SNS COLLEGE OF ALLIED HEALTH SCIENCES- COIMBATORE 35

DEPARTMENT : RADIOGRAPHY AND IMAGNG TECHNOLOGY

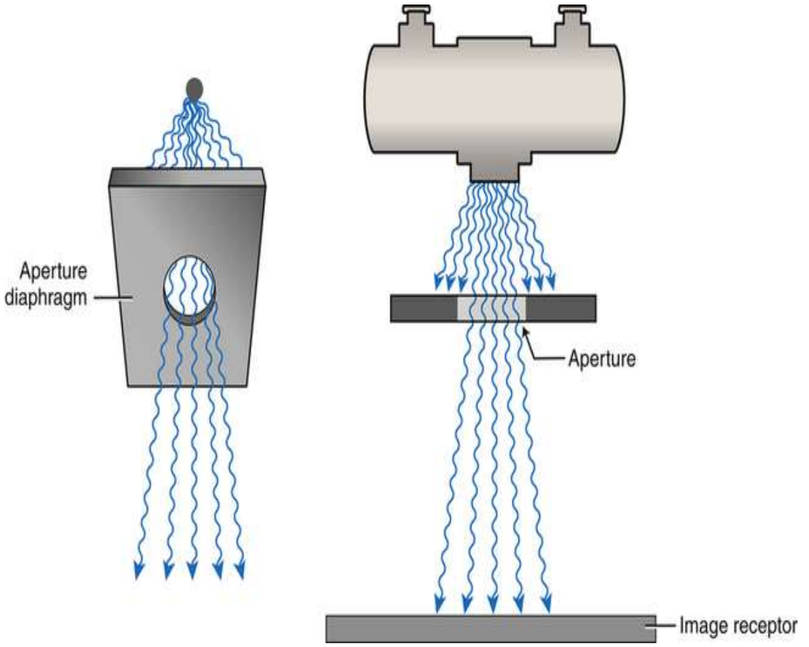
SUBJECT : GENERAL PHYSICS, RADIATION PHYSICS AND PHYSICS OF DIAGNOSTIC RADIOLOGY

PAPER : PAPER II (UNIT 5 – PHYSICS OF DIAGNOSTIC RADIOLOGY : X-ray TUBE)

TOPIC : 7. X-ray BEAM RESTRICTORS

X-ray BEAM RESTRICTORS

- Beam restrictors are the devices that are attached to the X-ray tube housing for regulating the size and shape of an X-ray beam.
- The beam restrictors reduce the scatter radiation, reduces patient dose, and improves the image contrast.
- There are three types of beam-restricting devices are-Diaphragm, Cones or Cylinders, and Collimator.



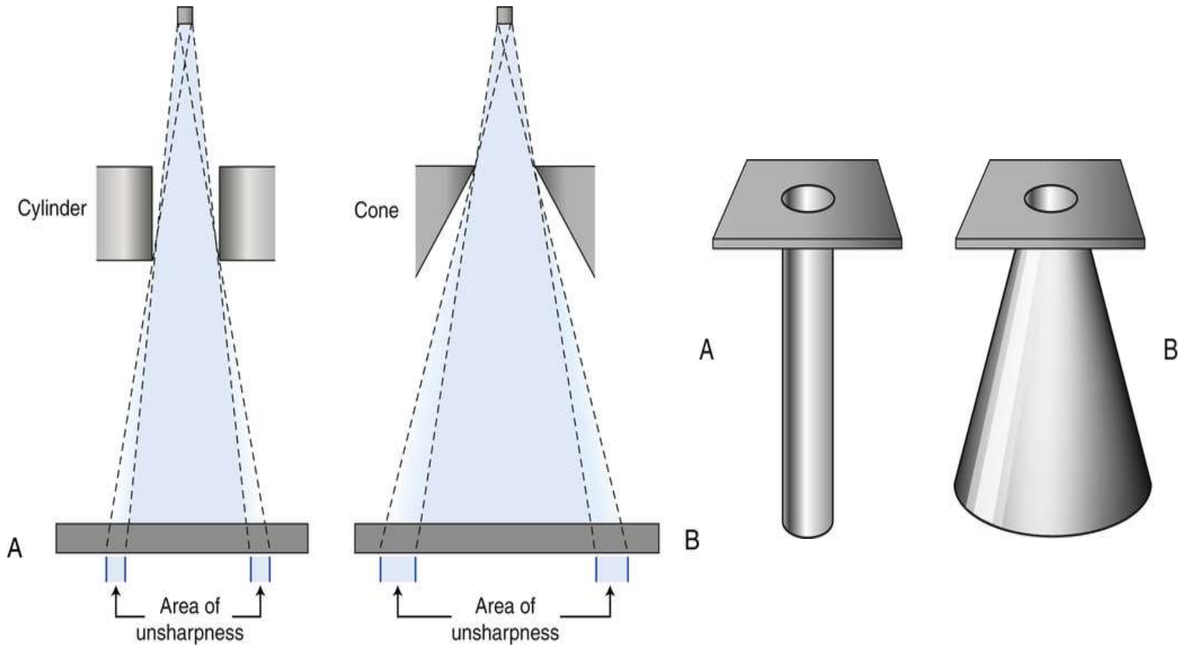
APERTURE DIAPHRAGM :

