Mark scheme

Pressure

Physics 0625 · Questions from Paper 3 and Paper 4

Total marks

70

MARKS FOR EACH QUESTION

1	2	3	4	5	6	7	8	9	10	Total
4	5	7	7	8	7	7	7	9	9	**70**

Question 1 [4]

1(a)	manometer	B1
1(b)	760–280	C1
	480 (mm Hg)	A1
1(c)	(level A) up (level B) down	B1

Question 2 [5]

2 **(a)** greater pressure from man **OR** man will fall through ice **OR** ice will break / crack B1

(b) idea of increasing area **OR** spreading load M1

any three from: A3
larger (surface) area
load / weight / force more spread out
less pressure
use of $P = F / A$

[Total: 5]

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Question 3 [7]

3(a)	$W = m \times g$ in any form	C1
	400 (N)	A1
3(b)	pressure = force ÷ area in any form	C1
	400 **OR** candidates (a) ÷ 0.02	C1
	20 000 (N/m^2)	A1
3(c)	greater pressure **OR** wtte	B1
	(same force/weight acts on a) smaller area	B1
	Total:	7

Question 4 [7]

4(a)(i)	Pressure = force ÷ area in any form	C1
	50 ÷ 1.8	C1
	28 (N / cm^2)	A1
4(a)(ii)	In range 13 500 to 15 000 (N / cm^2)	B1
4(b)(i)	(mercury) barometer	B1
4(b)(ii)	vacuum **OR** nothing	B1
4(b)(iii)	a value less than 760 mm (Hg) and > 0 mm (Hg)	B1

Question 5 [8]

5(a)	any **three** from: pressure = force ÷ area weight or force distributed / spread or wtte (over) larger area (so) lower pressure (on the ground) (vehicle) doesn't sink into the mud owtte	B3
5(b)(i)	vacuum	B1
5(b)(ii)	atmospheric / air	B1
	pressure	B1
5(c)(i)	(pressure at hole 2 is) less (than that at hole 3) ora	B1
5(c)(ii)	water from top hole not travelling further than from middle hole	B1

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Question 6 **[7]**

6 **(a)** (p =) F/A OR in words OR 90/4.8 OR 90 / 0.00048 C1
= 18.75 N/cm^2 OR 1.875 × 10^5 Pa OR 187500 Pa
OR 187.5 kPa OR 0.1875 MPa at least 2 s.f. A1

(b) Area of Y bigger (than area of X so force greater) B1

(c) Volume of oil moved at Y = volume of oil moved at X B1
Area of Y × distance moved by Y = Area of X × distance moved by X (so distance move by Y smaller) B1
OR
Work done by piston X = work done on piston Y (B1)
Work = force × distance and F_2 is greater than F_1 so distance moved by Y smaller (than distance moved by X) (B1)

(d) Air bubbles compress when pressure applied M1
More movement of piston X required for same movement of piston Y
OR Y moves less (for same movement of X)
OR Driver must push the brake pedal further / do more work
OR Pressure reduced / force on Y reduced
OR System is less efficient A1

[Total: 7]

Question 7 **[7]**

7 **(a)** **(i)** ($W = mg$ =1440 × 10 =) 14 400 N B1

(ii) (P =) F/A OR 14 400 / (1.5 × 1.2) C1

8000 Pa OR N / m^2 A1

(b) **(i)** (P =) $h\rho g$ OR 1.4 × 1000 × 10 C1

14 000 Pa OR N / m^2 A1

(b) **(ii)** pressure on base of **P** smaller / **Q** greater M1

(with same volume removed) smaller decrease in depth in Q
OR height in **Q** is greater A1

[Total: 7]

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Question 8 [7]

8(a)(i)	(p =)$h\rho g$ **or** 0.36 × 840 × 10 3.0(24) × 10^3 Pa	**C1** **A1**
8(a)(ii)	1.0(2024) × 10^5 Pa (**allow** 1.0 × 10^5 Pa **with evidence of addition**)	**B1**
8(b)(i)	left level not as low right level not as high **or** one level higher **and** one level lower smaller h / height (difference)	**B1** **B1**
8(b)(ii)	both / liquid levels higher same / 0.36 m h / height (difference)	**B1** **B1**
	Total	**5**

Question 9 [9]

9 **(a)** **(i)** force / pressure greater on outside surface owtte B1

(ii) $p = F/A$ in any form **OR** (F =) pA C1
= (1.0 × 10^5 – 6000) × 0.12 C1
11280 N to at least 2 sig. figs. A1

(b) **(i)** pressure of oil = pressure of water B1

(ii) **1.** (p=) $h\rho g$ C1
(= 0.25 × 1000 × 10 =) 2500 Pa A1

2. $h\rho g$ = 2500 C1
(ρ = 2500 / (0.32 × 10) =) 781 kg / m^3 to at least 2 sig. figs. A1

[Total: 9]

Question 10 [9]

10(a)(i)	pressure = force/area accept P inversely proportional to area	**B1**
	same force exerted by each group of books	**B1**
	area (in contact with bookshelf) in group B is greater OR area (in contact with bookshelf) in group A is smaller	**B1**
10(a)(ii)	(pressure =) 1900 Pa	**A3**
	force = 6 × 0.52 × 10 OR 31(.2) seen	**C1**
	area = 6 × 0.013 × 0.21 OR 0.016(38) seen OR 163.8 (cm^2)	**C1**

10(b)	(depth =) 19 m	**A3**
	$p = \rho gh$ OR (3.0 – 1.0) × 10^5 = 1030 × 10 × h in any form	**C1**
	h = (3.0 – 1.0) × 10^5/1030 × 10 OR h = 2.0 × 10^5/1030 × 10	**C1**

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