MATRIX
FOUNDATION PROGRAM

PHYSICS
Daily Practice Problems (DPPs)

TARGET – NTSE / STSE / OLYMPIADS

CLASS - 10TH

LIGHT & HUMAN EYE

DPP 01

Concepts
Reflection of light & Plane mirror

1. The path along which light travels in a homogeneous medium is called the :
    (A) beam of light   (B) ray of light
    (C) pencil of light   (D) none of these

2. A thin layer of water is transparent but a very thick layer of water is :
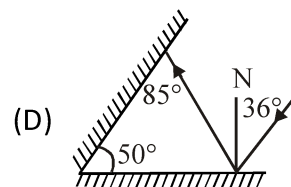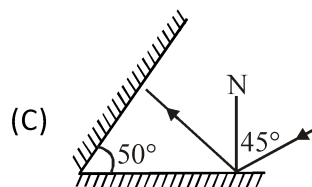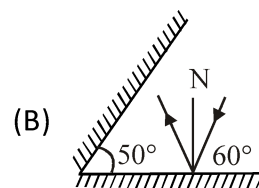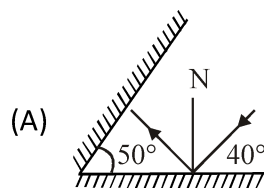   (A) translucent   (B) opaque
    (C) most transparent   (D) none of these

3. Air is not visible because it _
    (A) is nearly a perfectly transparent substance
    (B) neither absorbs nor reflects light
    (C) transmits whole of light
    (D) all the above are correct

4. According to laws of reflection of light :
    (A) Angle of incidence is equal to the angle of reflection
    (B) Angle of incidence is less than the angle or reflection
    (C) Angle of incidence is greater than the angle of reflection
    (D) None of these

5. Which of the following correctly represents graphical relation between angle of incidence (i) and angle of reflection (r) ?

6. A boy is standing in front of a plane mirror at a distance of 3 m from it. What is the distance between the boy and his image ?
    (A) 3 m
    (B) 4.5 m
    (C) 6 m
    (D) None of these

7. A person is standing 4 m away from plane mirror. Distance between mirror and image is :
    (A) 4 m
    (B) 8 m
    (C) 2 m
    (D) 6 m

8. Which are of the following correctly depicts reflection. When two mirrors are inclined at an angle of 50° ?

9. At the traffic signals, red light is used for stop due to the reason that it can be seen from a distance. The phenomenon involved is known as :
    (A) Reflection
    (B) Refraction
    (C) Dispersion
    (D) Scattering

10. Which one of the following phenomena is an example of scattering of light ?
    (A) Bending of rod at interface of air and water
    (B) Twinkling of star
    (C) Tyndall effect
    (D) Mirage in desert during summer

Concepts
Reflection from Spherical mirror
(Concave mirror & Convex mirror)

1. For an incident ray directed towards centre of curvature of a spherical mirror, the reflected ray :
   (A) Retraces its path
   (B) Passes through focus
   (C) Passes through pole
   (D) Becomes parallel to the principal axis

2. The focal length of a concave mirror is f and the distance from the object to the principal focus is a. The magnitude of magnification obtained will be-
   (A) (f + a)/f   (B) f/a
   (C) $\sqrt{f} / \sqrt{a}$ (D) f^2/a^2

3. The magnification of an object placed 10 cm from a convex mirror of radius of curvature 20 cm will be.
   (A) 0.2   (B) 0.5
   (C) 1   (D) infinity

4. The image formed by a concave mirror is observed to be virtual, erect and larger than the object. the position of the object should be-
   (A) between the focus and the centre of curvature.
   (B) at the centre of curvature
   (C) beyond the centre of curvature
   (D) between the pole of the mirror and the focus

5. The magnification produces by a concave mirror-
   (A) is always more the one
   (B) is always less than one
   (C) is always equal to one
   (D) may be less than or greater than one

6. Choose the correct relation between u,v and R-
   (A) $R = \dfrac{2uv}{u+v}$ (B) $R = \dfrac{2}{u+v}$
   (C) $R = \dfrac{2(u+v)}{(uv)}$ (D) None of these

7. The image formed by a concave mirror is real, inverted and of the same size as that of the object. The position of the object should be :
   (A) Beyond C
   (B) Between C and F
   (C) At C
   (D) At F

8. If 'p' and 'q' are distance of object and image from principal focus of a concave mirror, then what is the relation between 'p', 'q' and 'f' ?
   (A) $pq = \sqrt{f}$ (B) $pq = f$
   (C) $pq = f^2$ (D) $pq = \dfrac{1}{f}$

9. Which of the following statements is correct for a concave mirror ?
   (A) Always produces real image only
   (B) Always produces virtual image only
   (C) Can produce real and virtual image
   (D) Can not produce real image at all

10. A convex mirror used for rear - view on an automobile has a radius of curvature of 3.00 m. If a bus is located at 5.00 m from this mirror, find distance of the image from the mirror.
    (A) 0.32   (B) 0.23 m
    (C) 0.87 m   (D) 1.15 m

Concepts
Refraction of light & Effect of Refraction of light

1. R.I. of glass w.r.t. air is $\dfrac{3}{1}$,then the R.I. of air w.r.t. glass is –
   (A) $\dfrac{3}{4}$ (B) $\dfrac{2}{3}$
   (C) $\dfrac{1}{3}$ (D) 3

2. Refractive index of glass with respect to air is 1.5 and refractive index of water with respect to air is $\dfrac{4}{3}$. What will be the refractive index of glass with respect to water ?
   (A) 1   (B) 1.5
   (C) 1.125   (D) -10

3. The refractive index of a medium depends upon -
   (A) Nature of material of the medium
   (B) Optical density of the medium
   (C) Wavelength of light
   (D) All of these

4. If refractive index of water w.r.t. air is $\frac{4}{3}$, then refractive index of air w.r.t. water will be-

(A) 4×3 (B) $\frac{3}{4}$

(C) $\sqrt{\frac{4}{3}}$ (D) $\sqrt{\frac{3}{4}}$

5. A ray of light in incident normally on a rectangular piece of glass. The value of angle of refraction will be-

(A) $180°$ (B) $90°$

(C) $45°$ (D) $0°$

6. The unit of refractive index is :

(A) Metre   (B) Degree

(C) Dioptre   (D) It has no unit

7. The speed of light in vacuum is 3.0×10^8 m/s. If the refractive index of a transparent liquid is 4/3, then the speed of light in the liquid is -

(A) 2.25×10^8 m/s   (B) 3×10^8 m/s

(C) 4×10^8 m/s   (D) 4.33×108 m/s

8. A swimming pool appears to be 2m deep. It actual depth is (μ for water = 1.33) –

(A) 2.66 m   (B) 2m

(C) 2.34 m   (D) 2.54 m

9. A coin kept inside water $\left(\mu = \frac{4}{3} \right)$ when viewed from air in a vertical direction, appears to be raised by 2.0 mm. The depth of the coin in water is :

(A) 8.00 mm   (B) 6.00 mm

(C) 8.00 cm   (D) 6.00 cm

10. A swimming pool appears less deeper than its real depth :

(A) Due to reflection   (B) Due to refraction

(C) Due to dispersion   (D) None of these

DPP 04

Concepts
Concave Lens & Convex Lens

1. To get a real and inverted image of the same size as that the object should be placed in front of the convex lens at:

(A) F

(B) 2F

(C) between F and 2F

(D) away from 2F, where F is focal length

2. A spherical mirror and a spherical lens have each focal length of –10 cm. The mirror and lens are :

(A) both convex

(B) both concave

(C) mirror is convex and lens is concave

(D) mirror is concave and lens is convex

3. The power of lens having focal length 50 cm is :

(A) $\frac{1}{2}$ D   (B) 2 D

(C) 3 D   (D) 0.2 D

4. The focal length of a lens of power – 2.0 D is :

(A) –2.0 m   (B) 0.2 m

(C) –0.5 m   (D) 0.5 m

5. Two lenses of +5D and -5D are placed in chose contact. The focal length of the combination is :

(A) Zero   (B) 8

(C) Zero or 8   (D) None of these

6. A student needs a lens of power -2.0 dioptre to correct his distant vision. The focal length of the given lens is :

(A) + 50 cm   (B) –50 cm

(C) 10 cm   (D) –10 cm

7. Focal length of coloured goggles (without number) i :

(A) zero

(B) infinity

(C) between zero & infinity

(D) None of these

8. Where should an object be placed so that a real and inverted image of very large size is obtained, using a convex lens ?

(A) At the focus

(B) At 2F

(C) Between F & 2F

(D) Beyond 2F

9. A convex lens is :

(A) Thicker at the middle, thinner at the edges

(B) Diverging

(C) Thicker at the edges thinner in the middle

(D) Of uniform thickness everywhere

10. A ray passing through which part of a lens emerges undeviated ?

(A) Focus

(B) Centre of curvature

(C) Optical centre

(D) Between focus and centre of curvature

Concepts

Miscellaneous

1. The image of the moon is formed by a concave mirror whose radius of curvature is 4.8 m at a time when distance from the moon is 2.4×10^8 m. If the diameter of the image is 2.2 cm the diameter of the moon is -
   (A) 1.1×10^6 m   (B) 2.2×10^6 m
   (C) 2.2×10^8 m   (D) 2.2×10^{10} m

2. A needle placed 45 cm from a lens forms an image on a screen placed 90 cm the other side of lens, focal length and type of lens is :
   (A) 10 cm, convex lens   (B) 30 cm, convex lens
   (C) 30 cm, concave lens (D) 10 cm, concave lens

3. A convex lens has focal length 30 cm. If an object is placed at a distance of 15 cm from it, then the magnification produced by the lens is :
   (A) 6.66   (B) 0.5
   (C) 1   (D) 2

4. The net power (P) of three lenses having powers P_1, P_2, P_3 placed in contact is given by :
   (A) $P = P_1 \times P_2 \times P_3$
   (B) $P = P_1 + P_2 + P_3$
   (C) $1/P = 1/P_1 + 1/P_2 + 1/P_3$
   (D) $P = (P_1 + P_2 + P_3)/3$

