SNC 2PI Optics Unit Review **/95** **Name:** _____

Part 1: True or False – Indicate in the space provided if the statement is true (T) or false(F) [15]

1.		Light is a form of energy
2.		Shadows are proof that light travels in straight lines
3.		The colour of an object under white light is the colour of light that it reflects
4.		If you shine white light at a red apple it will absorb green and blue light
5.		Transmission is the process in which light travels through an object
6.		An opaque material lets some light through
7.		The secondary colours of additive colour theory are the same as the primary colours of subtractive colour theory
8.		Colour is a result of different wavelengths of light
9.		Real images always have the same orientation as the object
10.		The retina of the eye has receptors for all the colours of the rainbow
11.		Concave mirrors always form images that are upright, virtual, and larger than the object
12.		Black is a type of colour
13.		When light rays enter a more dense medium they are always refracted
14.		When parallel light rays pass through a converging lens, they spread out
15.		If you are legally blind then you can't see anything

Part 2: Short Answer [80 marks]

16. Several properties of light can be explained using the wave model. Draw a wave and label it with the terms on the left. [3]

a. amplitude
b. wavelength
c. rest position

17. How is wave frequency and energy related? How do those terms connected to different colours? [2]

18. Light can be produced in many ways. Describe each of the terms by indicating how the light is produced. [6]

incandescent

bioluminescence

chemiluminescence

triboluminescence

fluorescence

phosphorescence

19. What information about light do we discover when we shine white light through a prism or when sunlight passes through rain drops? [2]

20. White light may be treated as a combination of three different primary colours that can be combined or separated.
    a. When do we use additive colour theory, and what do we get when all three colours are mixed?

    b. red + blue =

    c. green + red =

    d. When do we use subtractive colour theory and what do we get when all three colours are mixed?

    e. cyan + yellow =

    f. magenta + cyan =

21. The electromagnetic spectrum is split into various parts, some with longer wavelengths than visible light and some with shorter wavelengths than visible light. Match the part of the electromagnetic spectrum that is used for each application. [7]

Column 1 Part of the Electromagnetic Spectrum		Column 2 Provide a use for the type of light
A.	X rays	
B.	radio waves	
C.	Visible light	
D.	ultraviolet radiation	
E.	infrared radiation	
F.	gamma rays	
G.	Microwaves	

22. Using the letters from column 1, order the parts of the electromagnetic spectrum from **shortest to longest** wavelength. [2]

23. The ray model describes how light interacts with matter. How do these three terms relate to the amount of light that is blocked? [3]

opaque

translucent

transparent

24. Using the ray model complete the following diagram of 2 point sources of light and 1 rectangular object. Label the parts of the shadow. [3]

25. Light can be absorbed, reflected, or refracted as it goes from one medium to another. What are three other words to describe the behaviour of the light? [3]

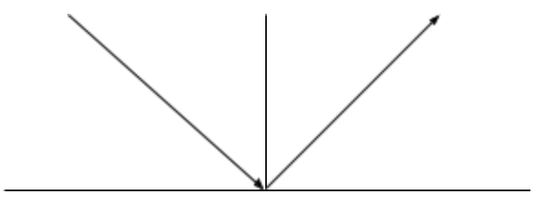
Absorbed =

Reflected =

Refracted =

26. What is the law of reflection? Label the following diagram with the terms on the left and define the law. [3]

a. angle of incidence
b. angle of reflection
c. incident ray
d. reflected ray
e. normal
f. plane mirror



