

Multiple Part True/False Questions. For each question, indicate which of the statements, (A)–(D), are **true** and which are **false**? Note: Questions may have zero, one or multiple statements that are true.

Question 1. Which of the following statements about colour are **true**? Which are **false**?

- (A) Modern, high quality computer monitors can display all the visible colours of the CIE XYZ colour system.
- (B) Two light mixtures with different spectral power distributions will be perceived as the same colour by a (normal) human observer if they have the same coordinates in an RGB colour space.
- (C) A fluorescent light bulb is more efficient than an incandescent light bulb because its output is tuned to the spectral response of human scotopic (night-time) vision.
- (D) In the human eye, the rods are cells that are used for sensing very low light levels and the cones are used for sensing under normal illumination. Only cones contribute to the perception of colour.

Solution : (A) False, (B) True, (C) False, (D) True.

Question 2. We would like to generate all the colours that humans can perceive by varying the intensity of 3 coloured lights and combining their colours. Which of the following statements about properties these 3 lights must have are **true**? Which are **false**?

- (A) The lights must have colours that lie at the corners of the CIE colour diagram.
- (B) The lights must be chosen so that each stimulates a single colour receptor of human vision.
- (C) The lights can not be monochromatic. Instead, the individual output of each light needs to span the full visible spectrum, albeit in differing relative amounts.

(D) It is impossible to find 3 light sources that can do this.

Solution : (A) False, (B) False, (C) False, (D) True.

Question 3. Which of the following are **true** statements about goals of a colour constancy algorithm? Which are **false**?

- (A) Correct for changes in the illumination in different parts of the scene so that the entire image is made consistent with what would be seen with a single, uniform light source.
- (B) Correct the colours of an image so that the brightest patch is normalized to white.
- (C) Normalize the colours in an image so that all colours have the same average brightness.
- (D) Correct the colours of an image taken under a coloured light so that they appear the same as if seen under a standard white light.

Solution : (A) False, (B) False, (C) False, (D) True.

Short Answer Questions.

Question 4. If you were asked to develop a computer vision system to help a paint store match the colours of paints for customers, would it be best to use the standard CIE XYZ colour space or a uniform colour space? Explain your answer with just one or two sentences.

Solution : You should use a uniform colour space because it measures which differences in colour will be perceptible to human vision.