5. A convex lens produces an image of an object on a screen with a magnification of 2. When the lens is moved 30 cm away from the object, the magnification of the image is $\dfrac{1}{2}$. The focal length of the lens is :
   (A) 20 cm   (B) 25 cm
   (C) 30 cm   (D) 35 cm

6. A convex mirror of focal length f (in air) is immersed in a liquid) ($\mu = \dfrac{4}{3}$). The focal length of the mirror in liquid will be :
   (A) $\left(\dfrac{3}{4}\right)f$ (B) $\left(\dfrac{4}{3}\right)f$
   (C) f   (D) $\left(\dfrac{7}{3}\right)f$

7. A concave mirror of focal length 'f' produces a real image 'n' times the size of the object. Find the distance of the object from the mirror.
   (A) $\dfrac{(n-1)}{n}f$ (B) (n + 1) f
   (C) $\dfrac{(n+1)}{n}f$ (D) (n − 1)f

8. When a ray of light enters a transparent medium it undergoes change in :
   (A) Frequency only
   (B) Wavelength only
   (C) Wavelength and velocity both
   (D) Velocity and frequency both

9. The image distance of an object placed 10 cm in front of a thin lens of focal length + 5 cm is :
   (A) 6.5 cm   (B) 8.0 cm
   (C) 9.5 cm   (D) 10.0 cm

10. A convex lens has focal length of 20 cm. Calculate at what distance from the lens should the object be placed so that it forms an image at 40 cm on the other side of the lens?
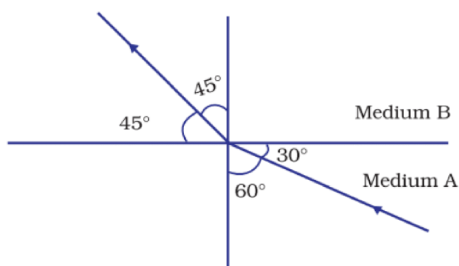   (A) 10 cm   (B) 20 cm
    (C) 30 cm   (D) 40 cm

Concepts

NCERT Exemplar Based

1. Which of the following can make a parallel beam of light when light from a point source is incident on it?
   (A) Concave mirror as well as convex lens
   (B) Convex mirror as well as concave lens
   (C) Two plane mirrors placed at 90° to each other
   (D) Concave mirror as well as concave lens

2. A 10 mm long awl pin is placed vertically in front of a concave mirror. A 5 mm long image of the awl pin is formed at 30 cm in front of the mirror. The focal length of this mirror is
   (A) − 30 cm   (B) − 20 cm
   (C) − 40 cm   (D) − 60 cm

3. Under which of the following conditions a concave mirror can form an image larger than the actual object?
   (A) When the object is kept at a distance equal to its radius of curvature
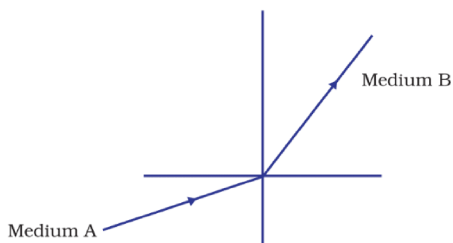
(B) When object is kept at a distance less than its focal length

(C) When object is placed between the focus and centre of curvature

(D) When object is kept at a distance greater than its radius of curvature

4. Figure shows a ray of light as it travels from medium A to medium B. Refractive index of the medium B relative to medium A is
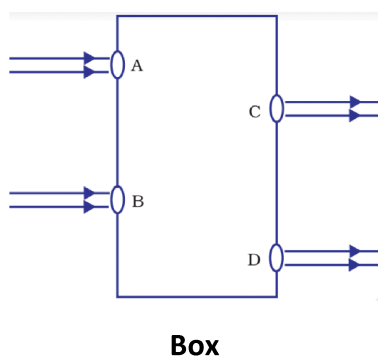

(A) $\sqrt{3}/\sqrt{2}$ (B) $\sqrt{2}/\sqrt{3}$

(C) $1/\sqrt{2}$ (D) $\sqrt{2}$

5. A light ray enters from medium A to medium B as shown in Figure. The refractive index of medium B relative to A will be
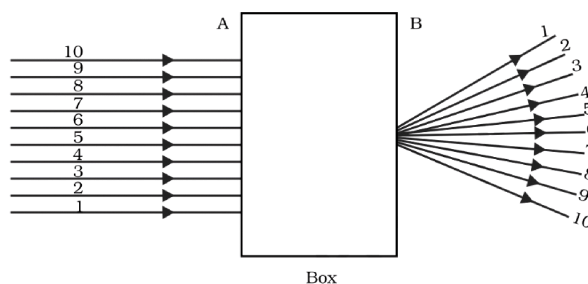

(A) greater than unity   (B) less than unity

(C) equal to unity   (D) zero

6. Beams of light are incident through the holes A and B and emerge out of box through the holes C and D respectively as shown in the Figure. Which of the following could be inside the box?

Box

(A) A rectangular glass slab
(B) A convex lens
(C) A concave lens
(D) A prism

7. A beam of light is incident through the holes on side A and emerges out of the holes on the other face of the box as shown in the Figure . Which of the following could be inside the box?

Box

(A) Concave lens
(B) Rectangular glass slab
(C) Prism
(D) Convex lens

8. Which of the following statements is true?
(A) A convex lens has 4 dioptre power having a focal length 0.25 m
(B) A convex lens has –4 dioptre power having a focal length 0.25 m
(C) A concave lens has 4 dioptre power having a focal length 0.25 m
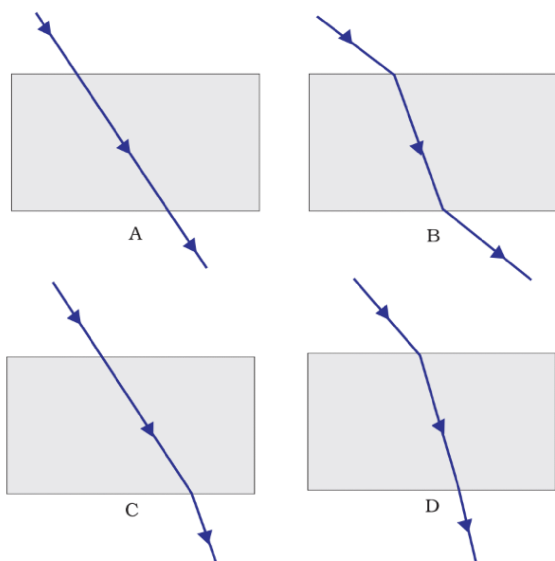(D) A concave lens has –4 dioptre power having a focal length 0.25 m

9. Magnification produced by a rear view mirror fitted in vehicles
(A) is less than one
(B) is more than one
(C) is equal to one
(D) can be more than or less than one depending upon the position of the object in front of it

10. Rays from Sun converge at a point 15 cm in front of a concave mirror. Where should an object be placed so that size of its image is equal to the size of the object?
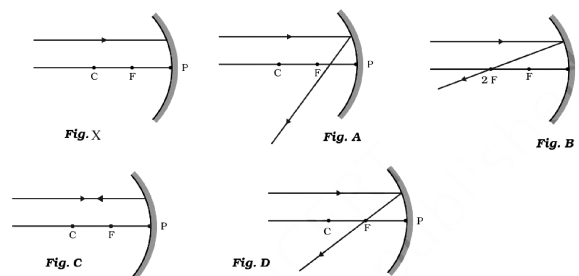(A) 15 cm in front of the mirror
(B) 30 cm in front of the mirror
(C) between 15 cm and 30 cm in front of the mirror
(D) more than 30 cm in front of the mirror

11. A full length image of a distant tall building can definitely be seen by using
    (A) a concave mirror
    (B) a convex mirror
    (C) a plane mirror
    (D) both concave as well as plane mirror

12. In torches, search lights and headlights of vehicles the bulb is placed
    (A) between the pole and the focus of the reflector
    (B) very near to the focus of the reflector
    (C) between the focus and centre of curvature of the reflector
    (D) at the centre of curvature of the reflector

13. The laws of reflection hold good for
    (A) plane mirror only
    (B) concave mirror only
    (C) convex mirror only
    (D) all mirrors irrespective of their shape

14. The path of a ray of light coming from air passing through a rectangular glass slab traced by four students are shown as A, B, C and D in Figure. Which one of them is correct?
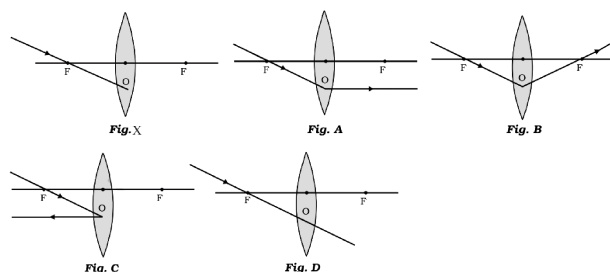

    (A) A   (B) B
    (C) C   (D) D

15. You are given water, mustard oil, glycerine and kerosene. In which of these media a ray of light incident obliquely at same angle would bend the most?
    (A) Kerosene
    (B) Water
    (C) Mustard oil
    (D) Glycerine

16. Which of the following ray diagrams is correct for the ray of light incident on a concave mirror as shown in Figure-X ?

