

Name of the Student: _____

Max. Marks : 21 Marks

Time : 21 Minutes

Mark Schemes

Q1.

- (a) different temperatures emit different intensities of infrared 1

which are represented (on the infrared camera) as different shades / colours

*allow wavelength / frequency / amount for intensity
throughout*

1

- (b) visible light 1

- (c) both ionising radiation so some risk of cancer 1

the whole body is irradiated by gamma rays 1

when an X-ray is taken only part of the body is exposed 1

exposure time for gamma rays is longer 1

- (d) $1.2 \times 10^{-13} = F \times 0.015$ 1

$$F = \frac{1.2 \times 10^{-13}}{0.015}$$

*allow a correct rearrangement using an incorrectly / not
converted value of s*

1

$$F = 8.0 \times 10^{-12} \text{ N}$$

*allow 8×10^{-12} allow a correct calculation using an
incorrectly / not converted value of s*

1

- (e) some of the energy of the electrons causes heating 1

(therefore) increasing the temperature 1

(so using tungsten) allows more electrons to be collided per second than using any other metal

allow (so using tungsten) enables more energy per second

Q2.

(a) the spring will return to its original length when the force is removed

1

(b) Any **two** from:

- spring constant
- (original) length
- diameter

2

(c) $0.80 = k \times 0.0040$

1

$$k = \frac{0.80}{0.0040}$$

1

$$k = 200 \text{ (N/m)}$$

1

(d) the upward force on the spring is equal to the downward force

1

the spring is inelastically deformed

1

[8]