**BC SCIENCE 8 - Chapter 4 - Practice Booklet**

**Answer Section**

**COMPLETION**

**1)** Refraction

**2)** prism

**3)** red

**4)** red, green, blue

**5)** hertz

**6)** spectrum

**7)** wavelength

**8)** crests

**9)** troughs

**10)** frequency

**11)** radiant

**SHORT ANSWER**

**12)** There are no particles in a vacuum. Light slows down in the denser environment of Earth's atmosphere. This is the principle of refraction.

**13)** You see the colour of light reflected by the object. The colours you do not see are absorbed by the object.

**14)** Frequency is halved. The longer a wave is, the fewer times it vibrates per second.

**15)** Wavelength and frequency are inversely proportional. As wavelength decreases (becomes shorter), frequency increases.

**16)** The wave model helps to explain some of light's strange behaviours while accounting for the fact that light travels in straight lines.

**17)** In a transverse wave the matter in the medium moves perpendicular to the direction that the wave travels, while in a compression wave the matter in the medium moves back and forth along the same direction that the wave travels.

**18)** In a light wave, electrical and magnetic fields vibrate. As a result, light is classified as electromagnetic radiation. The electromagnetic spectrum classifies light into visible and invisible forms of radiant energy.

Any five appropriate examples such as:

- radio waves

- infrared

- ultraviolet

- X-ray

- gamma ray

**19)** Without the ozone layer, harmful ultraviolet radiation from the Sun would not be blocked and would continue into Earth's atmosphere. Ultraviolet radiation can cause skin cancer. This radiation can damage the cornea of the eye, causing slow loss of vision.

**20)** One of:

- All energy in the electromagnetic spectrum is radiant energy.

- All types travel in waves.

- All types can travel in space (no medium).

**21)** No. Yellow (a secondary colour) light is made from red and green light. Adding yellow to blue is then the same as adding the three primary colours, which produce white light.

**22)** 1. red, blue, green

2. red, cyan

3. blue, yellow

4. green, magenta

**23)** (i) crest

(ii) rises

(iii) trough

(iv) wavelength

(v) lowers

**24)** Wear light clothing that covers your arms and legs. Use a sunscreen lotion. Wear sunglasses.

**25)** red, orange, yellow, green, blue, indigo, violet

**26)** heat radiation

**27)** Radar is shorter wavelength microwaves and is used in tracking the movement of automobiles and aircraft.

**28)** The wave model of light pictures light travelling as a wave. The model predicts how light will behave.

**PROBLEM**

**29)** (a) No colour passes through the filter. Green and blue light combine to make cyan. Since the red filter allows only red light to pass through (absorbing the rest of the light colours) and the cyan light has no red component, it will not pass through.

(b) All colours except red.

**30)** There are no particles in a vacuum. Light slows down in the denser environment of Earth's atmosphere. This is the principle of refraction.

**31)** (a) look for an "If … then" formula; statements such as “If blue light is shone onto a red tomato, then the tomato will appear blue” are appropriate

(b) variables include: colour of light, appearance of tomato *or* colour of tomato with light on it.

**32)** When light strikes an object, such as a green piece of paper, the light may be reflected off the object, absorbed by the object, or transmitted through the object. When white light is shone on green paper, the green paper absorbs all the colours of light except the green. Green light is reflected, making the paper appear green.

**33)** look for: the conversion rate 1 nm = 1.0  10-9 m, mechanics of calculation, correct answers.

(a) 15 nm  10-9 = 0.000 000 015 m = 1.5  10-8 m

(b) 510 nm  10-9 = 0.000 000 510 = 5.1  10-7 m

(c) 0.050 nm  10-9 = 0.000 000 000 050 = 5.0  10-11 m

**34)** Light reflects off the flower (this is why we see it). The primary colours (red, green, and blue) strike the flower, but the green light is absorbed and the red and blue light combine to make the secondary colour, magenta (the colour of the flower we see).

**35)** (a) yellow

(b) magenta

(c) white

(d) cyan

**36)** look for correct answer as well as mechanics of the calculation

1 Hz = 1 vibration per second



**37)** (a) microwaves, 1 mark

(b) 1 mark each: (i) transmitting station; (ii) microwave signals transmitted through atmosphere; (iii) microwave signals amplified; (iv) telecommunications satellite; (v) amplified signals transmitted back to Earth; (vi) receiving station

(c) Microwaves are transmitted to telecommunications satellites orbiting Earth. Satellites amplify signals, and retransmit them to new location (on Earth). Receiving station picks up signals. 1 mark