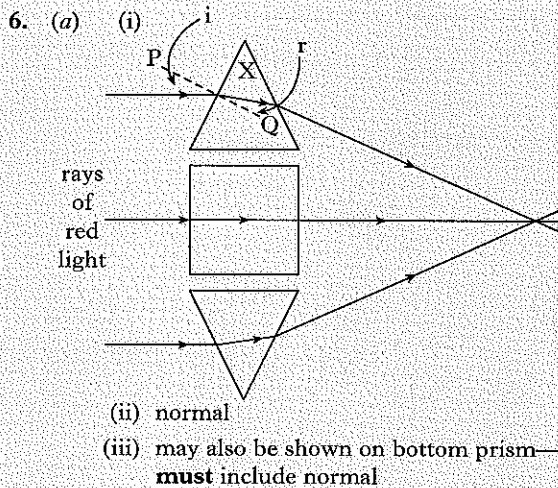


Physics Credit Level 2002

1. (a) The transmitter transmits a **radio** signal, which consists of an **audio** wave and a **carrier** wave. The process of combining these waves is known as **modulation**.
- (b) (i) Any correct answer relating to signal strength—hills/diffraction/distance/interference/far away/out of range
(ii) (different) frequency/wavelength
2. (a) (i) 3×10^8 m/s
(ii) 2.8×10^{-3} s
(iii) 2.2 m
- (b) period 24 hours/1440 minutes
so always above same point on Earth/geostationary
- (c) 100/101 (minutes)
- (d) infrared/IR
- (e) (the) Moon
3. (a) (i) 8.3Ω
(ii) resistance is constant since the graph is a straight line through the origin
or since V and I vary universally
- (b) (i) not a straight line graph/not constant gradient $\frac{V}{I}$ is not constant/ R increases as I
(ii) (A) 3.2 A
(B) 38.4 W
4. (a) (i) (circuit) Y
(ii) Any **two** from
thinner wire/less current per cable/convenience (of adding new sockets)/less heat/cost/safety/less voltage drop
- (b) lighting circuit is simple parallel—because lower current
or lighting circuit supplies (fixed) lights not sockets—separate circuits
or lighting circuit uses thinner cables—lower current
or ring circuit has two paths—and explanation similar to (a)(ii)
or different fuse value—because of different currents
- (c) (i) larger current/lot of energy/more power
(ii) 15 840 000 (J)
- (d) (i) safety or an implication of safety eg prevent electrocution
(ii) casing live (because of fault); earth wire gives low resistance path/large current; fuse blows; appliance isolated from supply

5. (a) (i) (sounds of) $f > 20\,000$ Hz
or sounds above upper frequency/pitch value
(ii) 1.25×10^{-5} s
- (b) (i) (ultra) sound reflects off baby (in womb) reflected (ultra) sound is picked up (by receiver)
(ii) ultrasound does not damage cells
or X-rays can damage (living) cells
or ultrasound is not **ionising** radiation
or X-rays are **ionising** radiation

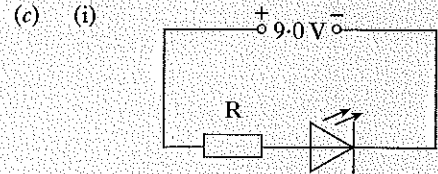


- (b) convex (converging)
7. (a) 1 V
(b) (i) AND
(ii) OR
(iii)

P	Q	R	S	T
0	0	0	0	0
0	1	0	0	0
1	0	0	0	0
1	1	1	0	1
0	0	0	1	1
0	1	0	1	1
1	0	0	1	1
1	1	1	1	1

(iv) to raise the barrier in an emergency/if LDR or pay machine circuit faulty/no money/no change

8. (a) loudspeaker
(b) filament lamp
Any **one** from
greater light output/white light/LED is a low current device



(ii) 330Ω

Physics Credit Level 2002 (cont.)

9. (a) 4200 J
 (b) (i) Q
 (ii) 1.8 m
 (iii) energy is transferred (as heat)
 due to (the force of) friction
or energy is lost to the system
or work done against friction
10. (a) 0.5 s
 (b) 2.0 m/s^2
 (c) (i) 240 m (ii) 28.75 m (29 m)
11. (a) 300
 (b) (i) 4.5 A (ii) 0.23 A
 (c) (i) $P = I^2 R$ **or** $V = IR$
 $\therefore R = \frac{P}{I^2}$ $\therefore R = \frac{V}{I}$
 $= \frac{18}{1.5^2}$ $= \frac{12}{1.5}$
 $= 8.0 \Omega$ $= 8.0 \Omega$
 (ii) 2.7Ω
12. (a) 15 120 (J)
 (b) (i) $995 \text{ J kg}^{-1} \text{ } ^\circ\text{C}^{-1}$
 (ii) (A) not all of the energy is transferred as heat to the block
 (B) lag/insulate the aluminium block
13. (a) weight per unit mass
or pull of Earth
 force of gravity
 force due to
 gravitational field } per { unit mass
 kilogram
- (b)

Stage	Gravitational field strength (N/kg)	Mass (kg)	Weight (N)
on the Moon	1.6	21	33.6
at a point during the journey	0	21	0
on the Earth	10	21	210