

Multiple Choice Answers

Q16: B

Multiple Choice Answers

Q15: C

Q16: A

Multiple Choice Answers

Q12: C

2(a)(i)	(normal) force per (unit cross-sectional) area
2(a)(ii)	(due to difference in depth there is a) difference in pressure between top and bottom (of ball)
	(due to pressure difference, upwards) force on bottom of ball is greater (than downwards force on top of ball, so resultant force is upwards)
2(b)(i)	arrow vertically downwards labelled 'weight'
	arrow vertically upwards labelled 'upthrust'
	arrow vertically upwards labelled '(viscous) drag'
2(b)(ii)	SI base units of D : kg m s^{-2}
	base units of η : $\text{kg m s}^{-2} / (\text{m} \times \text{m s}^{-1})$ $= \text{kg m}^{-1} \text{s}^{-1}$
2(c)(i)	upthrust $= 920 \times (4/3) \times \pi \times (4.2 \times 10^{-3})^3 \times 9.81 = 2.8 \times 10^{-3} \text{ (N)}$
2(c)(ii)	weight = drag + upthrust
	$(2.4 \times 10^{-3} \times 9.81) = (2.8 \times 10^{-3}) + (6\pi \times 4.7 \times 4.2 \times 10^{-3} \times v)$
	$v = 0.056 \text{ m s}^{-1}$

Multiple Choice Answers

Q14: A

Q16: C

Multiple Choice Answers

Q14: D

Multiple Choice Answers

Q13: D

Multiple Choice Answers

Q13: A

Multiple Choice Answers

Q10: A

1(a)	mass per unit volume
1(b)(i)	density $= 0.243 / (0.0541 \times 0.1109 \times 0.0162)$
	$= 2500 \text{ kg m}^{-3}$
1(b)(ii)	$(0.001 / 0.243) \text{ or } (0.01 / 5.41) \text{ or } (0.01 / 11.09) \text{ or } (0.01 / 1.62)$
	$(\Delta \rho / \rho) = (\Delta m / m) + (\Delta x / x) + (\Delta y / y) + (\Delta z / z)$ $= (0.001 / 0.243) + (0.01 / 5.41) + (0.01 / 11.09) + (0.01 / 1.62)$ $(= 0.013)$
	percentage uncertainty in $\rho = 0.013 \times 100$ $= 1.3\%$ (allow 1 s.f. answer of 1%)
1(c)	zero error (on calipers / balance) or incorrect calibration (of calipers / balance)