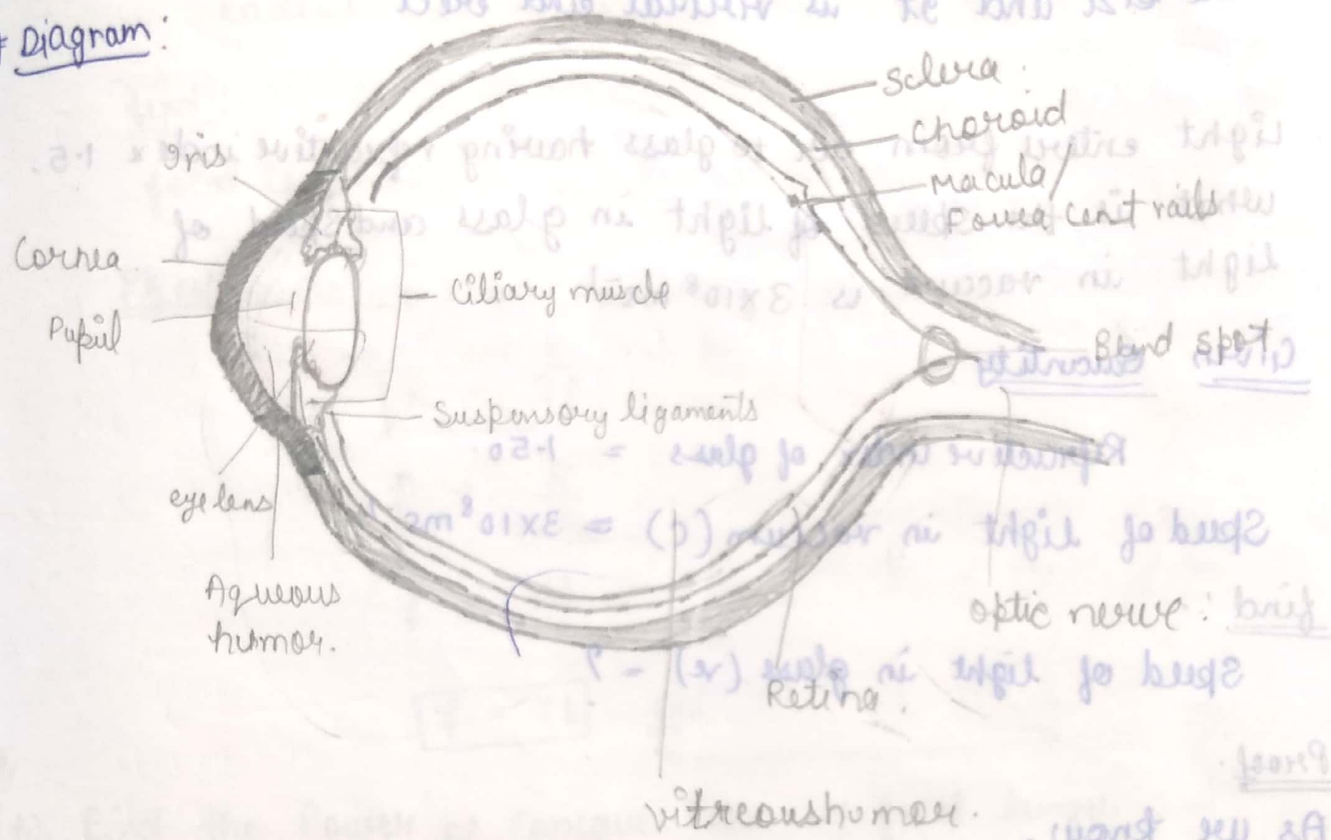- brain reassembles the signals into a meaningful image and gives rise to sensation of vision.

Vitreous Humor

- It is a jelly like substance filled in the space b/w the retina and eye lens.
- It helps in maintaining the shape of eye.

Blind spot

- It is a small region in retina where the optic nerve enters the eye.
- It is insensitive to light. Hence it is called the blind spot.

Diagram:

Labels: Cornea, Pupil, eye lens, Aqueous humor., Ciliary muscle, Suspensory ligaments, vitreous humour., Retina, Sclera, choroid, macula, Fovea can't railsrew, Blind spot, optic nerve

Ques 1. The magnification produced by plane mirror is +1. what does it mean?