    (A) Fig. A   (B) Fig. B
    (C) Fig. C   (D) Fig. D

17. Which of the following ray diagrams is correct for the ray of light incident on a lens shown in Figure-X ?

    (A) Fig. A   (B) Fig. B
    (C) Fig. C   (D) Fig. D

18. A child is standing in front of a magic mirror. She finds the image of her head bigger, the middle portion of her body of the same size and that of the legs smaller. The following is the order of combinations for the magic mirror from the top.
    (A) Plane, convex and concave
    (B) Convex, concave and plane
    (C) Concave, plane and convex
    (D) Convex, plane and concave

19. In which of the following, the image of an object placed at infinity will be highly diminished and point sized?
    (A) Concave mirror only
    (B) Convex mirror only
    (C) Convex lens only
    (D) Concave mirror, convex mirror, concave lens and convex lens

ANSWER KEY

DPP – 1

1.	B	2.	A	3.	D	4.	A	5.	D	6.	C	7.	A
8.	A	9.	D	10.	C								

DPP – 2

1.	A	2.	B	3.	B	4.	D	5.	D	6.	A	7.	C
8.	C	9.	C	10.	D								

DPP – 3

1.	C	2.	C	3.	D	4.	B	5.	D	6.	D	7.	A
8.	A	9.	A	10.	B								

DPP – 4

1.	B	2.	B	3.	B	4.	C	5.	D	6.	B	7.	B
8.	A	9.	A	10.	C								

DPP – 5

1.	B	2.	B	3.	D	4.	B	5.	A	6.	C	7.	C
8.	C	9.	D	10.	D								

DPP – 6

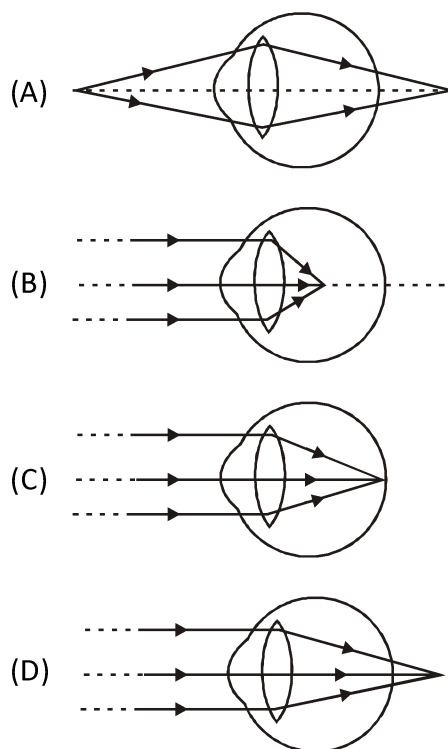| 1.	A	2.	B	3.	C	4.	A	5.	A	6.	A	7.	D
8.	A	9.	A	10.	B	11.	B	12.	B	13.	D	14.	B
15.	D	16.	D	17.	A	18.	C	19.	D				

THE HUMAN EYE AND THE COLOURFUL WORLD

DPP 01

Concepts
Human eye

1. A ray of light may suffer total internal reflection when it goes from
   (A) Air to water
   (B) Water to glass
   (C) Air to glass
   (D) Oil to air

2. It is said that the sun becomes visible before the actual rise and remains visible even after the actul sunset. This makes the day a bit longer. It happens due to
   (A) Scattering of sunlight
   (B) Atmospheric reflection of sunlight
   (C) Atmospheric refraction of sunlight
   (D) Dispersion of sunligjht

3. After a shower of rain, a colourful spectrum is seen
   (A) Towards the sun
   (B) Opposite to the sun
   (C) Anywhere in the sky
   (D) Even in absence of the sun

4. The size of an object as perceived by an eye depends primarily on
   (A) actual size of the object
   (B) distance of the object from the eye
   (C) aperture of the pupil
   (D) size of the image formed on the retina

5. Where is the image of object formed in human eye ?
   (A) Iris
   (B) Pupil
   (C) Retina
   (D) Cornea

6. The least distance of distinct vision for an adult man/woman.
   (A) 25 cm
   (B) 2.5 m
   (C) 25 m
   (D) 2.5 cm

7. The human eye can focus objects at different distances by adjusting the focal length of the eye lens. This is known as
   (A) Presbyopia
   (B) Accommodation
   (C) Myopia
   (D) Astigmatism

8. To correct myopic defect, the focal length of the concave lens should be
   (A) Equal to the distance of far point
   (B) Less than the distance of far point
   (C) Less than the distance of near point
   (D) Equal to the distance of near point

9. Select the correct sequence of light entering the different parts of human eye
   (A) cornea, lens, iris, pupil, retina
   (B) pupil, cornea, iris, lens, retina
   (C) cornea, pupil, iris, lens, retina
   (D) cornea, iris, pupil, lens, retina

10. Which of the following diagrams shows myopic eye ?
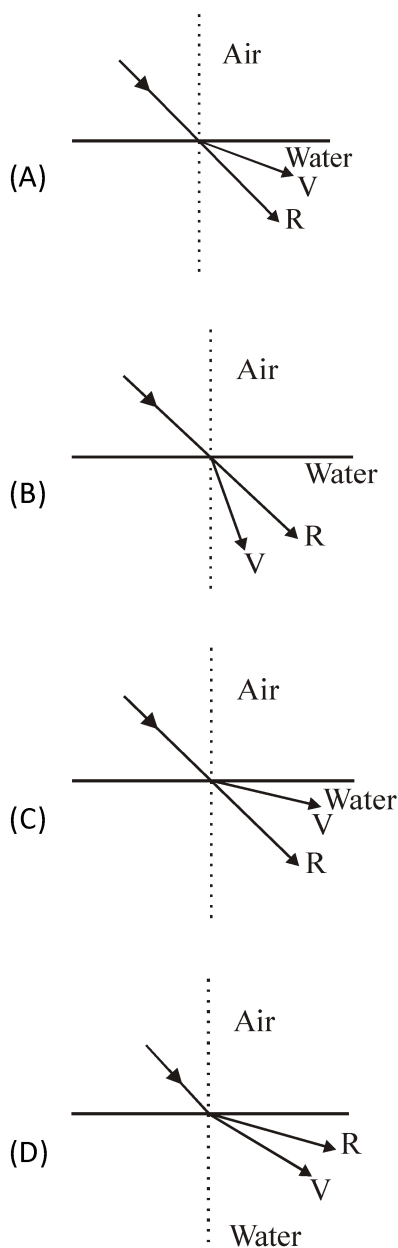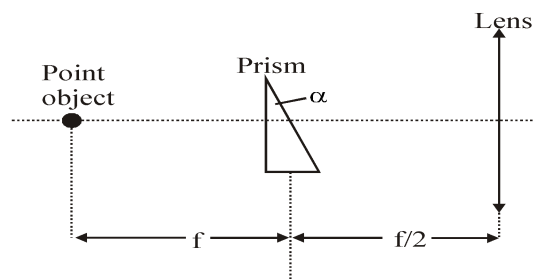

DPP 02

Concepts
Prism

1. When sunlight is incident on a prism, it produces a spectrum due to
   (A) Atmospheric refraction
   (B) Reflection
   (C) TIR
   (D) Variation in speeds of different colours of light in the prism

2. A ray of light is coming from air to water. Which of the following figures show dispersion of the light?

(A)

Air

Water
V
R

(B)

Air

Water
R
V

(C)

Air

Water
V
R

(D)

Air

R
V
Water

3. Which of the following colour of light undergoes the maximum deviation while passing through a glass prism ?
   (A) Red   (B) Blue
   (C) Violet   (D) Green

4. A beam of white light when passes through a glass prism, a spectrum is observed. But when same beam of light passes through hollow glass prism then
   (A) Spectrum is same
   (B) Spectrum become brighter
   (C) There will be no spectrum
   (D) Colours of spectrum reversed

5. Rainbow is formed due to
   (A) Dispersion and total internal reflection
   (B) Refraction and absorption
   (C) Dispersion and scattering
   (D) Refraction and scattering

6. When a beam of light passes through an unknown solution, its path becomes visible. The unknown solution among the following is
   (A) Water   (B) Vinegar
   (C) Blood   (D) Salt solution

7. A thin lens is made with a material having refractive index $\mu = 1.5$. Both the sides are convex. It is dipped in liquid ($\mu = 1.33$), it will behave like.
   (A) Convergent lens   (B) A divergent lens
   (C) A rectangular slab   (D) A prism

8. When white light is passed through a prism, it is observed that violet light bends more than the red light. This is because
   (A) Velocity of red light in glass is less than that of violet light
   (B) Refractive Index of glass is more for violet light
   (C) Wave length of violet light is less than that of red light
   (D) It is the properties of these colours

9. In the formation of primary rainbow, the sunlight rays emerge at minimum deviation from rain-drop after
   (A) One internal reflection and one refraction
   (B) One internal reflection and two refraction
   (C) Two internal reflection and one refraction
   (D) Two internal reflection and two refraction

10. A system is shown in the figure. Light rays from a point object are first deviated by a prism and then focused by a thin lens of focal length f. The prism is made of material with refractive index 3/2 and has small apex angle 2º i.e., small angle approximations are valid. $\sin \alpha \cong \alpha$ and $\sin (\alpha + \beta) = \alpha + \beta$, where α and β are angles. The final image is

Lens

Prism

Point object
α

f   f/2

(A) virtual and formed at a distance 2f from the lens
(B) real and formed at a distance 2f from the lens
(C) real and formed at a distance 3f/2
(D) real and formed at a distance 3f from the lens

DPP 03

Concepts
Miscellaneous

1. The focal length of eye lens controlled by-
   (A) Iris   (B) Cornea
   (C) Ciliary muscles   (D) Optic nerve
2. A white lights falls on a glass prism, the least deviated colour is-
   (A) Violet   (B) Orange
   (C) Red   (D) Yellow
3. Blue colour of sky is due to -
   (A) dispersion of light   (B) scattering of light
   (C) refraction of light   (D) reflection of light
4. Rainbow is formed due to -
   (A) reflection and dispersion of light through a water droplet
   (B) Total internal reflection, refraction and dispersion of light through a water droplet
   (C) only dispersion of light
   (D) only refraction of light
5. Power of accommodation (max. variation in power of eye lens) of a normal eye is about -
   (A) 1D   (B) 2D
   (C) 3D   (D) 4D
6. Dispersion of light by a prism is due to the change in -
   (A) frequency of light   (B) speed of light
   (C) scattering   (D) none of these
7. Least distance of distinct vision of a long-sighted man is 40 cm. He wish to reduce it to 25 cm by using a lens, the focal length of the lens is -
   (A) $+\dfrac{200}{3}$ cm   (B) $-\dfrac{200}{3}$ cm
   (C) +200 cm   (D) -200 cm
8. Which of the following colour has the least wave length ?
   (A) red   (B) orange
   (C) violet   (D) Blue
9. Convex lens of suitable focal length can correct -
   (A) short sightedness   (B) long sightedness
   (C) presbyopia   (D) astigmatism

10. The focal length of human eye lens is -
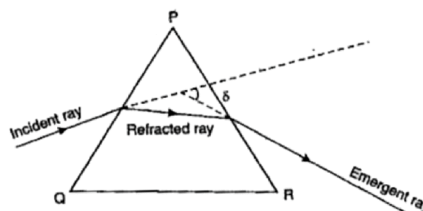   (A) 2.5 cm   (B) 25 cm
    (C) 25 m   (D) ∞

