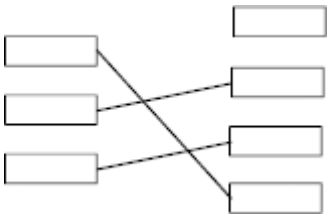
M1. (a) radio

1

(b)



*award **1** mark for each correct line*

if more than one line is drawn from any em wave then none of those lines gain credit

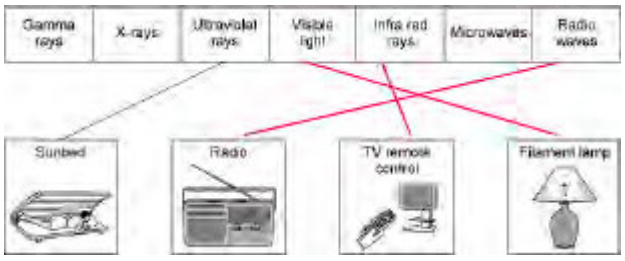
3

(c) ionising

1

[5]

M2. (a) all three lines correct



*allow **1** mark for each correct line*

if more than one line goes from a device then all lines from that device are wrong

3

(b) (i) skin cancer

*do **not** accept cancer*

*do **not** accept sunburn*

correct answer only

1

(ii) other factors may be involved

accept may have been in the Sun too long

accept (over)-use of sunbeds and (over)- exposure to the Sun (both) give the same symptomsaccept any other sensible factor that could lead to doubt

*do **not** accept irrelevant answers eg may be run over by a car*

*do **not** accept killed by exposure to the Sun*

1

(iii) can assess risk

answers should be in terms of assessing our own health risk

or

make your own decision

accept so you limit its use / don't use one

*do **not** accept so you don't get skin cancer*

*do **not** accept so you don't get sunburn*

1

[6]

M3. (a) vibrate / oscillate

accept a correct description

move is insufficient

1

(b) 336

*allow **1** mark for correct substitution, ie 420 × 0.8(0) provided no subsequent step shown*

2

[3]

M4. (a) (i) (visible) light

accept visible

1

(ii) microwaves

1

(b) J

1

(c) (i) B

1

(ii) shorter than

1

(d) (i) To find out if using a mobile phone is harmful to health

1

(ii) any **two** from:

- (X has a) low(er) SAR value
  "it" refers to mobile phone
  accept has a low(er) rate
- (maximum) energy absorbed (by the head) is less
  accept energy emitted (by phone) is less
  accept radiation for energy
- (if mobiles are harmful) less likely to cause harm
  accept will not cause harm
  accept it is safer

2

[8]

M5. (a) C

1

(b) reflection at the mirror of ray from shoe to person's eye

may be drawn freehand

1

angle of incidence = angle of reflection

judged by eye

a ruler must have been used

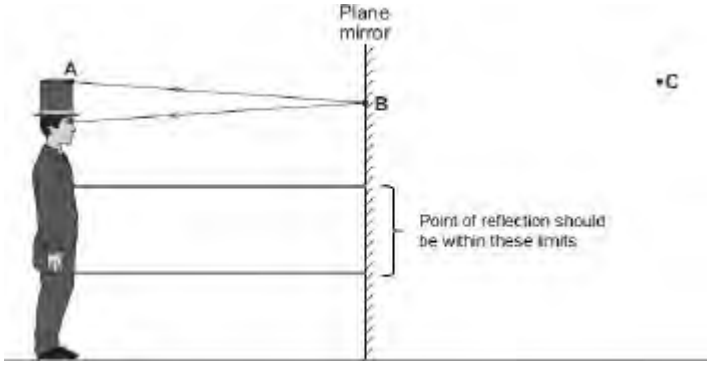
1

arrow to show correct direction on either incident or reflected ray

only one arrow needed but if more drawn must be no contradiction

both incident and reflected ray must be shown

1



(c) virtual

1

[5]

M6. (a) long

1

(b) lens A

1

it is a concave / diverging lens

this mark is only gained if lens A is stated

any reference to lens material or mass of lens negates this mark

allow it will focus light onto the retina

1

(c) The refractive index of the lens material

1

(d) 4

ignore any signs

*allow **1** mark for correct substitution, ie* $\frac{1}{0.25}$ *provided no subsequent step*

2

(e) Cauterising open blood vessels

1

(f) 5

*allow **1** mark for correct substitution, ie* $\frac{70}{14}$ *provided no subsequent step*

2

[9]

M7. (a) transmits

correct order

1

absorbs

1

(b) light

allow ultra violet ***or*** *UV* ***or*** *infrared* ***or*** *IR* ***or*** *gamma*

1

(c) 20

allow ***1*** *mark for correct working, ie* $\frac{60}{3}$ *provided no subsequent step*

2

(d) Killing cancer cells

1

[6]

M8. (a) refraction

1

(b) towards the normal

1

(c) (i) convex

1

(ii) principal focus

accept focal point

1

(d) parallel on left

1

refracted towards the normal at first surface

1

refraction away from normal at second surface

1

passes through or heads towards principal focus

1

(e) refractive index

accept material from which it is made

1

(radius of) curvature (of the sides)

accept shape / radius

*do **not** accept power of lens*
ignore thickness / length

1

[10]

M9. (a) decreases

correct order only

1

increases

1

(b) (i) intensity (of transmitted light) depends on thickness
or
to enable a valid comparison
or
it is a control variable

accept absorption depends on thickness
it would affect the results is insufficient
fair test is insufficient

1

(ii) transmits the least light
or
absorbs the most light

accept very little light is transmitted
*do **not** accept transmits none of the light*
*do **not** accept absorbs all of the light*
any reference to heat negates this mark

1

[4]