1. Motion, forces and energy

1.8 Pressure

Paper 3 and 4

Answer Key

Paper 3

Q1.

2(c)	(pressure =) 6.3 (N / cm^2)	**A3**
	(pressure =) 240 ÷ 38	(C2)
	(pressure =) force ÷ area OR (p) = $F \div A$	(C1)

Q2.

3(c)	0.19 (N / cm^2)	**A3**
	(P =) 8.5 ÷ 44	(C2)
	(P =) $F \div A$ in any form	(C1)

Q3.

Question	Answer	Marks
5(a)	(P =) F ÷ A OR (pressure =) force ÷ area in any form	**C1**
	12 ÷ 25	**C1**
	0.48 (N / cm^2)	**A1**

Q4.

Question	Answer	Marks
3(a)	P = F ÷ A in any form	**C1**
	120 ÷ 0.5	**C1**
	240 (N / cm^2)	**A1**
3(b)	Less (than)	**B1**
3(c)	elastic OR strain OR potential	**B1**

Q5.

Question	Answer	Marks
(b)	P = F/A in any form	**C1**
	30 ÷ 12	**C1**
	2.5	**A1**
	N/cm²	**B1**

Q6.

(c)	3.9	**A4**
	280 / 72	C3
	(*P* =) *F*/*A* **OR** (pressure =) force/area	C1
	(area = 4 × 18 =) 72 (cm²)	C1
	N / cm²	**B1**

Paper 4

Q7.

Question	Answer	Marks
3(a)	particles (of liquid) are touching / close to each other	**B1**
	forces (of repulsion) between particles (of liquid) are large	**B1**
3(b)(i)	($\Delta p =$) $\rho g(\Delta)h$	**B1**
	$1000 \times 9.8 \times 0.087$ **OR** ($\Delta p =$) 852.6 (Pa)	**B1**
3(b)(ii)	12 N	**A2**
	$p = F / A$ **OR** ($F =$) pA **OR** 850×0.014	C1
3(b)(iii)	1.2 kg	**A2**
	$g = W / m$ **OR** ($m =$) F / g **OR** $12 / 9.8$	C1

Q8.

Question	Answer	Marks
3(a)	(force of gravity / weight of person is spread over a much) greater area	**B1**
	$p = F/A$ **OR** $p \propto 1/A$	**B1**
	(force is same so) pressure is lower (so ice is less likely to crack)	**B1**
3(b)	5.8×10^3 Pa	**A4**
	p (due to water) = ρgh **OR** ($p =$) ρgh **OR** ($p =$) $1000 \times 9.8 \times 0.45$ **OR** ($p =$) 4410	C1
	$W = mg$ **OR** ($W =$) mg **OR** ($W =$) (690×9.8) **OR** ($W =$) 6762 **OR** (p (due to ice) =) 1352.4	C1
	(pressure =) candidate's calculated pressure due to water + candidate's calculated pressure due to ice **OR** total pressure = $[1000 \times 9.8 \times 0.45] + [(690 \times 9.8) / 5.0]$ **OR** total pressure = 4410 + 1352.4	C1

Q9.

Question	Answer	Marks
4(a)(i)	240 N	**A2**
	$F = pA$ in any form **or** $1.0 \times 10^5 \times 2.4 \times 10^{-3}$	C1
4(a)(ii)	5.0 J	**A2**
	WD = Fx_1 **or** 240×0.021	C1

Q10.

1(c)	(P =) 8200 Pa	**A3**
	(P =) $h\rho g$	C1
	(P =) 1020 × 10 × 0.8(00) (Pa)	C1
	OR	
	(P =) F / A	(C1)
	$F = mg$ **OR** F = 1020 × 0.8(00) × 3.72 × 10	(C1)

Q11.

Question	Answer	Marks
3(a)	molecules (already very) close / touching	**B1**
	(repulsive) forces (very) large	**B1**
3(b)(i)	6.5×10^5 Pa	**A3**
	(p =) F / A in any form **or** 8800 / 0.016 **or** (F_{air} =)$1.0 \times 10^5 \times 0.016$	**C1**
	5.5×10^5 **or** 5.5×10^5 (+ 1.0×10^5) **or** (1600 + 8800) / 0.016	**C1**
3(b)(ii)	pressure due to (increased height of) oil in cylinder mentioned **or** pressure (in liquid) increases as depth increases	**B1**
	to keep the upwards force constant **or** to lift the (extra) oil **or** to counteract / oppose the increased pressure / force / weight of the oil	**B1**
3(b)(iii)	(initial) force has to be greater than 8800 N to start the motion **or** the upwards force (just) balances the weight (so no movement) **or** piston / oil has weight **or** friction (between moving parts)	**B1**

Q12.

Question	Answer	Marks
3(a)(i)	W = (4.8 × 10 =) 48 N	1
3(a)(ii)	(P =) F ÷ A OR 48 ÷ (0.12 × 0.16)	1
	2500 Pa	1
3(b)	Atmospheric pressure (in addition to liquid pressure)	1