

Pressure

Mark Scheme 2

Level	IGCSE
Subject	Physics
ExamBoard	CIE
Topic	General Physics
Sub-Topic	Pressure
Paper Type	(Extended) Theory Paper
Booklet	Mark Scheme 2

Time Allowed: 68 minutes

Score: /57

Percentage: /100

- 1 (a) ρgh in symbols, words or numbers
700 Pa or N/m^2 C1
A1 [2]
- (b) use of $F = pA$
14.7 N ecf from (a) C1
A1 [2]
- (c) $(30.9 - 14.7 =)16.2\text{N}$ OR evidence of calculation of resultant C1
use of $a = F/m$ C1
5.24 m/s^2 A1 [3]
- 2 (a) $(P =) F/A$ words or symbols B1
- (ii) 22500 Pa
- (b) less pressure B1
less sinking B1
- (c) any suggestion which involves increasing the area in contact with the ice B1
e.g. snow shoes / sk [5]
- 3 (a) (i) $(P =) F/A$ in any form OR 1000/0.01 C1
100 000 Pa accept N/m^2 A1
- (ii) multiplication of either force or area by 4 C1
0.08 \times his (i) OR 0.02 \times his (i) C1
8000 N e.c.f. from (i) A1
(2000 N gets C0, C1, A1)
- (b) his (ii) – 2000 correctly evaluated C1
600 kg e.c.f. A1

[Total: 7]

- 4 (a) (i) $P = F/A$ in any form, letters, words or numbers C1
 1.4×10^6 Pa accept N/m^2 A1
(ii) 84 N OR 84.0 N B
(iii) same force over (much) smaller area B1
(much) bigger pressure B1
- (b) (i) $P = hd\rho g$ in any form, letters, words or numbers C1
 3×10^4 Pa OR 30 000 Pa OR 30 kPa accept N/m^2 A1
(ii) his (i) B1 [8]
- 5 (a) (i) increases B1
(ii) $pV = \text{const}$ in any form C1
 $1.05 (\times 10^5) \times 860 (\times 10^{-6}) = p \times 645 (\times 10^{-6})$ C
 1.4×10^5 Pa A1
(iii) $F = pA$ in any form accept weight for F C1
EITHER increase in pressure = 0.35×10^5 (Pa) C1
 $0.35 \times 10^5 \times 5.0 \times 10^{-3}$ C1
175 N (minimum 2 s.f.) c.a.o. A1
OR $1.05 \times 10^5 \times 5.0 \times 10^{-3}$ or 525 N or $1.4 \times 10^5 \times 5.0 \times 10^{-3}$ or 700 N (C1)
700 – 525 N e.c.f. from (a) (ii) (C1)
175 N (minimum 2 s.f.) c.a.o. (A1)
- (b) increases B1
(ii) no change B1
(iii) extra weight (on tray/piston) B1
(iv) increases B1

- 6 (a) (i) hdg or $70 \times 1050 \times 10$ C1
 $735\,000\text{ Pa}$ or $7.35 \times 10^5\text{ Pa}$ accept N m^{-2} for Pa A1
- (ii) $8.35 \times 10^5\text{ Pa}$ OR his (a)(i) + 1.0×10^5 accept N/m^2 for Pa B1
- (b) pressure \times area or $P = F/A$ or $6.5 \times 10^5 \times 2.5$ C1
 $1.625 \times 10^6\text{ N}$ A
- (c) because density is less accept new calculation of pressure B1
 OR because salt water is denser [6]

7	(a)	$P = \text{hdg}$ or $2 \times 1000 \times 10$ $= 20\,000\text{ N/m}^2$ or Pa	C1 A1	[2]
	(b)	$p = f/a$ or $20\,000 = 50/a$ $a = 0.0025\text{ m}^2$	C1 A1	[2]
	(c)	potential energy of the water converted to kinetic energy of water through outlet (and heat)	B1 B1	[2] Total[6]

- 8 (a) pressure = depth \times g \times density of water C1
 pressure = $50 \times 10 \times 1000$ C1
 so value is $500\,000\text{ Pa}$ or N/m^2 A1 3
- (b) force = pressure \times area in any form C1
 force = $500\,000 \times 0.15 \times 0.07$ C1
 force = 5250 N A1 3
- [6]