Engineering is Elementary

"Lighting System" Assessment

Marking Instructions

- Use a No. 2 pencil or a blue or black ink pen only.
- Do not use pens with ink that soaks through the paper.
- Make solid marks that fill the response completely.
- Make no stray marks on this form.

Use the picture below to answer questions 1 and 2.

1. On which of the objects will the light be BRIGHTEST?
   - The truck
   - The books
   - The apple
   - They will all be the same

2. On which of the objects will the light be LEAST BRIGHT?
   - The truck
   - The books
   - The apple
   - They will all be the same

3. In which diagram will light from the flashlight be BRIGHTEST in the corner marked by the X?
   - It is not possible to light the corner marked by the X.
4. A student is trying to design a way to use a spotlight to light up two paintings. What should the student think about?
- The size of the paintings
- The angle between the spotlight and the paintings
- How far from the paintings she should put the spotlight
- All of the above

5. At work an optical engineer is MOST LIKELY to:
- Construct bridges.
- Improve lenses for a telescope.
- Repair TV screens when they break.
- Design an obstacle course for race cars.

6. A flashlight is turned on. What happens?
- Light stays in the flashlight.
- Light moves from the flashlight and goes through any objects in its path.
- Light moves from the flashlight in straight lines until it hits another object.
- Light does not move from the flashlight unless there is something for it to hit.

7. Which of the following objects reflects light?
- Blue teapot
- White wall
- All of the above

8. At work, an optical engineer might:
- Design tunnels.
- Install wiring in houses.
- Improve cameras.
- Fix headlights on trucks.

9. A student is trying to use a spotlight to light up a flag. The light is not bright enough. What can she do to make the light on the flag brighter?
- Move the spotlight closer to the flag.
- Move the spotlight to the left of the flag.
- Move the spotlight farther away from the flag.
- You can't make the light on the flag any brighter.

10. Which of the following would an optical engineer MOST LIKELY work on?
- Something that helps you see things better
- Something that helps you go places quickly
- Something that makes computers run faster
- An optical engineer would not work on any of these things

11. Which of the following will transmit light?
- White wall
- Aluminum foil
- Wood block
- Glass window

12. What would be BEST to use to get light to shine around a corner?
- Black paper
- Aluminum foil
- White paper
- Grey plastic bag
13. Which picture BEST shows what happens to light when it shines on a mirror?

![Mirror options]

14. Someone is improving a lighting system for a playground. If he makes the streetlights taller, what will happen to the light on the playground?

- The streetlights will get brighter.
- The light on the playground will be less bright.
- Less of the playground will be covered with light.
- Nothing will happen to the light on the playground.

15. The picture below shows a girl standing in the sunlight. Which of the following best explains why she creates a shadow?

- She bends light from the Sun.
- She absorbs light from the Sun.
- She reflects light onto the ground.
- She changes the color of the sunlight hitting the ground.

16. What happens if you shine light on a window?

- All of the light goes through the window.
- All of the light bounces off of the window.
- Light fills the air on one side of the window.
- Some of the light goes through the window and some bounces off of the window.

17. What happens when someone turns on a light bulb in a room?

- Light stays just around the bulb.
- Light fills all parts of the room equally.
- Light travels in straight lines from the light bulb out in all directions.
- Light travels around things in the room to shine on all parts of the room.

18. What might an optical engineer think about for his or her job?

- Where to put traffic lights
- Where lightning comes from
- How to package eyeglasses
- How light gets from one place to another

19. What is an optical engineer LEAST LIKELY to work on for her job?

- Video cameras
- Lights on vehicles
- CD and DVD players
- An optical engineer would not work on any of these things
24. Which of these items will absorb light?

- A mirror
- A clear block of plastic
- A sheet of metal painted black
- All of these items absorb some light

25. You use some mirrors and a flashlight to light up a painting in a room. Which of these set-ups will make the light on the painting the brightest?

- The light on the painting will be the same brightness in each of these set-ups.