- It consists of a sheet of lead with a hole in the center that controls the size and shape of the beam. The Aperture Diaphragm is attached directly to the X-ray tube.

X-ray BEAM RESTRICTORS

CONES AND CYLINDERS

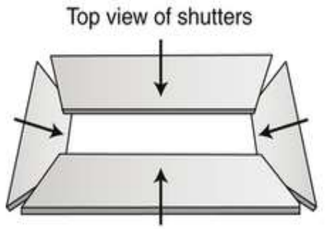
- The cones and cylinders are consisting of lead sheets.
- The cones and cylinders are used for regulating the size and shape of an X-ray beam in a circular shape.
- These cones and cylinders also reduce the penumbra.
- Thus the image contrast is improved.

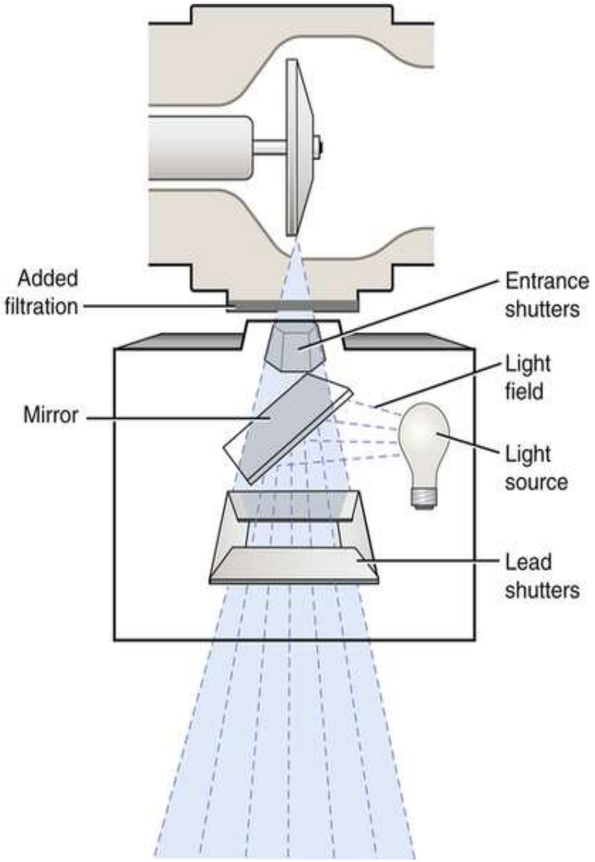


X-ray BEAM RESTRICTORS

COLLIMATOR

- It is a device that is used to minimize the field of view.
- The collimator is attached to the X-ray tube below the glass window.
- It consists of two sets of lead shutters that can be moved independently.
- The collimator also has a light bulb and a mirror.
- The light bulb is positioned laterally, and the mirror is at an angle of 45 degrees.
- The collimator regulates the size and shape of an X-ray beam.
- Thus, it reduces the scatter radiation, reduces the patient dose, and improves the image contrast.





INTERROGATIONS

1. What are the X-ray beam restrictors ?
2. Purpose of Beam Restrictors ?
3. Most commonly used beam restrictors ?

INTERROGATIONS

1. What is Attenuation ?
2. What is Absorption ?
3. What is Scattering ?

REFERENCES

1. Physics for Radiography - Hay and Hughs
2. Ball and mores essential physics radiographers, IV edition, Blackwell publishing.
3. Basic Medical Radiation physics – Stanton.
4. Christensen’s Physics of Diagnostic Radiology – Christensen.
5. The physics of Radiology and Imaging – K Thayalan.

THANK YOU