DPP 04

Concepts
All Concepts

1. When light rays enter the eye, most of the refraction occurs at the
   (A) crystalline lens
   (B) outer surface of the cornea
   (C) iris
   (D) pupil
2. The focal length of the eye lens increases when eye muscles
   (A) are relaxed and lens becomes thinner
   (B) contract and lens becomes thicker
   (C) are relaxed and lens becomes thicker
   (D) contract and lens becomes thinner
3. Where is the image of object formed in human eye ?
   (A) Iris   (B) Pupil
   (C) Retina   (D) Cornea
4. The cones cells of the eyes are sensitive to
   (A) Colour   (B) Intensity of light
   (C) Frequency of light   (D) None of these
5. The size of an object as perceived by an eye depends primarily on
   (A) actual size of the object
   (B) distance of the object from the eye
   (C) aperture of the pupil
   (D) size of the image formed on the retina
6. Which of the following statement is correct ?
   (A) A person with myopia can see distant objects clearly.
   (B) A person with hypermetropia can see nearby objects clearly.
   (C) A person with myopia can see nearby objects clearly.
   (D) a person hypermetropia cannot see distant objects clearly.
7. Colour blind person may have
   (A) normal vision
   (B) defective vision
   (C) sometimes normal and sometimes defective vision
   (D) cannot say

8. Vision problem occurring in old age is known as
   (A) myopia (B) presbyopia
   (C) hypermetropia (D) anepia
9. A concave lens of suitable focal length is used for correcting a
   (A) myopic eye (B) hypermetropic eye
   (C) both (A) and (B) (D) neither (A) nor (B)
10. Hypermetropia is corrected by
   (A) concave lens (B) convex lens
   (C) concave mirror (D) convex mirror
11. In long sightedness, image is formed
   (A) on retina (B) in front of retina
   (C) behind retina (D) on blind spot
12. Twinkling stars are seen due to
   (A) irregular emission of from stars
   (B) weather changes
   (C) stars are fare away
   (D) refractive index of air in the given region goes on changing and randomly.
13. At noon the sun appears white as
   (A) light is least scattered
   (B) all the cours of the white light are scattered away
   (C) blue colours is scattered the most
   (D) red colour is scattered the most
14. Which of the following phenomena contributes significantly to the reddish appearance of the sun at sunrise or sunset ?
   (A) Dispersion of light
   (B) Scattering of light
   (C) Total internal reflection of light
   (D) Reflection of light from the earth
15. Which of the colours of visible light has minimum frequency ?
   (A) Violet (B) Red
   (C) Yellow (D) Green
16. The amplitude of scattered light varies with wavelength λ as
   (A) $\propto \dfrac{1}{\lambda^4}$ (B) $\propto \dfrac{1}{\lambda}$
   (C) $\propto \dfrac{1}{\lambda^2}$ (D) $\propto \lambda^2$
17. A parallel beam of light falling on the eye gets focused on the retina because of refractions at
   (A) the cornea
   (B) the crystalline lens

   (C) the vitreous humor
   (D) various surfaces in the eye
18. Variable focal lenght of eye lens is responsible for
   (A) accommodation of eye
   (B) persistence of vision
   (C) colour blindness
   (D) least distance of distinct vision
19. Which of the following coloured light among seven colours on passing white light throught a glass prism is bottom most ?
   (A) violet (B) yellow
   (C) red (D) green
20. A beam of white light when passes through a glas prism, a spectrum is observed. But when same beam of light passes throught hollow glass prism then
   (A) spectrum is same
   (B) spectrum become brighter
   (C) there will be no spectrum
   (D) colours of spectrum reversed
21. Sunset is red because at that time the light coming from the sun has to travel
   (A) lesser thickness of earth's atmosphere
   (B) greater thickness of earth's atmosphere
   (C) varying thickness of earth's atmosphere
   (D) along the horizon
22. The intensity of scattered light varies inversely as n^{th} power of wavelength (λ) of incident light where
   (A) n = 2 (B) n = 1
   (C) n = 4 (D) n = −4
23. Which of the following is not caused by the atmospheric refraction of light ?
   (A) twinkling of stars at night
   (B) sun appearing higher in the sky than it actually is
   (C) sun becoming visible two minutes before actual sunrise
   (D) sun appearing red at sunset
24. A ray of light passes through a prism as show in the figure.

The angle δ is known as

(A) angle of deviation
(B) angle of dispersion
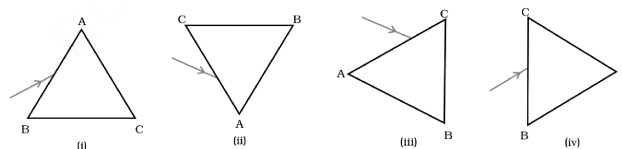(C) angle of emergence
(D) angle of refraction

25. Sheela cannot read newspaper when she holds it closer than 100 cm. The defect in her eye and the power of lens prescribed to her is (Normal eye near point = 25 cm)
(A) myopia with + 3D lens
(B) myopia with − 3D lens
(C) hypermetropia with −3D lens
(D) hypermetropia with +3D lens

26. When white light is passed through an upside down (inverted) prism then
(A) white light is obtained
(B) spectrum is obtained with violet colour undergoing maximum deviation and red colour undergoing minimum deviation
(C) spectrum is obtained with red colour undergoing maximum deviation and violet colour undergoing mimimum deviation
(D) light gets blocked

DPP 05

Concepts

NCERT Exemplar Based

1. A person cannot see distinctly objects kept beyond 2 m. This defect can be corrected by using a lens of power
(A) + 0.5 D   (B) − 0.5 D
(C) + 0.2 D   (D) − 0.2 D

2. A student sitting on the last bench can read the letters written on the blackboard but is not able to read the letters written in his text book. Which of the following statements is correct?
(A) The near point of his eyes has receded away
(B) The near point of his eyes has come closer to him
(C) The far point of his eyes has come closer to him
(D) The far point of his eyes has receded away

3. A prism ABC (with BC as base) is placed in different orientations. A narrow beam of white light is incident on the prism as shown in. In which of the following cases, after dispersion, the third colour from the top corresponds to the colour of the sky?
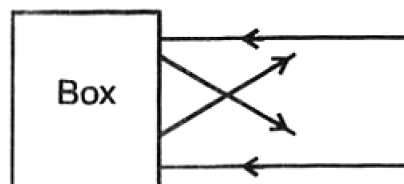

(A) (i)   (B) (ii)
(C) (iii)   (D) (iv)

4. At noon the sun appears white as
(A) light is least scattered
(B) all the colours of the white light are scattered away
(C) blue colour is scattered the most
(D) red colour is scattered the most

5. Which of the following phenomena of light are involved in the formation of a rainbow?
(A) Reflection, refraction and dispersion
(B) Refraction, dispersion and reflection
(C) Refraction, dispersion and total internal reflection
(D) Dispersion, scattering and total internal reflection

6. Twinkling of stars is due to atmospheric
(A) dispersion of light by water droplets
(B) refraction of light by different layers of varying refractive indices
(C) scattering of light by dust particles
(D) internal reflection of light by clouds

7. The clear sky appears blue because
(A) blue light gets absorbed in the atmosphere
(B) ultraviolet radiations are absorbed in the atmosphere
(C) violet and blue lights get scattered more than lights of all other colours by the atmosphere
(D) light of all other colours is scattered more than the violet and blue colour lights by the atmosphere

8. Which of the following statements is correct regarding the propagation of light of different colours of white light in air?
(A) Red light moves fastest
(B) Blue light moves faster than green light
(C) All the colours of the white light move with the same speed
(D) Yellow light moves with the mean speed as that of the red and the violet light

9. The danger signals installed at the top of tall buildings are red in colour. These can be easily seen from a distance because among all other colours, the red light
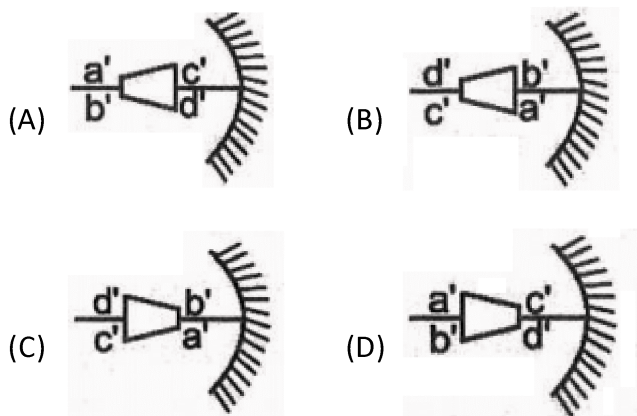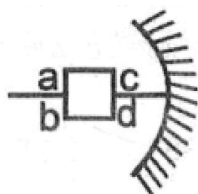
(A) is scattered the most by smoke or fog
(B) is scattered the least by smoke or fog
(C) is absorbed the most by smoke or fog
(D) moves fastest in air

10. Which of the following phenomena contributes significantly to the reddish appearance of the sun at sunrise or sunset?
(A) Dispersion of light
(B) Scattering of light
(C) Total internal reflection of light
(D) Reflection of light from the earth

11. The bluish colour of water in deep sea is due to
(A) the presence of algae and other plants found in water
(B) reflection of sky in water
(C) scattering of light
(D) absorption of light by the sea

12. When light rays enter the eye, most of the refraction occurs at the
(A) crystalline lens
(B) outer surface of the cornea
(C) iris
(D) pupil

13. The focal length of the eye lens increases when eye muscles
(A) are relaxed and lens becomes thinner
(B) contract and lens becomes thicker
(C) are relaxed and lens becomes thicker
(D) contract and lens becomes thinner

14. Which of the following statement is correct?
(A) A person with myopia can see distant objects clearly
(B) A person with hypermetropia can see nearby objects clearly
(C) A person with myopia can see nearby objects clearly
(D) A person with hypermetropia cannot see distant objects clearly

---

DPP 06

Concepts

PREVIOUS YEARS QUESTIONS

1. In the given diagram the reflecting surface inside the box will be   **[Raj./NTSE Stage-/2005]**

(A) Plane mirror   (B) Concave mirror
(C) Convex mirror   (D) Biconvex mirror

2. On passing white light through a glass prism. Which colour ray will deviate maximum towards its base ?
          [Raj./NTSE Stage-I/2005]
(A) Red   (B) Yellow
(C) Blue   (D) Violet

