1. **What is “Shape from X”?**

**Please give 3 examples for “Shape from X” and also explain them in details.**

**Answer:**

1.1 The study of how shape can be inferred from such cues like shading, texture, focus is sometimes called shape from X.

1.2

Shape from shading:

* The problem of recovering the shape of a surface from this intensity variation is known as shape from shading.

Shape from texture:

* The foreshortening of regular patterns as the surface slants or bends away from the camera.

Shape from focus:

* A strong cue for object depth is the amount of blur, which increases as the object’s surface moves away from the camera’s focusing distance.

1. **Please explain “Photometric Stereo”, “Lambertian Surface”, “Perfect Reflecting Diffuser” in details.**

Answer:

Photometric Stereo:

* Another way to make shape from shading more reliable is to use multiple light sources that can be selectively turned on and off.

Lambertian Surface:

* Light falling on it is scattered such that the apparent brightness of the surface to an observer is the same regardless of the observer's angle of view

Perfect Reflecting Diffuser:

* A Perfect (Reflecting) Diffuser (PRD) is a theoretical perfectly white surface with Lambertian Distance (its brightness appears the same from any angle of view). It does not absorb light, giving back 100% of the light it receives.