Model Question Paper 3

Ray Optics 3

11th Standard

**Physics**

Reg.No. : | | | | | | |

Answer all the Questions

Time : 01:00:00 Hrs

Total Marks : 55

## Part A

11 x 1 = 11

1) A ray of light has a ..... width and is represented in diagrams as straight lines.
   (a) finite (b) infinite (c) zero (d) varying
2) A beam of light is a collection of .....
   (a) lines (b) points (c) rays (d) dots
3) A search light emits a ..... beam of light.
   (a) unparallel (b) parallel (c) curved (d) scattered
4) Light from a lamp is a ..... beam.
   (a) Convergent (b) divergent (c) dispersed (d) parallel
5) Convex lens produces a ..... beam of light.
   (a) convergent (b) divergent (c) dispersed (d) parallel
6) Mirrors in every day use are coated with ..... on the back side of the glass.
   (a) silver (b) mercury (c) zinc (d) aluminium
7) The largest reflector in the world is a curved mirror. Its front surface is coated with .....
   (a) silver (b) mercury (c) zinc (d) aluminium
8) The largest reflector in the world-the hale telescope is on the top of .....
   (a) Mount San Antonio (b) Mount Abu (c) Mount Palomer (d) Mount Wilson
9) The angle between the incident ray and the normal is called .....
   (a) angle of incidence (b) angle of reflection (c) angle of deviation (d) angle of emergence
10) The angle between the reflected ray and the normal is called .....
   (a) angle of incidence (b) angle of reflection (c) angle of deviation (d) angle of emergence
11) The incident ray, the reflected ray and the normal drawn to the reflecting surface at the point of incidence .....
   (a) all lie in same plane (b) all lie in different plane (c) are all mutually perpendicular to each other (d) are all inclined at $120^\circ$

## part B

6 x 2 = 12

12) What is total internal reflection?
13) State the conditions for total internal reflection to take place?
14) What is refraction?
15) What is a lens?
16) When several thin lenses of focal length $f_1$,$f_2$,$f_3$ .....are in contact, what is its effective focal length?Express the effective focal length in terms of its power?
17) What is the cause of the brilliance of diamonds? Explain.

## Part C

4 x 3 = 12

18) Explain how will you determine the angle of the minimum deviation of a prism using the spectrometer.
19) Write a note on the formation of rainbows.
20) Show that the angle of deviation of a ray by a plane mirror or a plane surface is twice the glancing angle.
21) obtain the expression for magnification in the case of image formed by a convex and concave lens using (i) sign convention, (ii) using lens formula.

## Part D

4 x 5 = 20

22) A ray passes through an equilateral prism such that the angle of incidence is equal to the angle of emergence and the later is equal to 3/4 of the angle of prism. Find the angle of deviation.
   Given data.
   Given prism is an equilateral prism
   Angle of incidence = Angle of emergence
   Angle of emergence = $\frac{3}{4}$ of the angle of prism
23) The refractive indices of flint glass of equilateral prism for 400 nm and 700 nm are 1.66 and 1.61 respectively. Calculate the difference in angle of minimum deviation.
   Given data.
   Given two prisms are equilateral prisms made of flint glass
   $\Rightarrow$ Angle of the prism (A) = $60^\circ$
   Refractive index of glass prism for light of wavelength 400 nm($\mu_1$)=1.66
   Refractive index of glass prism for light of wavelength 700 nm($\mu_2$)=1.61

24) White light is incident on a small angled prism of angle $5^\circ$. Calculate the angular dispersion if the refractive indices of red and violet rays are 1.642 and 1.656 respectively.

Given data.

Angle of small angled prism = $5^\circ$

Refractive index of the small angled prism for red light ($\mu_r$)=1.642

Refractive index of the small angled prism for violet light ($\mu_v$)=1.656

25) A thin prism of refractive index 1.5 deviates a ray by a minimum angle of $5^\circ$. When it is kept immersed in oil of refractive index 1.25, what is the angle of minimum deviation?

Given data:

Refractive index of thin prism ($\mu_1$)=1.5

Angle of minimum deviation ($D_1$)=$5^\circ$

The prism is immersed in oil of refractive index ($\mu_2$)=1.25

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