27. Match the following terms to their appropriate definition

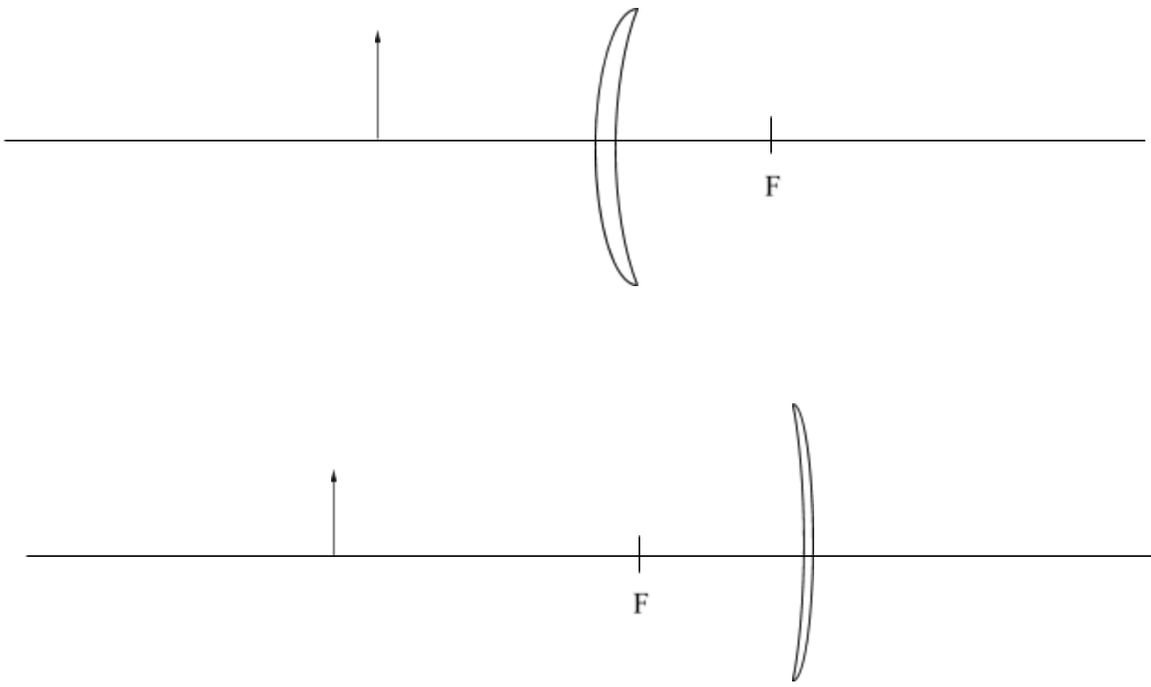
Place Letter	Term	Letter	Definition
	Center of curvature	A	Location at the center of the mirror
	Vertex	B	A straight line passing through the center of the mirror
	Principal Axis	C	All parallel rays cross after reflecting off the mirror
	Focal point	D	The radius of the circle

28. Mirrors can be used for several purposes depending on how they are shaped. Provide one use for each of the three types of mirrors. [3]

29. Diverging mirrors are also called _____ [1]

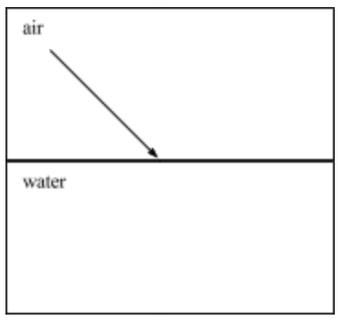
30. Converging mirrors are also called _____ [1]

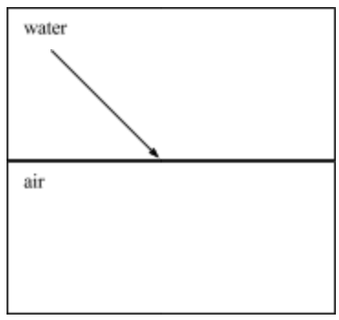
31. Complete the ray diagram for the following two **mirrors**. Label the image as real or virtual. [6]



32. When light travels from one medium to another its properties might change. What is a medium? [1]

33. What happens to a ray of light as it passes through an air and water boundary? Provide the two possible situations by drawing a ray diagram. (Assume the light ray is at an angle when it crosses the boundary) [4]



