SHIKSHA CLASSES

Sub. : Science **Question Paper** **Marks : 30**

Std. : Xth - CBSE **10. Light Reflection and Refraction** **Time : 1 Hour**

SECTION (A) **(Each - 1 Mark)**

Q.1 : A ray of light that strikes a plane mirror PQ at an angle of incidence of 30^0, is reflected from the plane mirror and then strikes a second plane mirror QR placed at right angles to the first mirror.

The angle of reflection at the second mirror is :

a) 30^0 b) 45^0 c) 60^0 d) 90^0

OR

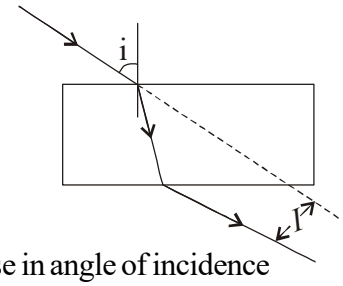
A ray of light is passes from a medium X to another medium Y. No refraction of light occurs if the ray of light hits the boundary of medium Y at an angle of :

a) 120^0 b) 90^0 c) 45^0 d) 0^0

Q.2 : What is the position of the object if a concave mirror produces a magnification of +4?

OR

A student traces the path of a ray of light passing through a rectangular slab for three different values of angle of incidence ($\angle i$) namely 30^0, 45^0 and 60^0. He extends the direction of incident ray by a dotted line and measures the perpendicular distance 'I' between the extended incident ray and the emergent ray.



He will observe that :

a) 'I' keeps on increasing with increase in angle of incidence

b) 'I' keeps on decreasing with increase in angle of incidence

c) 'I' keeps the same for all three angle of incidence

d) 'I' is the maximum for $\angle i = 45^0$ and is less than this value for $\angle i = 30^0$ and $\angle i = 60^0$.

For question number 3 to 5 two statement are given one labeled Assertion (A) and other labeled Reason (R) select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below

a) Both A and R are true and R is correct explanation of the assertion.

b) Both A and R are true but R is not the correct explanation of the assertion.

c) A is true but R is false. d) A is false but R is true.

Q.3 : **Assertion (A) :** In the dispersion of white light by a prism, the red light bends the least.

Reason (R) : The frequency of red light is the highest.

Q.4: **Assertion(A) :** Light travels faster in glass than in air.

Reason (R) : Glass is denser than air.

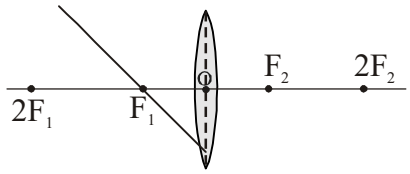
Q.5: **Assertion(A) :** The emergent ray is parallel to the direction of the incident ray.

Reason (R) : The extent of bending of the ray of light at the opposite parallel faces (air- glass interface and glass-air interface) of the rectangular glass slab is equal and opposite.

Q.6: State a condition for no refraction of light entering from one medium to another.

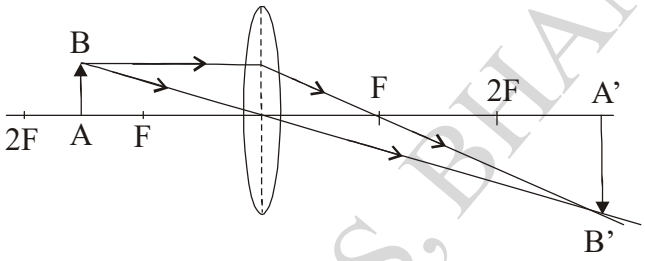
OR

Redraw the ray diagram given below and complete the path of ray.



Q.7 : **Observe the following diagram and answer any two questions from 5(i) to 5(iii)**

(2 Mark)



i) What is the position of the object?

a) Beyond 2F b) Between F and 2F

c) Both a and b d) None of these

ii) What is the nature of the image?

a) Real b) Virtual

c) neither real nor virtual d) Both a and b

iii) What is the position of the image?

a) Between F and 2F b) Beyond 2F c) Both a and b d) None of these.

Q.8: If an incident ray passes through the focus, the reflected ray will

(a) pass through the pole (b) be parallel to the principal axis

(c) retrace its path (d) pass through the centre of curvature

Q.9: If the magnification produced by a lens has a negative value, the image will be

(a) virtual and inverted (b) virtual and erect (c) real and erect (d) real and inverted

Q.10: When the object is placed between f and 2f of a convex lens, the image formed is

(a) at f (b) at 2f (c) beyond 2f (d) between O and f

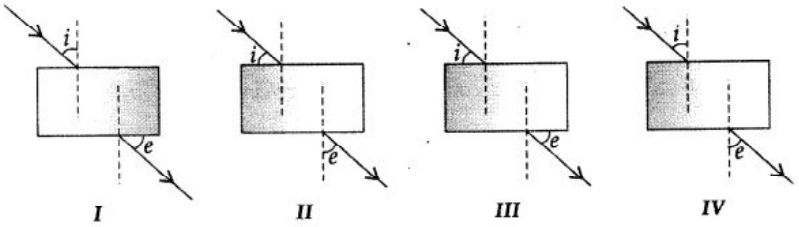
Q.11: A ray of light is travelling from a rarer medium to a denser medium. While entering the denser medium at the point of incidence, it

(a) goes straight into the second medium (b) bends towards the normal

(c) bends away from the normal (d) does not enter at all

Q.12:A student does the experiment on tracing the path of a ray of light passing through a rectangular glass slab for different angles of incidence. He can get a correct measure of the angle of incidence and the

angle of emergence by following the labelling indicated in figure:



(a) I **(b)** II **(c)** III **(d)** IV

Q.13: The unit of power of lens is

(a) Metre (b) Centimeter (c) Diopter (d) M^{-1}

Q.14: The radius of curvature of a mirror is 20cm the focal length is

(a) 20cm (b) 10cm (c) 40cm (d) 5cm

SECTION (B) **(Each - 2 Mark)**

Q.15: The refractive index of material is 1.33. If the velocity of light in vaccum is 3×10^8 m/s. Find the velocity of light in the material.

OR

The angle of incidence in air for a ray of light is 40^0. If the ray travels through water of refractive index 4/3 find the angle of refraction. (sin 40 = 0.6427)

Q.16 : Draw a ray diagram when the object is placed between c and f of a concave mirror.

SECTION (C) **(Each - 3 Mark)**

Q.17: An object 15cm in length is placed at a distance of 10cm in front of a convex mirror of focal length 15cm. Find the position, nature and size of the image formed. 3

OR

A convex lens of focal length 40 cm and a concave lens of focal length 50cm are placed in contact with each other. Calculate: i) the power of the combination,

ii) focal length of the combination.

Q.18 : An object 2 cm high is placed at a distance of 16 cm from a concave mirror which produces a real image 3 cm high. 3

i) Find the position of the image. ii) What is the focal length of mirror?

SECTION (D) **(5 Marks)**

Q.19 : i) State Snell's Law of refraction of light.

ii) A transparent medium A floats in another travels transperant medium B.When a ray of light travels obliquely from A into B, the refracted ray bends away from the normal. Which media A or B is optically denser and why?

iii) Draw ray diagrams to show passage of rays of light through a rectangular glass slab, when angle of incidence is (a) Zero (b) little less than 90.

OR

List the sign conventions for reflection of light by spherical mirrors.

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