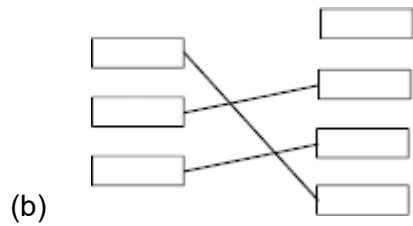


M1. (a) radio

1



*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*

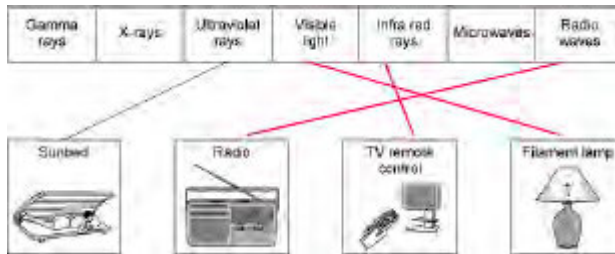
3

(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 symptoms accept 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  $420 \times 0.8(0)$  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*

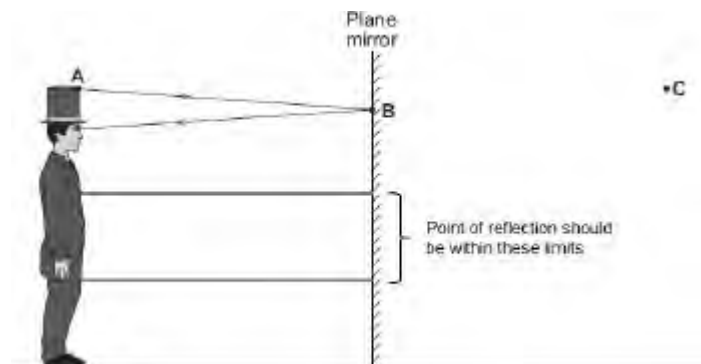
1

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 <i>accept focal point</i>	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 <i>accept material from which it is made</i>	1
	(radius of) curvature (of the sides) <i>accept shape / radius</i>	



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]