3. On immersing a glass lens in water its focal length
          [Raj./NTSE Stage-I/2005]
(A) Will become zero   (B) Will decrease
(C) Will increase   (D) Will become infinite

4. A point object is placed in the middle of two concave mirrors. The focal length of each mirror is 10 cm. to obtain single image of point object, the distance between two mirrors in cm will be :
          [Raj./NTSE Stage-I/2005]
(A) 10   (B) 20
(C) 30   (D) 40

5. If a ray of light is incident normally on the glass slab, then angle of refraction will be :
          [Raj./NTSE Stage-I/2005]
(A) 0°   (B) 45°
(C) 60°   (D) 90°

6. While obtaining the image of a candle by a convex lens, if lower half portion of the lens is blackened to make it opaque completely, then the intensity of the image will be :   **[Raj./NTSE Stage-I/2007]**
(A) Constant   (B) Decreased
(C) Increased   (D) Zero

7. When a light wave of frequency 5×10^{14} Hz is passed through a medium of refractive index 1.5 then its wavelength will become : **[Raj./NTSE Stage-I/2007]**
(A) 4000 Å   (B) 4500 Å
(C) 6000 Å   (D) 9000 Å

8. The lens used in the photographic camera is : **[Raj./NTSE Stage-I/2007]**
   (A) Biconcave Lens   (B) Concave lens
   (C) Convex lens   (D) Both (A) and (C)

9. An object in placed in front of concave mirror of focal length 'f' as shown in figure. Choose the correct shape of image : **[Haryana./NTSE Stage-/2013]**

10. Match the following **[Haryana./NTSE Stage-I/2013]**

Column-I	Column-II
(a) Convex mirror, real object	p. Real image
(b) Concave mirror, real object	q. Virtual image
(c) Concave lens, real object	r. Magnified image
(d) Convex lens, real object	s. Diminished image

   (A) (a) − q, s (b) p,q, s (c) q, r (d) − p, q, r, s
   (B) (a) − q, (b) p,q, s (c) q, r (d) − p, q, r,
   (C) (a) − s (b) p,q,s (c) q, s (d) − p, q, r, s
   (D) (a) − q, s (b) p, q, r, s (c) q, s (d) − p, q, r, s

11. The minimum distance between an object and its real image in convex lens is : (f = focal length of the lens) **[West Bengal./NTSE Stage-I/2013]**
    (A) 2.5 f   (B) 2f
    (C) 4f   (D) f

12. The frequency of light of wave length 5000 Å is : **[West Bengal./NTSE Stage-I/2013]**
    (A) 1.5×10^5 Hz   (B) 6×10 Hz
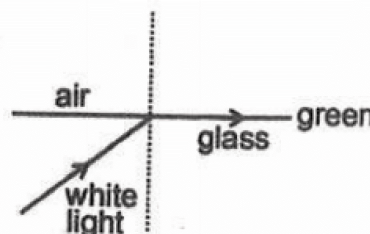   (C) 6×10^{14} Hz   (D) 7.5×10^{15} Hz

13. The relation among u, v and f for mirror is : **[Mizoram/NTSE Stage-I/2013]**
    (A) $f = uv / (u + v)$
    (B) $v = fu (u + f)$
    (C) $u = fv (f + v)$
    (D) All of these

14. The correct relation between u, v and r for a mirror will be : (symbols represent traditional meaning) **[Raj./NTSE Stage-/2014]**

    (A) $r = \dfrac{2uv}{u + v}$ (B) $r = \dfrac{uv}{2(u - v)}$

    (C) $r = \dfrac{1}{u + v}$ (D) $\dfrac{1}{r} = \dfrac{1}{u} + \dfrac{1}{v}$

15. White light is incident on the interface of glass and air as shown in the figure. If green light is just totally internally reflected then the emerging ray in air contains : **[Haryana/NTSE Stage-/2014]**
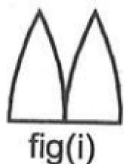

    (A) Yellow, orange, red
    (B) Violet, indigo, blue
    (C) All colours except green
    (D) All colours

16. A concave mirror is placed in a horizontal table with its axis directed vertically upwards. Let O be pole of the mirror and C its centre of curvature. A point object is placed at C. It has a real image, also located at C. If the mirror is now filled with water, the image will be : **[Raj./NTSE Stage-I/2014]**
    (A) Real and tocated at a point between C and O
    (B) Real and will remain at C
    (C) Real and located at point between C and O
    (D) Virtual and located at a point between C and O

17. If a lens of focal length 'f' cut in two equal parts shown as : **[Haryana/NTSE Stage-I/2014]**

are put in contact as shown in figure (i) and (ii)

the resulting focal length of fig (i) and (ii) will be
(A) f/2,0
(B) 0, f/2
(C) f, f
(D) f/2, (infinity)

18. The mirror used by a dentist to examine the teeth of a person is : **[M.P./NTSE Stage-I/2014]**
(A) Convex
(B) Concave
(C) Plane
(D) Plano convex

19. The twinkiling of stars is due to atmospheric : **[M.P./NTSE Stage-I/2014]**
(A) Reflection of light
(B) Dispersion of light
(C) Interference of light
(D) Refraction of light

20. The blue colour of sky is due to : **[M.P./NTSE Stage-I/2014]**
(A) Reflection of light
(B) Dispersion of light
(C) Diffraction of light
(D) Scattering of light

21. For magnification in spherical mirrors object height is : **[Maharashtra/NTSE Stage-I/ 2014]**
(A) Negative
(B) Positive
(C) For real images positive
(D) For virtual image negative

22. After refraction of light through a glass slab, incident ray and refracted are : **[Maharashtra/NTSE Stage-I/ 2014]**
(A) Perpendicular
(B) Parallel
(C) In a straight line
(D) (A) and (C)

23. Convex lens is not used in : **[Maharashtra/NTSE Stage-I/ 2014]**
(A) Simple microscope
(B) Spectacles
(C) Telescope
(D) Flood lights

24. If sum of velocities of light in two media is 3.25×10^8 m/s, and their difference is 0.75×10^8 m/s, find the refractive index of the second medium with respect to one : **[Maharashtra/NTSE Stage-I/ 2014]**
(A) 1.25
(B) 1.6
(C) 1.5
(D) 1.3

25. The ability of a lens to converge or diverge light rays depends on : **[Maharashtra/NTSE Stage-I/ 2014]**
(A) Principal axis
(B) Focal length
(C) Object distance
(D) Image distance

26. As the thickness of the atmospher increases colour of scattered light is found in the ...... **[Maharashtra/NTSE Stage-I/ 2014]**
(A) Blue, violet, yellow, red
(B) Violet, blue, yellow, red
(C) Red, yellow, blue, violet
(D) Violet, blue, red, yellow

27. The focal length of a concave mirror in air is f. If it is immersed in water $\left(\mu = \dfrac{4}{3} \right)$, then the focal length will be : **[Raj./NTSE Stage-I/2015]**
(A) f
(B) $\dfrac{4}{3} f$
(C) $\dfrac{3}{4} f$
(D) 4f

28. A student was asked to draw a ray diagram for formation of image by a convex lens for the following positions of the object the position for which virtual image can be formed among these is : **[Raj./NTSE Stage-I/2015]**
(A) Between F and 2F
(B) at F
(C) at 2 F
(D) Between F and optical centre

29. The far point of a myopic person is 75 cm in front of the eye. The nature and power of the lens required to correct the problem, will be : **[Raj./NTSE Stage-I/2015]**
(A) Convex lens, – 1.33 D
(B) Concave lens, – 1.33 D
(C) Concavel lens, + 1.33 D
(D) Convex lens, + 1.33 D

30. The resultant focal length of the lenses as shown in figure is : **[Delhi/NTSE Stage-I/2014]**

(A) 2f

(B) $\dfrac{f}{2}$

(C) $\dfrac{f}{4}$

(D) f
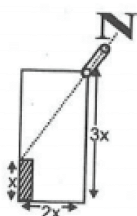
31. White colour of the cloud is due to :

[Delhi/NTSE Stage-I/2014]

(A) Reflection of seven colours of light

(B) Refraction of seven colours of light

(C) Scattering of seven colors of light

(D) Absorption of seven colors of light

32. A man can see through a hole, the top end of a thin rod of height x, the height of beaker is 3x, if the beaker is filled with a liquid of refractive index μ upto height 3x. He can now see the lower end of rod. The value of μ is :
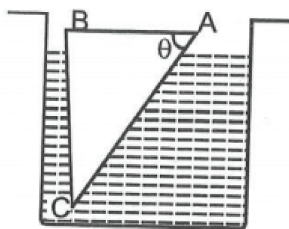
[Haryana/NTSE Stage-I/2014]

(A) $\dfrac{5}{2}$

(B) $\sqrt{\left(\dfrac{5}{2}\right)}$

(C) $\sqrt{\dfrac{3}{2}}$

(D) $\dfrac{3}{2}$

33. A glass prism of refractiv index 3/2 is immersed in water of refractive index 4/3. A light beam incident normally on the face AB is totally reflected to reach the face BC if : **[Haryana/NTSE Stage-I/2014]**

(A) $\sin\theta > \dfrac{8}{9}$

(B) $\dfrac{2}{3} < \sin\theta < \dfrac{8}{9}$

(C) $\sin\theta < \dfrac{2}{3}$

(D) $\sin\theta > \dfrac{3}{2}$

34. If a part of a convex lens is covered, its focal length will be: **(West Bengal/NTSE Stage-1/2014)**

(A) Remain unchanged

(B) Become twice

(C) Become half

(D) Depend on the covered area

35. The minimum distance between an object and its real image in a convex lens is:

(West Bengal/NTSE Stage-1/2014)

(A) 2.5 times its focal length

(B) 2 times its focal length

(C) 4 times its focal length

(D) equal to its focal length

36. A convex lens forms a real image of a point object placed on its principal axis. If the upper half of the lens is cut then : **(Bihar/NTSE Stage-1/2014)**

(A) The image will be shifted downwards

(B) The image will be shifted upward

(C) The intensity of the image will decrease

(D) None of the above

37. A screen is placed at a distance 40 cm away from an illuminated object. A converging lens if placed between the source and screen and attempt is made to from an image on screen. If no position could be found. The focal length of the lens:

(Bihar/NTSE Stage-1/2014)

(A) Must be less than 10 cm

(B) Must be greater than 20 cm

(C) Must be less than 10 cm

(D) Must not be less than 10 cm

38. Find the wrong statement related to convex lens

(Maharashtra/NTSE Stage-1/2015)

(A) Two spherical surfaces bulging outward

(B) Converging lens

(C) Positive focal length

(D) Image is always virtual and diminshed

39. Velocity of light travelling from rarer medium to denser decreased by 30%. Find the refractive index of the denser medium with respect to rarer medium ?

