Ladera Vista Invitational Science Olympiad: Optics Test 2017-18 Answer Key

1. B
2. 55°
3. D
4. 1.90×10^8 m/s
5. Red
6. Objective lens
7. 36 mm to 4.4 mm
8. 134 cm to left of object
9. -45, -90, -450, -900
10. Refracting telescope and reflecting telescope
11. 83
12. 400 nm to 700 nm
13. Red stripes = black, White stars and stripes = Blue, Blue square = blue
14. Red, green, blue
15. Yellow, magenta, cyan, white
16. Red
17. The first filter will polarize the light, blocking one-half of its vibrations. The second filter will have no effect on the light.
18. Parallel

19. Plane mirrors always produce virtual images which are upright and located behind the mirror. They are always the same size as the object. Concave mirrors can produce both real and virtual images; they can be upright (if virtual) or inverted (if real); they can be behind the mirror (if virtual) or in front of the mirror (if real); also enlarged, reduced, or same size as object.
20. Only a concave mirror can be used to produce an inverted image; therefore, locate object at a position of more than one focal length from the concave mirror. Plane mirrors never produce inverted images.
21. Object is located in front of the focal point.
22. Plane mirror cannot do this. A convex mirror and diverging lens always do this. A concave mirror and a converging lens can produce an upright image and image is reduced in size, but never on which is both upright and reduced in size.
23. Iris
24. Retina
25. No