Ans: It mean that the image is at same distance and same size and it is virtual and erect

Ques 2. Light enters from air to glass having refractive index 1.5. what is the speed of light in glass and speed of light in vaccum is $3 \times 10^8 \, ms^{-1}$

Ans: **Given Quantity**

Refractive index of glass = 1.50.

Speed of light in vaccum (c) = $3 \times 10^8 \, ms^{-1}$

find:-

Speed of light in glass (v) = ?

Proof:

As we know,

Refractive index of glass = $\dfrac{\text{Speed of light in vaccum (c)}}{\text{speed of light in glass (v)}}$

$$1.50 = \dfrac{3 \times 10^8 \, ms^{-1}}{V}$$

$$1.50 \, V = 3 \times 10^8 \, ms^{-1}$$

$$V = \dfrac{3 \times 10^8 \, ms^{-1}}{1.50}$$

$$V = 2 \times 10^8 \, ms^{-1}$$

Speed of light in glass (v) = $2 \times 10^8 \, ms^{-1}$.

Ques 3:

(a) Find the focal length of Convex mirror whose radius of Curvature is 32 cm.

Sol __Given Quantity__

Radius of Curvature (R) = 32 cm.

__find__:

focal length (f) = ___?

__Proof__: As we know Radius of Curvature.

$$\boxed{R = 2f}$$

$$f = \frac{R}{2} \text{(inmetres)}$$

$$f = \frac{32}{2}$$

$$\boxed{f = 16} \quad \underline{Ans}$$

(b). Find the Power of Concave lens of focal length 2m.

Aus: __Given Quantity__

focal length (f) = 2m.

__find__:

Power of lens (P) = ___?

__Proof__: As we know Power of lens:

$$P = \frac{1}{f \text{(inmetres)}}$$

$$P = \frac{1}{2}$$

$$\boxed{P = 0.5 \, D} \quad \underline{Ans}$$

Ques 4: what is Refraction of light? write down laws of Refraction of light?

Ans: Refraction of light:-

The Phenomenon in which light ray passes from rarer medium to denser medium and denser medium to rarer medium and bends towards or away from the normal is known as refraction of light.
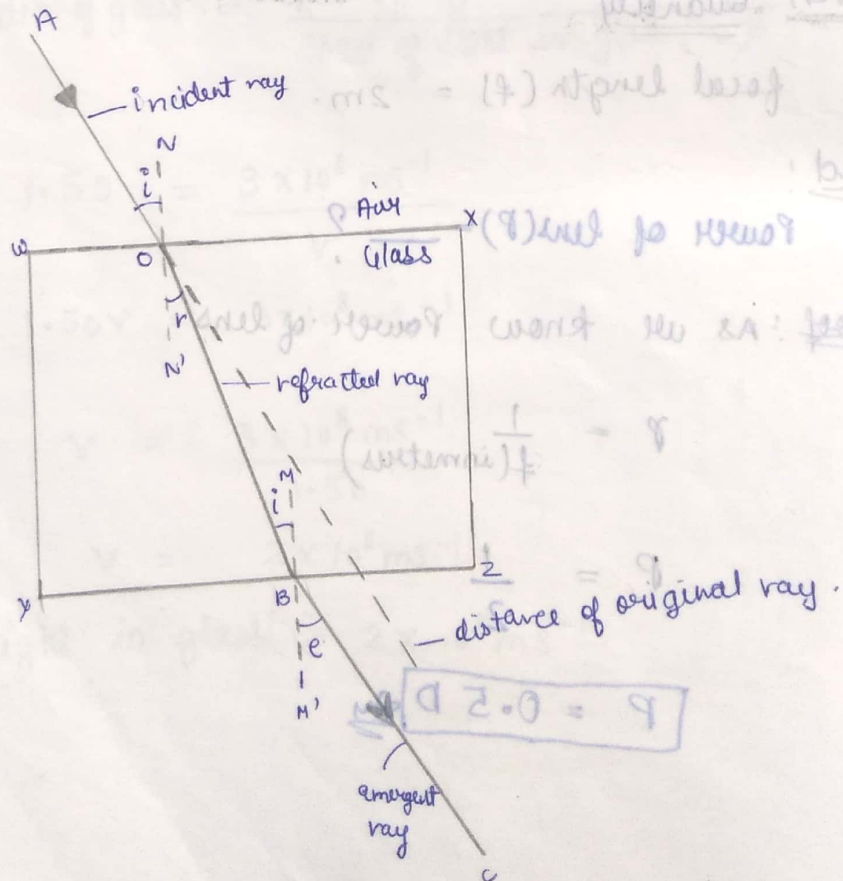
Laws of Refraction:

