

DIP ASSIGNMENT
SRN 01FB16ECS471
Manasa Jagadeesh

Question 1a) This is due to Purkinje effect, in which the peak luminance sensitivity of the human eye shifts from the red end of the colour spectrum to the blue end, at low illumination levels. This happens as a part of brightness adaptation in the dark. Hence, if runway lights are blue in colour, they will seem brighter than red lights and hence be noticed more easily.

Question 1b) Peripheral vision uses the peripheral retina, which is more densely packed with rods than with cones. Rods are the photoreceptors responsible for scotopic vision (vision at lower levels of illumination), and hence we can see better in the dark with our peripheral vision as opposed to looking straight at the object, in which case the central retina is used. The central retina is packed densely with cones which help with photopic vision and not vision in the dark.

Question 2a) The glass in window panes refracts more light than it reflects. During the day, most of the light sensed by the eye when viewing the window from inside, is the refracted light from outside, and hence the glass seems like a transparent surface. However, at night, the illumination levels outside the house are very low. Hence, most of the light sensed by the eye is the light from inside the house being reflected, making the window seem like a mirror.

Question 2b) Electromagnetic waves have a host of uses in the medical field, some of which are listed below:

Radio Waves: Nuclear Magnetic Resonance Imaging

IR Waves: IR scans, some kinds of laser surgery

Visible Light: Laser surgery

UV Rays: Sterilization of equipment, phototherapy

X-Rays: Chemotherapy (to destroy cancerous tissues), CT scans Gamma Rays: PET Scans, and some kinds of radiotherapy

Question 3b) Optical illusions can be caused due to brightness adaption or brightness discrimination. An example of an optical illusion that is based on this principle is the Mach bands, where two rectangles of the same shade of grey look different due to the colour of the area surrounding them.