(Maharashtra/NTSE Stage-1/2015)

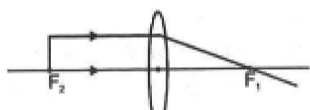(A) 1.35

(B) 1.5

(C) 1.4

(D) 1.428

40. Object when placed at .... in front of concave mirror magnification of - 1 is obtained : **(Maharashtra/NTSE Stage-1/2015)**
    (A) infinity
    (B) Centre of curvature
    (C) Between focus and centre of curvature
    (D) Principal focus

41. The position of image of the object in the ray diagram will be at: **(Uttarakhand/NTSE Stage-1/2015)**

    (A) Focal point F_2 (B) Focal point F_1
    (C) Infinity   (D) None of these

42. If two plane mirror are kept together at an angle of 30° then number of images of object will be : **(Uttarakhand/NTSE Stage-1/2015)**
    (A) 10   (B) 11
    (C) 13   (D) 11.5

43. Colour of scattered light depends: **(Maharashtra/NTSE Stage-1/2015)**
    (A) only on size of scattering particle
    (B) only on length of travelling light
    (C) both size of scattering particle and length of travelling light
    (D) on colour of incident light

44. If speed of light travelling from air to a medium decreased by 40%, find the refractive index of the medium with respect to air **(Maharashtra/NTSE Stage-1/2016)**
    (A) 2.5   (B) 1.67
    (C) 1.3   (D) 1.25

45. Choose the correct alternative which matches second and third column with first column: **(Maharashtra/NTSE Stage-1/2016)**

Column - I	Column - II	Column - III
(I) thickening of eye lens	(A) focal length increases	(i) cilliary muscles contract
(II) thickening of eye lens	(B) focal length decreases	(ii) cilliary muscles elongate

    (A) (I)-(B). (i), (II). A. (ii)
    (B) (I)-(B). (ii), (II). A. (i)
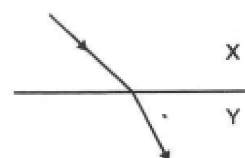   (C) (I)-(A). (i), (II). B.(ii)
    (D) (I)-(A). (ii), (II). (B).(i)

46. A mirror which can produce a magnification of +1 is: **(Delhi/NTSE Stage-1/2015)**
    (A) Convex mirror
    (B) Concave mirror
    (C) Plane mirror
    (D) Both concave mirror & plane mirror

47. When light travels from medium X to medium Y as shwon: **(Raj./NTSE Stage-1/2016)**

    (A) both the speed and the frequency decrease
    (B) both the speed and the frequency increase
    (C) both the speed and the wavelength decrease
    (D) both the wavelength and the frequency are unchanged.

48. A light ray enters from denser medium to rarer medium. What is the angle of incidence called that has 90° angle of reflection ? **(Gujrat/NTSE Stage-1/2015)**
    (A) angle of reflection   (B) critical angle
    (C) angle of deviation   (D) angle of refraction

49. Due to which motion of light does the tyndall effect occur ? **(Gujrat/NTSE Stage-1/2015)**
    (A) incidence   (B) refraction
    (C) scattering   (D) angle of refraction

50. The absolute refractive index of any medium is: **(Gujrat/NTSE Stage-1/2015)**
    (A) 1   (B) >1
    (C) <2   (D) 0

51. A lens have power +5D. This lens will be: **(U.P./NTSE Stage-1/2015)**
    (A) a convex of focal length 0.05 m.
    (B) a concave lens of focal length 0.05m
    (C) a convex lens of focal length 0.20m
    (D) a concave lens of focal length 0.05 m

52. The refractive index of glass is maxium for: **(U.P./NTSE Stage-1/2015)**
    (A) red colour   (B) yellow colour
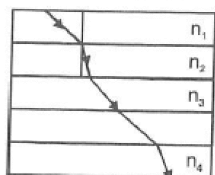   (C) violet colour   (D) green colour

53. A real and enlarged image can be formed by using a **(Jharkhand/NTSE Stage-1/2014)**
    (A) convex mirror
    (B) plance mirror
    (C) concave mirror
    (D) either convex or a plane mirror

54. Magnification produced by a convex lens is always

(Jharkhand/NTSE Stage-1/2014)
   (A) More than 1   (B) Less than 1
   (C) Equal to 1   (D) More or less than 1

56. Most of the refraction takes place at .... when light enter the eye: **(Haryana/NTSE Stage-1/2015)**
   (A) Pupil
   (B) Iris
   (C) Outer surface of cornea
   (D) Crytalline lens

57. For an incident ray directed towards centre of curvature of a spherical mirror, the reflected ray

(Bihar/NTSE Stage-1/2015)
   (A) Retractes its path
   (B) Passes throgh focus
   (C) Passes through pole
   (D) Becomes parallel to the principal axix

58. Wavelength of violet colour is

(Bihar/NTSE Stage-1/2015)
   (A) 7900 Å   (B) 6000 Å
   (C) 5800 Å   (D) 4000 Å

59. A convex lens of suitable focal length can correct man's eyes problem of :**(Bihar/NTSE Stage-1/2015)**
   (A) Short sightedness   (B) Long sightedness
   (C) Prespbyopia   (D) Astigmatism

60. The focal length of a spherical mirror is 20 cm. The radius of curvalture of this mirror will be:

(M.P./NTSE Stage-1/2015)
   (A) 10 cm   (B) 20 cm
   (C) 40 cm   (D) 80 cm

61. If λ_r, λ_y are wavelengths of light rays of red and violet colurs repectively then:

(M.P./NTSE Stage-1/2015)
   (A) $\lambda_r < \lambda_y$ (B) $\lambda_r > \lambda_y$
   (C) $\lambda_r = \lambda_y$ (D) None of these

62. To correct the defect Myopia or near sightedness, we have to use: **(M.P./NTSE Stage-1/2015)**
   (A) conves lens   (B) concave lens
   (C) plance glass   (D) none of these

63. Which of the following coloures is not a primary colour ? **(M.P./NTSE Stage-1/2015)**
   (A) White   (B) Green
   (C) Red   (D) Blue

64. The image of an object in human eye is formed at

(M. P./NTSE Stage-1/2015)
   (A) Cornea   (B) Iris
   (C) Pupil   (D) Retina

65. You are provided with a concave lens having focal length 15 cm. If it diminshes the image by one-third, calculate the distance of image from lens ?

(Chandigrah/NTSE Stage-1/2015)
   (A) 5 cm   (B) 0 cm
   (C) −5 m   (D) 10 m

66. Refractive index of a medium with respect to air is $\mu = \sqrt{2}$, find the critical angle between the two medium : **(West Bengal/NTSE Stage-1/2015)**
   (A) 130°   (B) 90°
   (C) 45°   (D) 60°

67. What will be the colour the sky as seen from the earth if there is no atmosphere ?

(West Bengal/NTSE Stage-1/2015)
   (A) Black   (B) Blue
   (C) Orange   (D) Red

68. A convex lens of glass has power P in air, If it is immersed in water, its power will be:

(West Bengal/NTSE Stage-1/2015)
   (A) More than P   (B) less than P
   (C) P   (D) More the P for
   some colours and less than P for others

69. A Converging budle of light rays in the shape of cone with a vertex angle of 45° falls on a circular diaphragm of 20 cm diameter. A lens with power 5D is fixed in the diaphragm. Diameter of face of lens is equal ot that of diaphragm. If the vertex angle of new cone is θ, then $\tan\theta$ =

(Andra Pradesh/NTSE Stage-1/2015)
   (A) 1.5   (B) 2
   (C) 3   (D) 1

70. A point source is located at a distance of 20 cm from the from surface of a glass bi-convex lens. The lens has a thickness of 5 cm and radius of curvature of it's surface is 5 cm. The refractive index of glas is 1.5. The distance of image formed by it from the rear surface of this lens is **[Raj./NTSE Stage-1/2017]**
   (A) 9.2 cm   (B) 6.3 cm
   (C) 5.7 cm   (D) 4 cm

71. The image formed by a concave mirror is observed to real, inverted and larger than the object. Where should be the position of the object ?

[Raj./NTSE Stage-1/2017]
   (A) At the centre of curvature
   (B) Between the principal focus and centre of curvature
   (C) Beyond the centre of curvatue
   (D) Between the pole of the mirror and its principal focus

72. The path of ray of light in different media of refractive indices n_1, n_2, n_3 and n_4 is shown in figure. The velocity of light will be maximum in the medium whose refractive index is : **[Raj./NTSE Stage-I/2017]**
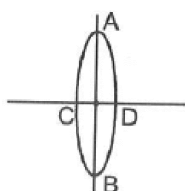

(A) n_1 (B) n_2
(C) n_3 (D) n_4

73. Which one of the following phenomena is an example of scattering of light ?
[Raj./NTSE Stage-1/2017]
(A) Bending of rod at interface of air and water
(B) Twinkling of stars
(C) Tyndall effect
(D) Mirage in desert during summer

74. Vision problem occurring in old age is knwon as
[M.P./NTSE Stage-I/2017]
(A) Myopia   (B) Presbyopia
(C) Hypermetropia   (D) Anepia

75. The focal length of each half, if the symmertrical lens of focal length f cut along AB:
[M.P./NTSE Stage-I/2017]

(A) f   (B) $\left(\dfrac{1}{2}\right)f$

(C) 2f   (D) Zero

76. The focal length of concave lens is 25 cm. Then its power will be: **[Chattis./NTSE Stage-1/2017]**

(A) 4D   (B) $\left(\dfrac{1}{4}\right)D$

(C) -4D   (D) All above

77. To remove short sightedness in eye which lens is used : **[Chattis./NTSE Stage-1/2017]**
(A) Cylindrical lens   (B) Bifocal lens
(C) Convex lens   (D) Concave lens

78. The dispersive power of a medium is:
[Jharkhand/NTSE Stage-I/2017]
(A) the greatest for red light
(B) the least for red light
(C) the least of yellow light
(D) the same for all colours.