1. The incident ray, the refracted ray and the normal at point of incidence, all lie in the same plane.

2. According to Snell's Law.

$$\frac{\text{sin of angle of incidence}}{\text{sin of angle of refraction}} = \text{Constant}.$$

$$\boxed{\frac{\sin i}{\sin r} = \text{Constant}}$$

Diagram:-

incident ray

N

i

O

P Air

Glass

r

N'

refracted ray

m

i

B

e

M'

emergent ray

distance of original ray.

$$\boxed{P = 0.25 D}$$

Ques 5 : Draw the ray diagram in each case to show the Position and nature of the image formed when the object is placed.

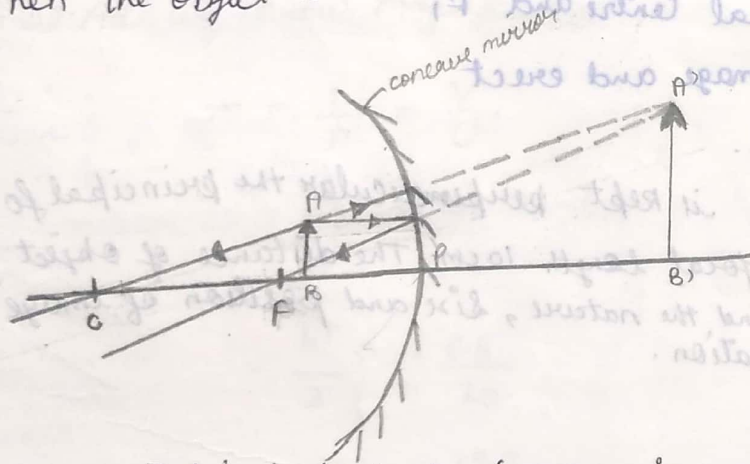Ans : (i) when the object at centre of curvature of concave mirror

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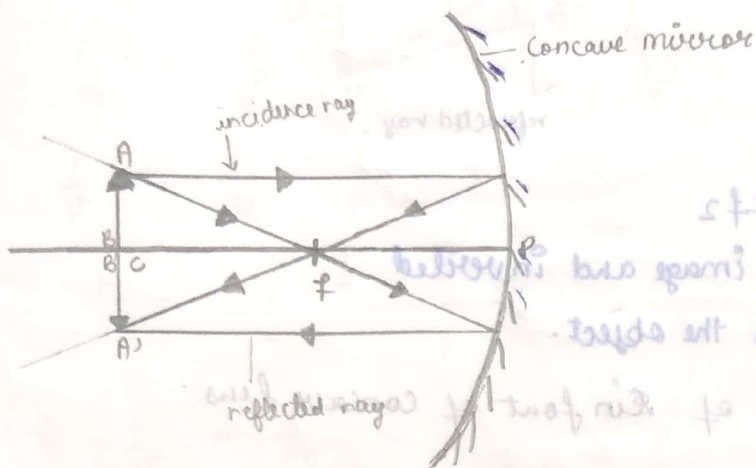
(i) Position : At Centre of Curvature
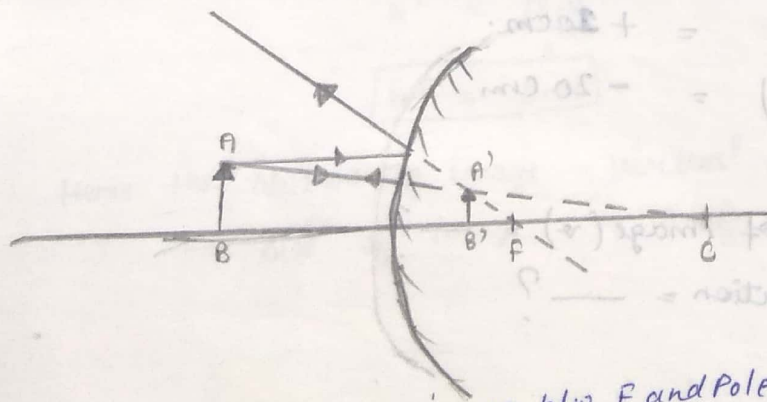(ii) Nature : Real image and inverted
(iii) Size : Same size as of object

(ii) when the object at between the Pole and focus of Concave mirror

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(i) Position : Behind the mirror
(ii) Nature : virtual image and erect
(iii) Size : Magnified.

