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Exam Preparation and Free Resources

Name of the Student:_____

Max. Marks : 22 Marks   **Time : 22 Minutes**

Mark Schemes

Q1.

(a)   C or 0.18 mm

                                                                                           1

(b)   0.6 (m)

          *allow **1** mark for correct substitution and/or transformation **or** 1 mark*
          for changing frequency to Hz
          *answer 600 gains **1** mark*

                                                                                           2

(c)   creates an alternating current

          accept 'ac' for alternating current
          accept alternating voltage

                                                                                           1

with the same frequency as the radio wave

          accept signal for radio wave

          *accept it gets hotter for **1** mark provided no other marks scored*

                                                                                           1

(d)   X-rays cannot penetrate the atmosphere

          accept atmosphere stops X-rays
          *do **not** accept atmosphere in the way*

or

X-rays are absorbed (by the atmosphere) before reaching Earth

          <u>*ignore*</u> *explanations*

                                                                                           1
                                                                                          [6]

Q2.

(a)   (i)   to check rise in temperature (of other thermometers) was due to the
              (different wavelengths of) light

            accept as a control / comparison
            to measure room temperature is insufficient

                                                                                           1

    (ii)   any **two** from three:

        • different colours produce different heating effects / (rises in)
         temperatures

- red light produces the greatest heating effect / (rise in) temperature

    or

- violet produces the least heating effect / (rise in) temperature

- all colours produce a greater heating effect than outside the spectrum
    an answer
    the longer the <u>wavelength</u> the greater the (rise in) temperature
    or
    the lower the <u>frequency</u> the greater the (rise in) temperature gains both marks

2

(b)   move a thermometer into the infrared region / just beyond the red light
            allow use an infrared camera / infrared sensor

1

the temperature increases beyond 24(°C)
            accept temperature higher than for the red light

1

(c) $v = f \times \lambda$

9.4×10^{-6}
            accept 9.375×10^{-6} or 9.38×10^{-6}

or

0.0000094
            accept 0.000009375
            or 0.00000938
            *allow **1** mark for correct substitution*
            ie $3 \times 10^8 = 3.2 \times 10^{13 \times \lambda}$

2

(d)   at night the surroundings are cooler
            accept at night the air is colder
            there is no heat from the Sun is insufficient

    or

at night there is a greater temperature difference between people and surroundings

1

(so surroundings) emit less infrared (than in daytime)
            accept camera detects a greater contrast

    or
gives larger difference in infrared emitted (between people and surroundings)
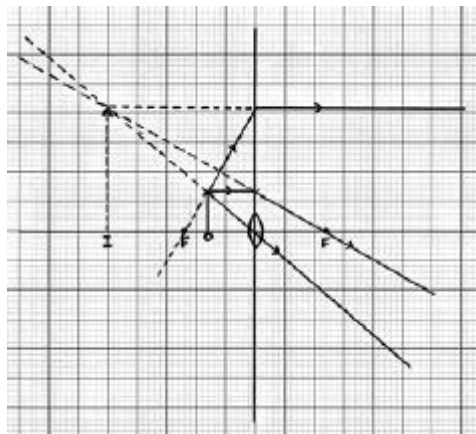
1

[9]

Q3.

(a)   (i)   **two** correct rays drawn

1 mark for each correct ray

- ray parallel to axis from top of object **and** refracted through focus **and** traced back beyond object

- ray through centre of lens **and** traced back beyond object

- ray joining top of object to focus on left of lens taken to the lens refracted parallel to axis **and** traced back parallel to axis beyond object

2

an arrow showing the position **and** correct orientation of the image for their rays

*to gain this mark, the arrow must go from the intersection of the traced-back rays to the axis **and** the image must be on the same side of the lens as the object and above the axis*

1

(ii) (x) 3.0

accept 3.0 to 3.5 inclusive

or

$$\frac{\text{their image height}}{\text{object height}}$$

correctly calculated

*allow **1** mark for correct substitution into equation using their figures*
ignore any units

2

(b) any **two** from:

in a camera the image is:

- real not virtual

- inverted and not upright
    accept upside down for inverted

- diminished and not magnified
    accept smaller and bigger
    accept converse answers but it must be clear the direction of the comparison
    both parts of each marking point are required

2

[7]