79. A person is standing 4 m away from plane mirror. Distance between mirror and image is:
[U.P./NTSE Stage-I/2017]
(A) 4 metre   (B) 8 metre
(C) 2 metre   (D) 6 metre

80. If an object is placed between two parallel plane mirror, how many image will be formed:
[U.P./NTSE Stage-I/2017]
(A) Only one   (B) Two
(C) Infinite   (D) None of these

81. In long sightedness image is formed:
[U.P./NTSE Stage-I/2017]
(A) On Retina   (B) Infront of Retina
(C) Behind Retina   (D) On blind spot

82. If 'p' and 'q' are distance of object and image from principal focus of a concave mirror then what is the relation between 'p' , 'q' and 'f' ?
[Haryana/NTSE Stage-I/2017]

(A) $pq = \sqrt{f}$ (B) $pq = f$

(C) $pq = f^2$ (D) $pq = \dfrac{1}{f}$

83. When the object is at distances u_1 and u_2 from a lens, a real and virtual images are formed respectively having the same magnification. The focal length of lens is: **[Haryana/NTSE Stage-I/2017]**

(A) $u_2 + \dfrac{u_2}{2}$ (B) $\dfrac{u_1 - u_2}{2}$
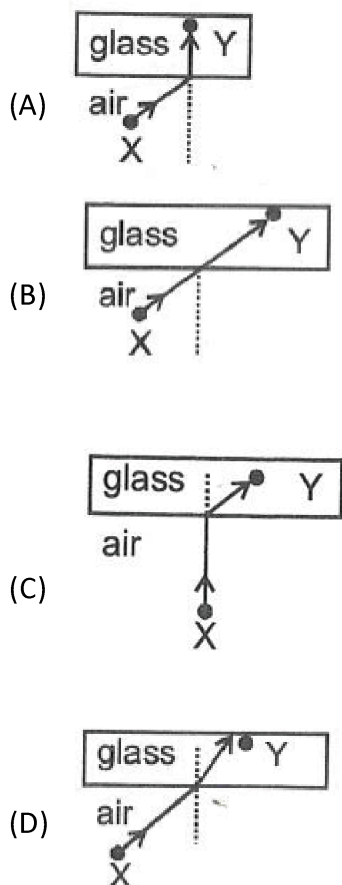
(C) $\dfrac{u_1 + u_2}{2}$ (D) $u_1 + u_2$

84. A lightwave of certain frequency moves from air to glass then its: **[West Bengal/NTSE Stages-1/2017]**
(A) wavelength does not change
(B) frequency does not change but wavelength changes
(C) frequency changes
(D) frequency and wavelength both changes.

85. For the define colour of light absolute refractive index of water is 4/3 and absolute refractive index of glass is 3/2, then will be the refractive index of glass with respect to water ?
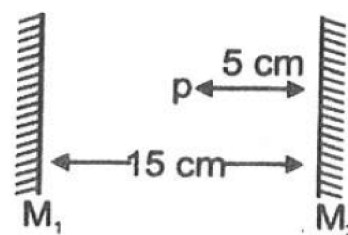
[West Bengal/NTSE Stages-1/2017]

(A) 1.125　　　　　(B) 1.33
(C) 1.56　　　　　(D) 2

86. The size of image formed by a concave mirror is same as the size of object. The position of the object will be: **[Raj./NTSE Stage-I/2018]**

(A) at F　　　　　(B) between F & C
(C) at C　　　　　(D) between C & infinity

87. A convex lens has focal length 30 cm. If an object is placed at a distance of 15 cm from it then the magnification produced by the lens is:

[Raj./NTSE Stage-1/2018]

(A) 6.66　　　　　(B) 0.5
(C) 1　　　　　　(D) 2

88. Which diagram below illustrates the path of a light ray as it trvels from a given point in air to another given point Y in glass: **[Raj./NTSE Stage-1/2018]**
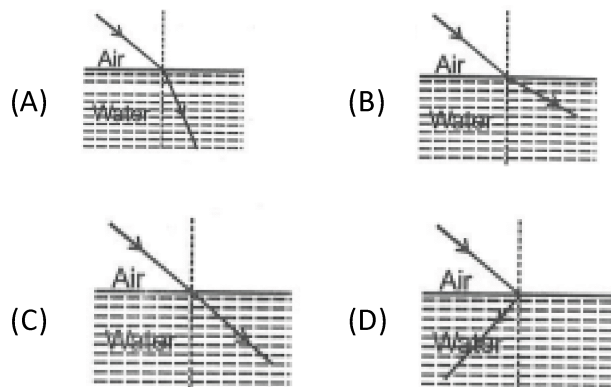

89. Between two parallel mirrors an object P is placed as shown in fig. Distance of first three images from mirror M_2 will be (in cm)

[Bihar/NTSE Stage-1/2017]

(A) 5, 15, 15　　　　(B) 5, 15, 30
(C) 5. 15. 25　　　　(D) 5. 25. 30

90. While travelling from air to water path or a sound beam is liked to be　**[Bihar/NTSE Stage-1/2017]**

91. The refractive indices of glass and water are $\frac{5}{3}$ and $\frac{4}{3}$ respectively. For a ray of light moving from glas t water, critical angle will be:

[Bihar/NTSE Stage-1/2017]

(A) $\sin^{-1}\frac{4}{5}$　　　　(B) $\sin^{-1}\frac{3}{5}$

(C) $\sin^{-1}\frac{3}{2}$　　　　(D) $\sin^{-1}\frac{2}{1}$

92. Two lenses of focal lengrth f_1 and f_2 are kept in c tact coaxially.The powr of the combination will be:
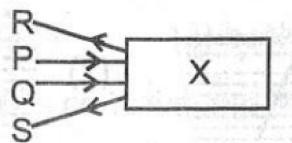
[Delhi/NTSE-1/2017]

(A) $\frac{f_1 f_1}{f_1 + f_2}$　　　　(B) $\frac{f_1 + f_1}{f_1 f_2}$

(C) $\frac{f_1 f_1}{f_1 - f_2}$　　　　(D) $f_1 + f_2$

93. In figure, a ray of light undergoes refraction from medium A to medium B. If the speed of light in medium A is v, then the speed of light in medium B will be: **[Delhi/NTSE Stage-1/2017]**

(A) $\sqrt{3}v$

(B) $\dfrac{v}{\sqrt{3}}$

(C) $2v$

(D) $\dfrac{v}{2}$

94. Two light rays P and Q are incident on an optical device 'X' which finally goes 'R' and 'S'. Identify optical 'X': **[Delhi/NTSE Stage-1/2017]**

(A) Concave lens   (B) Concave mirror
(C) Convex lens   (D) Convex mirror

95. Which defect in human eye arises due to the irregularities in spherical shape of cornea ?
[Raj./NTSE Stage-1/2019]
(A) Cataract
(B) Hypermetropia or long sightedness
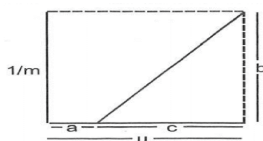(C) Myopia or short sightedness
(D) Astigmatism

96. Focal length of convex lens is +40 cm. The power of this lens will be : **[Raj./NTSE Stage-1/2019]**
(A) +4 dioptre   (B) +2.5 dioptre
(C) +40 dioptre   (D) +25 dioptre

97. Two plane mirrors P & Q are kept at with respect to each other. Light falls and P is reflected. The emergent ray is opposite to incident ray direction. The θ is equal to **[Haryana/NTSE Stage-1/2018]**
(A) 40°   (B) 30°
(C) 60°   (D) 90°

98. The graph in figure shown how the iverse of magnification (1/m) produced by a thin convex lens varies with object distance 'u' the power of lens will be **[Haryana/NTSE Stage-1/2018]**

(A) $\dfrac{b}{c}$

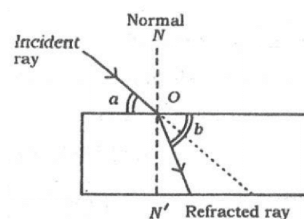(B) $\dfrac{b}{ca}$

(C) $\dfrac{bc}{a}$

(D) $\dfrac{c}{a}$

99. A screeb bearing a real image of magnification m_1, formec by a convex lens, is moved by a distance x. Theobject is then moved until a new image of magnification m_2 formed on screen. The focal lenght of lens is: **[Haryana/NTSE Stage-1/2019]**

(A) $\dfrac{x}{m_2 - m_1}$

(B) $\dfrac{m_2 - m_1}{x}$

(C) $\dfrac{x}{m_1 - m_2}$

(D) $\dfrac{m_1 - m_2}{x}$

100. Focal length of a lens is 25 cm. In dioptre power of lens will be **[Raj/NTSE Stage-1/2019]**
(A) 0.04   (B) 0.4
(C) 4   (D) 2.5

101. In the given ray diagram correct relation for snell's law is **[Raj./NTSE Stage-1/2019]**

(A) $\dfrac{\sin a}{\sin b}$ = constant

(B) $\dfrac{\sin b}{\sin a}$ = constant

(C) $\dfrac{\sin(90 - a)}{\sin(90 - b)}$

(D) $\dfrac{\sin(90 - a)}{\sin b}$

102. Find the power of a concave lens of focal length 2 m ? **[Gujrat/NTSE Stage-I/2019]**
(A) −0.5 D   (B) +0.5 D
(C) −4 D   (D) 4 D

103. The central point of lens is known as **[Gujrat/NTSE Stage-1/2019]**
(A) Centre of curvature   (B) Principal focus
(C) Optical centre   (D) Pole

104. For a young adult with norma vision, what is the value of least distance ? **[Gujrat/NTSE Stage-1/2019]**
(A) 25 cm   (B) 25 mm
(C) 25 m   (D) 50 mm

105. The idea that the sunlight is made up of seven colours was given by ?

[Gujrat/NTSE Stage-1/2019]

(A) Einstein   (B) Newton
(C) Tyndall   (D) Dalton

106. A spherical mirror and a thin spherical lens each of focal length-10 cm are given. The mirror and lens are likely to be : **[Karnataka/NTSE Stage-1/2019]**

(A) The mirror is concave mirror and the lens is concave lens.
(B) The mirror is convex mirror and the lens is convex lens.
(C) The mirror is convex mirror and the lens is concave lens.
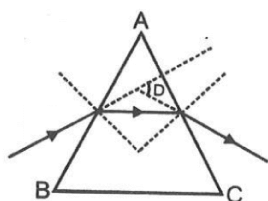(D) The mirror is concave mirror and the lens is convex lens.