(iii) when object is in font of Convex mirror

(i) Position : Behind the mirror b/w F and Pole.
(ii) Nature : virtual and erect
(iii) Size : Dimnished.

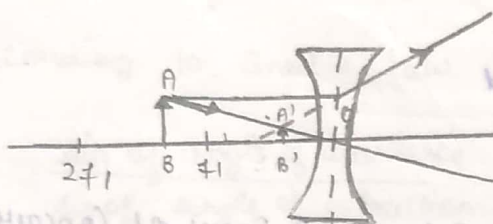(iv) when the object at 2F of convex lens:

Ans!

refracted ray.
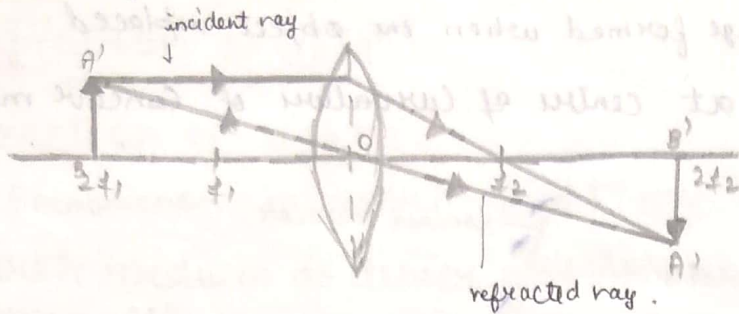
(i) Position : At $2f_2$

(ii) Nature : Real image and inverted

(iii) Size : Same as the object.

(v) when the object of F in font of concave lens.

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(i) Position : b/w optical Centre and F_1

(ii) Nature : Virtual image and erect

(iii) Size : Diminished.

Qus 6 An object 2 cm tall is kept perpendicular the principal focus. to a Convex lens of focal length 10 cm. The distance of object from the lens is 20 cm. Find the nature, Size and position of image. Also find its magnification.

Sol Given Quantity

object height (h) = 2 cm

focal length (f) = + 10 cm.

object distance (u) = - 20 cm.

find.

Case (a) position of image (v) = —?

Case (b) Magnification = —?

Proof. Case(a) As we know mirror formula.

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$

$$\frac{1}{v} = \frac{1}{f} - \frac{1}{u}$$

$$\frac{1}{v} = \frac{1}{10} - \frac{1}{(-20)}$$

$$\frac{1}{v} = \frac{2+1}{20} = \frac{3}{20}$$

$$\frac{1}{v} = \frac{3}{20}$$

$$v = \frac{20}{3}$$

$$\boxed{v = 6.6}$$

Case (b) As we know magnification.

$$m = \frac{h'}{h} = \frac{v}{u}$$

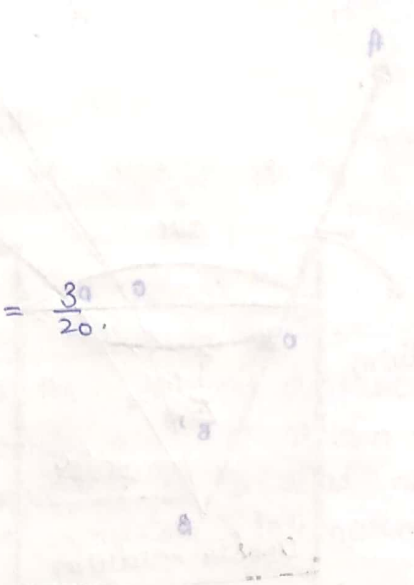$$\frac{h'}{h} = \frac{v}{u}$$

$$= \frac{h'}{2} \times \frac{6.6}{20}$$

$$20h' = 13.2$$

$$h' = \frac{13.2}{2}$$

$$\boxed{h' = + 0.66}$$

Hence the Nature of image = virtual image and erect

Size of image = 0.66.

Que 7 Explain with the help of diagram, why a pencil partly immersed in water appears to be bent at the water surface.

