THIRD TERM E-LEARNING NOTE

SUBJECT: PHYSICS   **CLASS: SS2**

SCHEME OF WORK

WEEK TOPICS
1. Reflection of light on plane surfaces, laws of reflection, image formation by plane mirror,   application of reflection on plane mirror
2. Reflection on curved mirrors-types, images produced, uses and mirror formulae
3. Refraction of light, laws of refraction, effects of refraction, refraction through rectangular   prism
4. Refraction through triangular prism, real and apparent depth, total internal reflection,   application of total internal reflection
5. Refraction through lenses-types of lenses, image formation in lenses, lens formulae
6. Optical instrument-camera, projector, simple and compound microscope, telescope, human   eye, defects and correction of vision
7. Dispersion of white light- production of pure and impure spectrum, colour of objects
8. Sound wave- production, transmission, speed, echo and its application, reverberation,   characteristics of sound, forced vibration, resonance
9. Musical instruments
10. Vibration in pipes.

REFERENCE TEXTBOOKS
- New School Physics by M.W Anyakhoha
- New System Physics by Dr. Charles Chow.
- SSCE WAEC Past Questions
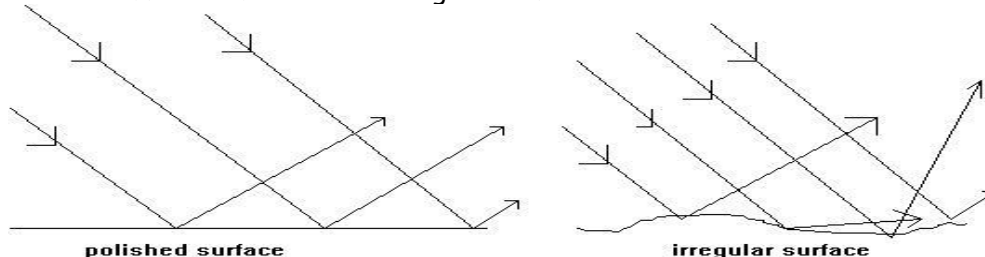- UTME Physics Past Questions

WEEK ONE
- ✓ Reflection of light on plane surface
- ✓ Laws of reflection
- ✓ Image formation by plane mirror
- ✓ Application of reflection on plane mirror

REFLECTION OF LIGHT ON PLANE SURFACE
There are two types of reflection:
1.   Regular Reflection
2.   Diffuse Reflection or Irregular Reflection

polished surface   irregular surface

In regular reflection, parallel rays of light incident on a smooth or polished surface are reflected as parallel rays in one direction. In diffused or irregular reflection, parallel rays of light incident on a rough or irregular surface are reflected in various directions

LAWS OF REFLECTION
The first law of reflection states that the incident ray, the reflected ray and the normal at the point of incidence all lie in the same plane

The second law of reflection states that the angle of incidence (i) is equal to angle of reflection (r).
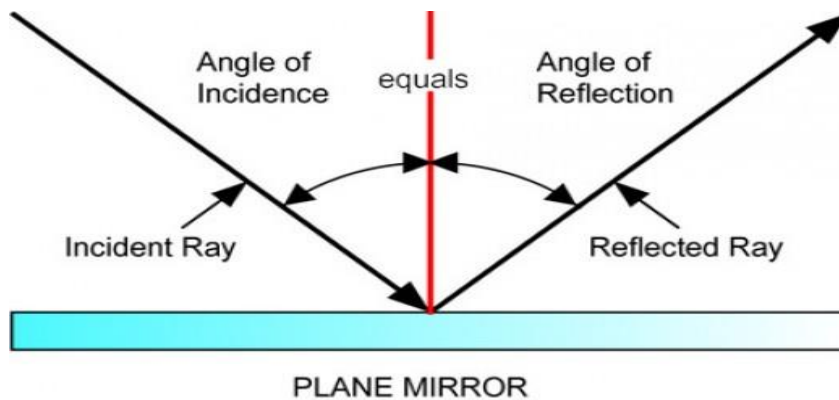
CHARACTERISTICS OF IMAGE FORMED BY PLANE MIRROR
1.   It is the same size as the object
2.   It is virtual
3.   It is laterally inverted
4.   It is upright
5.   It is far behind the mirror as the object is in front of the mirror
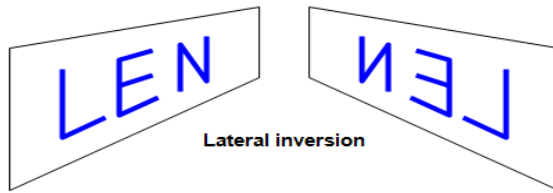
IMAGE
There are two types of image:
1.   Real image
2.   Virtual image

A real image is one that can be caught on a screen. Light rays actually pass through real image. A virtual image is one that cannot be caught on a screen. It is one through which rays do not actually pass but which is nevertheless visible to the eye.
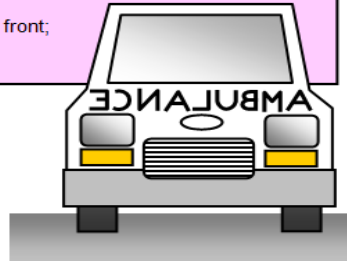
LATERAL INVERSION
The effect on plane mirror on objects placed in front of it whereby the appearance of the image looks like a reversal of the object is known as lateral inversion

Lateral inversion

An image in a plane mirror is:
the same size as the object;
the same distance behind the mirror as the object is in front;
laterally inverted
virtual.

IMAGES FORMED BY INCLINED MIRROR

When two mirrors are placed at an angle to each other, the number of images formed is given by:

$$N = \frac{360}{\theta} - 1$$

N = Number of images

θ = Angle of inclination

When θ = 180^0, the two mirrors will act as a single mirror and therefore formed only one image. When θ = O, the two mirrors are parallel to each other and the image of object placed between them will be at infinity.

EFFECT OF MIRROR ROTATION ON REFLECTED RAY-MIRROR GALVANOMETER

If the direction of an incident ray on a mirror is kept constant and the mirror is rotated through twice that angle. This fact is utilized in mirror galvanometer (to measure very small electric current) and in the navigators sextant.

EXAMPLE

The reflection of a narrow beam of light incident normally on a plane mirror falls on a metre rule parallel to the mirror and at a distance of 1m. Calculate the angle of rotation of the mirror if the reflected beam is displaced 21.26cm along the metre-rule when the mirror rotated.

Angle ONP = 2θ

$$\text{Tan } 2\theta = \frac{21.26}{100}$$

$$= 0.2126$$

$$2\theta = \tan^{-1}(0.2126)$$

$$2\theta = 12^0$$

$$\theta = 6^0$$

EVALUATION

1. If the angle of reflection of a propagated ray is 35°, calculate (a) The angle of deviation (b) The angle of glance (c) Angle of incidence.

2. An object is placed between two mirrors inclined at an angle 40 to each other. Find the number of images that will be formed.

USES OF PLANE MIRROR

1. It is used in periscope
2. It is…