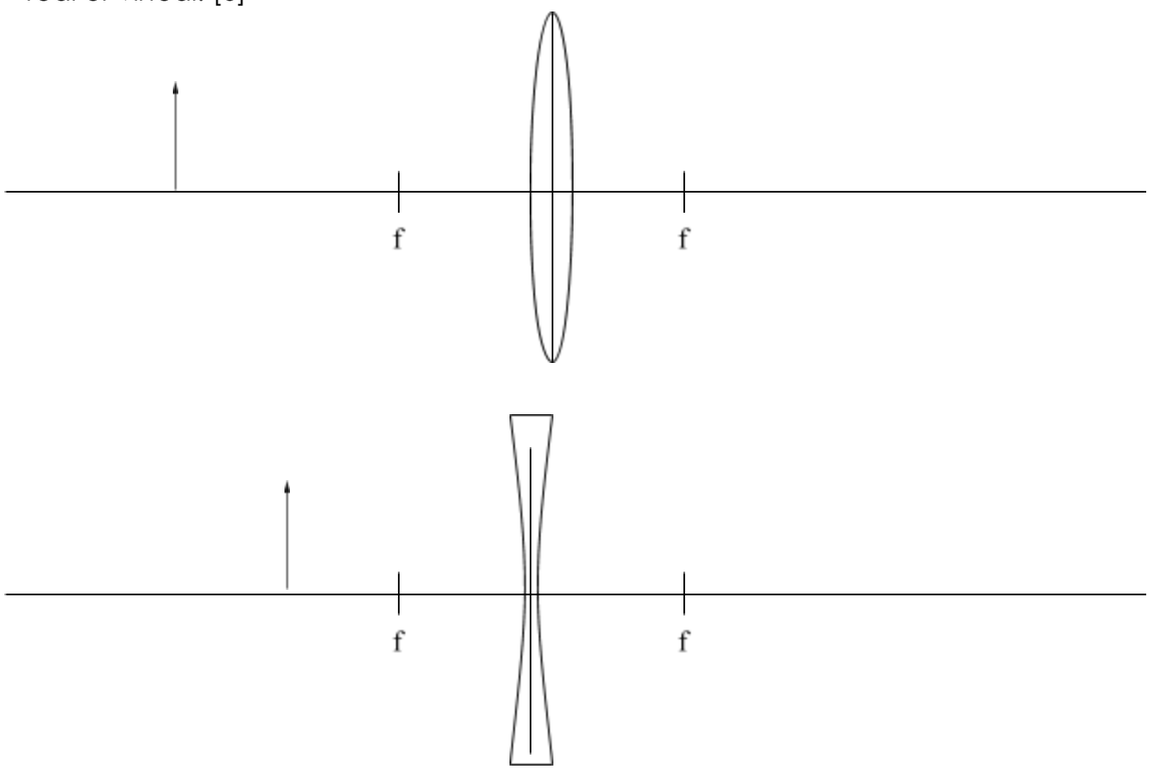


Explain why these scenarios just occurred (use density and speed of light).

34. A convex lens is also called _____ [1]

35. A concave lens is also called _____ [1]

36. Complete the ray diagrams for the following two lenses. Label the image as real or virtual. [6]



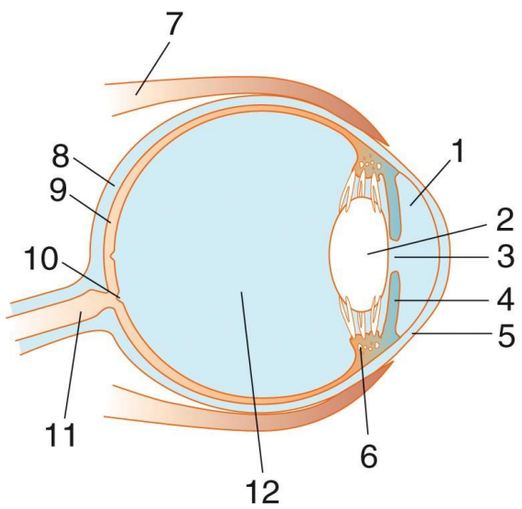
37. Human vision can be corrected using lenses. What is the difference between far-sighted and near-sighted and what types of lenses would be used to correct the vision? (a diagram might help) [4]

Far sighted:

Nearsighted

Using the diagram on the right indicate which number matches the following terms [4]

cornea _____
iris _____
blind spot _____
pupil _____
retina _____
optic nerve _____
lens _____
ciliary muscle _____



38. What is the function of the ciliary muscle?[1]

39. What is the function of the iris?[1]