Sol : Diagram of pencil bending in water
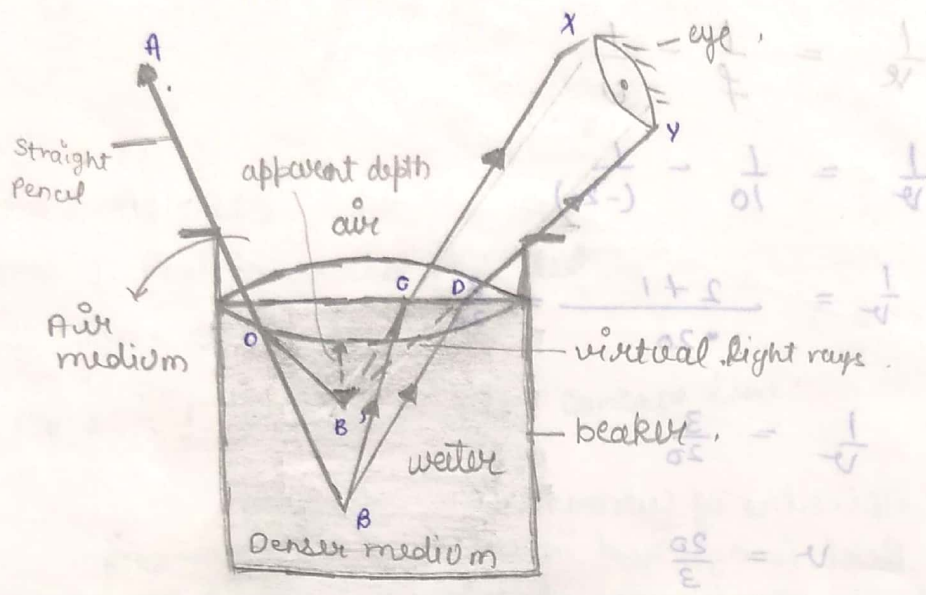
The Pencil get refracted because it passes from denser medium into a rarer medium, when the two rays produced backwards, apper to meet nearer to water surface. This is the virtual image of pencil.

Due to the refraction of light virtual image of pencil is formed. actually it was under water and . Thus, immersed part of pencil appears to be raised, and bent on surface of water.

Seen
20/0/16

18/10/18

Assignment -1

Ques 1 :

Ans 1. the three layers of human eye are :-

(i) Sclera.

(ii) Choroid

(iii) Retina.

Ques 2.

Ans 2 : the near point of eye means the minimum distance at which objects can be seen most clearly without strain is called the least distance of distinct vision .It is called near point of eye.

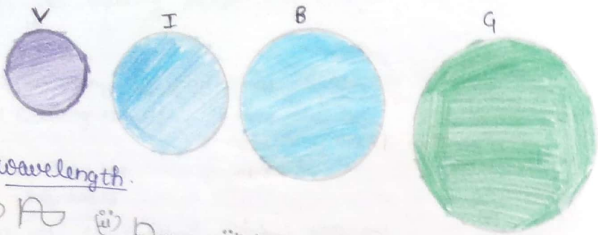# the last distance of distinct vision for normal eye is 25cm .

Ques 3 :

Ans Far point of eye :- the farthest point up to which the eye can see objects clearly without strain is called the far point of eye.

Ques 4

Ans 4 :, Convex lens.

Ques 5 :

Ans 5 : Ciliary muscle adjust the focal length of eye so that we can see distinct objects and nearby objects clearly and lens becomes thinner and focal length increases.
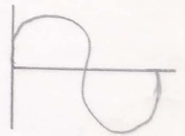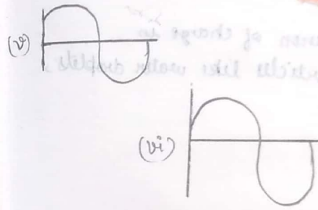
Ques 6 :

Ans 6 : Ciliary muscle attached to lens of eye contract and lens become thicker. when more curved. focal length of eye lens decreases.

Ques 7 :

Ans 7 : As we bring object closer to eye, the focal length of eye lens changes to form image of object at retina. there is a limit to how close the object may be to eye and image still be clearly seen. If object is close to eye. lens cannot curve tough enough to focus image on retina , therefore image is blurred , we feel strain

Worksheet

★ Multiple choice Questions.

Ques 1: For a young adult with normal vision, the near point is

Ans: 25cm.

Ques 2: The Change of focal length of eye lens is caused by action of

Ans: Ciliary muscle.

Ques 3: When the Ciliary muscles relax, the focal length of eye lens.

Ans: Increases.

Ques 4: The Cones of eyes are sensitive to,

Ans: Colour.

Ques 5: The human eye forms image of an object on its.

Ans: Retina.

VIBGYOR

V   I   B   G

wavelength.

(i)   (ii)   (iii)

(iv)

Y   O

R

(v)

(vi)