107. A ray of light passes from glass $\left(\mu = \dfrac{3}{2} \right)$ to water $\left(\mu = \dfrac{4}{3} \right)$. The value of critical angle will be:

[UP/NTSE Stage-1/2019]

(A) $\sin^{-1}\left(\dfrac{1}{2} \right)$ (B) $\sin^{-1}\left(\sqrt{\dfrac{8}{9}} \right)$

(C) $\sin^{-1}\left(\dfrac{8}{9} \right)$ (D) $\sin^{-1}\left(\dfrac{5}{7} \right)$

108. The refraction of light by a prism is shown in the following figure. the angle $\angle D$ is -

[UP/NTSE Stage-1/2019]

(A) Angle of prism
(B) Angle of refraction
(C) Angle of emergence
(D) Angle of deviation

109. The unit of power of a lens is dioptre. Then one dioptre (1 dioptre) is equal to -

[UP/NTSE Stage-1/2019]

(A) 100 cm^{-1} (B) 1 meter^{-1}
(C) 1 meter   (D) 100 cm

110. If f be the focal length of a convex lens, then the nature of image of an object placed at a

[UP/NTSE Stage-1/2019]

(A) Red, inverted and same size.
(B) virtural, erect and smell
(C) Real, erect and same size
(D) Virtual, inverted and same size.

111. The power of a plane mirror is -

[UP/NTSE Stage-1/2019]

(A) zero   (B) +1
(C) −1   (D) infinity

112. A beam of light is incident at 60° to a plane seperaling two medium. The reflected and refracted rays are found to be perpendicular ot each other. What is the refractive index of the second medium with respect to the first medium.

[West Bengal/NTSE Stage-1/2019]

(A) $\dfrac{1}{\sqrt{3}}$ (B) $\dfrac{1}{3}$

(C) $\sqrt{3}$ (D) 3

113. The absolute refractive indices of water and glass are 4/3 and 3/2 respectively. Which is the refravtive index of glass with respect to water ?

[West Bengal/NTSE Stage-I/2019]

(A) 1.125   (B) 1.5
(C) 1.25   (D) 1.52

114. When electromagnetic wave propagates, the angle between the electric field and the magnetic field is given by : **[West Bengal/NTSE Stage-1/2019]**

(A) 0°   (B) 90°
(C) 45°   (D) 135°

115. If a plane mirror is rotated by an angle 15° then the reflected light will be rotated by:

[Assam/NTSE Stage-1/2019]

(A) 15°   (B) 30°
(C) 45°   (D) 7.5°

116. If an object is placed away from the centre of curvature of a concave mirror, then the image would be: **[Assam /NTSE Stage-I/2019]**

(A) Magnified , real and inverted
(B) diminished, real and erect
(C) dimished, virtual, erect
(D) diminished, real, inverted

117. At total internal reflection the angle between the reflceted ray and the incident ray is :
[Assam/NTSE Stage-I/2019]
(A) Two times the angle of incidence
(B) Equal to the angle of incidence
(C) zero 0°
(D) 90°

118. If an object is placed at focus of a biconves lens then the image will be formed:
[Assam/NTSE Stage-I/2019)
(A) at focus on the otherside of the lens
(B) at the centre of curvature
(C) at infinity
(D) in between foucus and centre of curvature

119. The correct sequence in the increasing orden of frequency is: **(Assam/NTSE Stage-1/2019)**
(A) violet, yellow, orange
(B) red, orange, violet
(C) blue, yellow, violet
(D) blue, red, orange

120. A person can see distance object clearly but find it difficult to read a book. The perosn is suffering from :
(Assam/NTSE Stage-1/2019)
(A) Astigmatism   (B) Myopia
(C) Hypermetropia   (D) Presbyopia

121. A concave lens of focal length 30 cm placed in contact with a plane mirror acts as a:
[Bihar/NTSE Stage-1/2019]
(A) convax mirror of focal length 60 cm.
(B) concave mirror of focal length 15 cm.
(C) convex mirror of focal length 15 cm.
(D) concave mirror of focal length 60 cm.

122. Rainbow is formed due to a combination of :
[Bihar/NTSE Stage-1/2019]
(A) Dispersion and total internal reflection
(B) Refractuib abd avsirotion
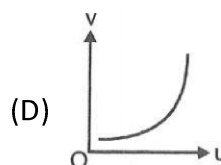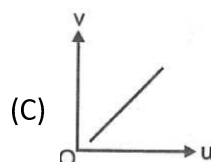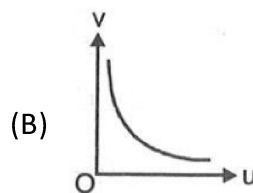(C) Dispersion and interference
(D) Scattering and dispersion.

123. A person has D cm wide face and his two eyes ar separated by d cm, the minumum width (in cm) of a mirror required for the person to view his complete face is : **[Bihar/NTSE Stage-1/2019]**
(A) $\dfrac{D+d}{2}$ (B) $\dfrac{D-d}{4}$
(C) $\dfrac{D+d}{4}$ (D) $\dfrac{D-d}{2}$

124. In an experiment to find the focal length of a concave mirror, a graph is drawn between magnitudede of u and v, The graph looks like:
[Chandigarh /NTSE Stage-1/2019]

(A)

(B)

(C)

(D)

125. Green light of wavelength 5460Å is incident on an air-glass interface, If the refractive index of glass is 1.5, the wavelength of leight in glass would be: (given velocity of light in air c=3 × 10⁸ m/s).
(Chandigarh/NTSE Stages-1/2019)
(A) 3640 Å   (B) 5460Å
(C) 4861 Å   (D) None of these

126. The raduis of curvature of concave mirror is 10 cm. If the object is placed at 20 cm in front of it, then what will be the position of image and magnification ?
(Chattishargh/NTSE Stages-1/2019]
(A) $\dfrac{20}{3}cm, 3$

(B) $-\dfrac{20}{3}cm, -\dfrac{1}{3}$

(C) $-20\ cm, 3$

(D) $-\dfrac{20}{3}cm, 6$

127. A person can not clearly see objects at a distance more than 40 cm. He is advised to use lens of power:

(Delhi/NTSE Stages - I/2019)

(A) −2.5 D

(B) 2.5 D

(C) −1.5 D

(D) 1.5 D

128. An observation moves towards a stationary plane mirror at a speed of 4 m/s the speed with which his image move towards him ?

(Delhi / NTSE Stage-1/2019)

(A) 2 m/s

(B) 4m/s

(C) 8 m/s

(D) Image will stay at rest

129. A concave mirror of focal length 15 cm forms an image. The position of the object when the image is virtual and linear magnification is 2 is:

(Delhi/NTSE Stage-I/2019)

(A) 22.5 cm (B) 7.5 cm

(C) 30 cm (D) 4.5 cm

130. Focal length of a lens is 50 cm. In diopter power of lens will be

(Raj./NTSE Stage-1/2020)

(A) 0.02 (B) 2

(C) 0.2 (D) 50

ANSWER KEY

DPP_1

1.	D	2.	C	3.	B	4.	D	5.	C	6.	A	7.	B
8.	A	9.	D	10.	B								

DPP_2

1.	D	2.	B	3.	C	4.	C	5.	A	6.	C	7.	A
8.	C	9.	B	10.	D								

DPP_3

1.	C	2.	C	3.	B	4.	B	5.	D	6.	B	7.	A
8.	C	9.	B	10.	A								

DPP_4

1.	B	2.	A	3.	C	4.	A	5.	D	6.	C	7.	A
8.	B	9.	A	10.	B	11.	C	12.	D	13.	A	14.	B
15.	B	16.	C	17.	B	18.	A	19.	A	20.	C	21.	B
22.	C	23.	D	24.	A	25.	D	26.	B				

DPP_5

1.	B	2.	A	3.	B	4.	A	5.	C	6.	B	7.	C
8.	C	9.	B	10.	B	11.	C	12.	B	13.	A	14.	C

DPP_6

1.	B	2.	D	3.	C	4.	D	5.	A	6.	B	7.	A
8.	C	9.	C	10.	D	11.	C	12.	C	13.	A	14.	A
15.	A	16.	C	17.	C	18.	B	19.	D	20.	D	21.	B
22.	B	23.	D	24.	B	25.	B	26.	D	27.	A	28.	D
29.	B	30.	B	31.	C	32.	B	33.	A	34.	A	35.	B
36.	C	37.	D	38.	D	39.	D	40.	B	41.	C	42.	B
43.	A	44.	B	45.	A	46.	C	47.	C	48.	B	49.	C
50.	B	51.	C	52.	C	53.	C	54.	B	56.	C	57.	A
58.	D	59.	B	60.	C	61.	B	62.	B	63.	A	64.	D
65.	C	66.	C	67.	A	68.	B	69.	A	70.	B	71.	A
72.	C	73.	C	74.	B	75.	C	76.	C	77.	D	78.	A
79.	A	80.	C	81.	C	82.	C	83.	C	84.	B	85.	A
86.	C	87.	D	88.	D	89.	D	90.	B	91.	A	92.	B
93.	A	94.	D	95.	D	96.	B	97.	D	98.	A	99.	C
100.	C	101.	C	102.	A	103.	C	104.	A	105.	B	106.	A
107.	C	108.	D	109.	B	110.	A	111.	A	112.	A	113.	A
114.	B	115.	B	116.	D	117.	A	118.	C	119.	B	120.	C
121.	C	122.	A	123.	D	124.	B	125.	A	126.	B	127.	A
128.	C	129.	B	130.	B								