MARKING SCHEME
2008 Prelim Exam.
Science (P, C).

Paper 1

1. B	6. B	11. B	16. B
2. D	7. A	12. D	17. D
3. D	8. C	13. B	18. A
4. D	9. A	14. A	19. D
5. C	10 B	15. B	18 D

1 (a) t: 4 s (1)

(b) Greatest distance = area under graph (1)

$= \frac{1}{2} \times 4 \times 10$

$= 20$ m (1)

(b) $a = \frac{v - u}{t}$

$= \frac{0 - 10}{4}$

$= -2.5 \text{ m/s}^2$ (1)

$\therefore$ deceleration $= 2.5 \text{ m/s}^2$

(1)

(c) $t = 8$ s (1)

2 (a) KE at A $= \frac{1}{2}mv^2$

$= \frac{1}{2} \times 100 \times (10)^2$

$= 5000$ J (1)

(b) Gain in PE $= mgh$ (1)

$= 100 \times 10 \times 3$

$= 3000$ J (1)

(c) Let V be the speed

$\frac{1}{2}mv^2 = 5000 - 3000$

$\frac{1}{2} \times 100 V^2 = 2000$ J (1)

$V^2 = \frac{2000}{50}$

$= 40$

$V = 6.3 \text{ m/s}$ (1)

6(a) $f\lambda = V_v$

$\lambda = \frac{V_v}{f}$ — (1)

$= \frac{1600}{40 \times 1000}$

$= 0.04$ m — (1)

(b) Depth = speed × time

$= 1600 \times \frac{0.1}{2}$ — (1)

$= 80$ m — (1)

(c) (i) No change in speed — (1)

(ii) The wavelength will be halved. — (1)

7. (a) Current through one bulb = $\frac{P}{V}$

$= \frac{120}{240}$

$= 0.5$ A (1)

∴ Current through live wire = 3×0.5

$= 1.5$ A (1)

∴ Suitable fuse rating = 2 A (1)

(b) (i) If one bulb is fused, the other 2 can still be lighted up. (1)

(ii) The brightness is greater than in series circuit (1)

(c) It is connected to the live wire so that the appliance will not became 'live' after the fuse has been blown. (1)

3. (a) (i) Temperature of melting ice (1)

(ii) Temperature of steam (1)

(b) $\theta = \frac{x_\theta - x_0}{x_{100} - x_0} \times 100\,^\circ C$

$= \left(\frac{72 - 12}{87 - 12}\right) \times 100$ (1)

$= \frac{60}{75} \times 100 = 80\,^\circ C.$ (1)

(c) (i) Have a narrower bore (1)

(ii) Have a thinner glass wall. (1)

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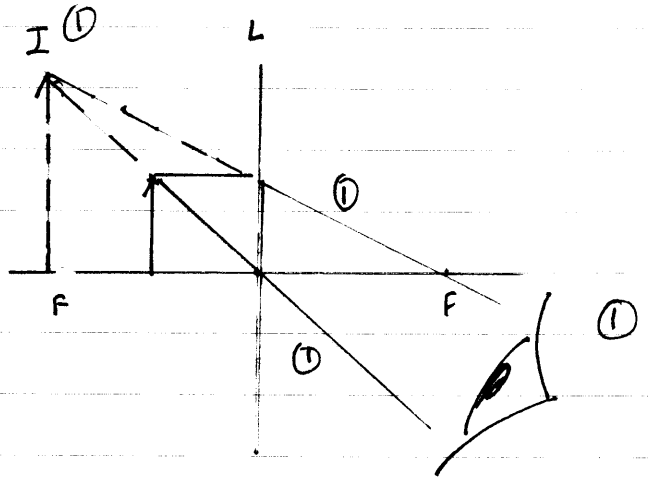


(1) (1) (1) (1)

5. (a) Ray moving along the radium. (1)

Normal incidence $\Rightarrow$ no deviation (1)

(b) 40° (1)

(b) 27° (1)

(d) Refractive Index $= \frac{\sin i}{\sin r}$

$= \frac{\sin 40^\circ}{\sin 27^\circ}$ (1)

$= 1.42$ (1)

8. (a) At the primary coil, the applied alternating voltage sets up a changing magnetic field which induces an e.m.f in the secondary coil. ① ① ①

(b) $$\frac{V_S}{V_P} = \frac{N_S}{N_P}$$

$$V_S = \frac{N_S \times V_P}{N_P}$$

$$= \frac{200 \times 240}{4000}$$ ①

$$= 12\ V$$ ①

(c) $$I_P V_P = I_S V_S$$

$$I_P = \frac{I_S V_S}{V_P}$$

$$= \frac{0.5 \times 12}{240}$$

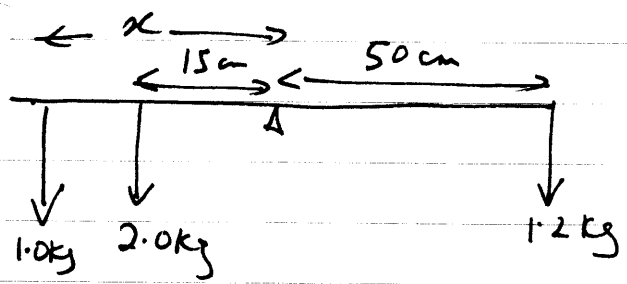
$$= 0.025\ A$$ ①

Section C

9. (a) Moment is the product of force and the perpendicular distance from the pivot. ①

(b) Digram ①
Apparatus ①
Procedure ④

(c)



Let x be the distance

$$\curvearrowleft = \curvearrowright$$

$$1 \times x + 2 \times 15 = 1.2 \times 50$$ ①

$$x + 30 = 60$$

$$\therefore x = 30\ cm.$$ ①

10(a) A e.m.f of 3V is the energy of 3J to transfer 1 coulomb of electric charge through the cell. (1)

(b) Combined resistance = 2 + 4 = 6Ω (1)

(c) Current$_{4\Omega}$ = $\frac{3}{6} = \left(\frac{V}{R}\right)$ (1)

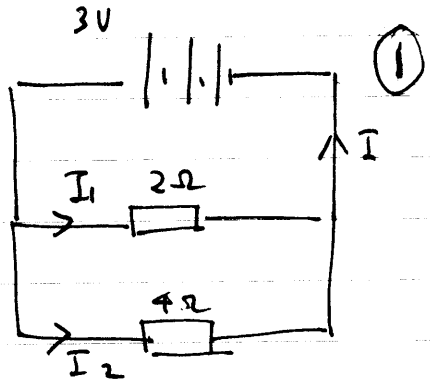
= 0.5 A (1)

(d) $Q = It$

= 0.5 × 60 s

= 30C (1)

(e) (i)



(1)

(ii) $I_2 = \frac{3}{4}\left(\frac{V}{R}\right)$ (1)

= 0.75A (1)

(iii) $I_1 = \frac{V}{R} = \frac{3}{2} = 1.5A$

$\therefore I = 1.5 + 0.75A$

= 2.25A. (1)

$\therefore$ Power through battery = IV

= 2.25 × 3

= 6.75W. (1)

11. (i) If the count rate registered by the detector is uniform throughout, it shows that all plates have equal thickness. (1) (1)

(ii) Only gamma rays can pass through steel. α and β particles cannot. (1)

(iii) 2 ways (2 marks) (1+1)

(b) (i) an electron (1)

(ii) $^{14}_{6}C \longrightarrow {}^{0}_{-1}e + {}^{14}_{7}N$ (1)

One neutron is changed to a proton + electron. ($n \longrightarrow p + e$) (1)

(iii) (A) 6 (1)

(B) 7 (1)