

Name of the Student: _____

Max. Marks : 21 Marks

Time : 21 Minutes

Mark Schemes

Q15.

Question number	Answer	Additional guidance	Mark
(i)	(upthrusts in each case) are equal (1)		(1) AO3

Question number	Answer	Additional guidance	Mark
(ii)	an explanation linking any three of weight of ball = weight of water displaced (1) seawater more dense than fresh water (1) smaller volume of seawater (needs to be) displaced (1) to produce same weight of water (displaced) (1)	accept reverse arguments accept saltwater for seawater upthrust = weight of water displaced accept less seawater displaced to produce same upthrust	(3) AO1

Q2.

Question number	Answer	Additional guidance	Mark
	any two from pressure(s) would be greater (values) (1) steeper gradient of graph (1) both straight lines (1) intercept (on pressure axis) the same (1)	credit mark points seen on graph bigger gradient / steeper line (of best fit) both linear pressure at surface is the same	(2) A03.2

Q3.

Question number	Answer	Additional guidance	Mark
(i)	rearrange $p = \rho g h$ to give $\rho = p / (g h)$ (1) substitution using any point from graph (1) e.g. depth = 50km and pressure = 1.5 GPa $\rho = p / (g h)$ $= 1.5 \times 10^9 / (10 \times 50 \times 10^3)$ Evaluation (2) $= 3000 \text{ (kg/m}^3\text{)}$	rearrangement and substitution in any order allow any combination from the graph and ignore 'pot' error here 'pot' error scores 2 marks maximum	(4)

Question number	Indicative content	Mark
(ii)	Answers will be credited according to the candidate's deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme. The indicative content below is not prescriptive and candidates are not required to include all of the material which is indicated as relevant. Additional content included in the response must be scientific and relevant. A02 (3 marks) A03 (3 marks) A03 Interpretation and evaluation from the graph Similarities: • both show increasing pressure with depth • both show a range of pressures over kilometre depths / heights Differences: • ocean water shows a linear relationship (straight line) but atmosphere gives a non-linear (curved) relationship • density of ocean water not changing with depth but density of atmosphere changes as you go higher • The pressures in the ocean recorded are much bigger (GPa compared with kPa) The depth of the ocean shown is up to 100km whereas the height of the atmosphere involved is only up to 10km A02 Link between graph shapes and underlying physics Similarities: • pressure is due to (increasing) weight of fluid (liquid / gas) above • more molecules above Differences: • atmosphere becomes thinner the higher you go • molecules in the ocean stay (on average) the same distance apart but in the atmosphere they get further apart (on average) as you go higher up	(6)

Level	Mark	Descriptor
	0	No awardable content
Level 1	1–2	- Interpretation and evaluation of the information attempted but will be limited with a focus on mainly just one variable. Demonstrates limited synthesis of understanding. (AO3) - The explanation attempts to link and apply knowledge and understanding of scientific ideas, flawed or simplistic connections made between elements in the context of the question. (AO2)
Level 2	3–4	- Interpretation and evaluation of the information on both variables, synthesising mostly relevant understanding. (AO3) - The explanation is mostly supported through linkage and application of knowledge and understanding of scientific ideas, some logical connections made between elements in the context of the question. (AO2)
Level 3	5–6	- Interpretation and evaluation of the information, demonstrating throughout the skills of synthesising relevant understanding. (AO3) - The explanation is supported throughout by linkage and application of knowledge and understanding of scientific ideas, logical connections made between elements in the context of the question. (AO2)

Q4.

Question number	Answer	Additional guidance	Mark
(i)	a description including pressure increases as height decreases (1) OR as height increases pressure decreases (1)	negative correlation	(2) AO3.2

	non-linear (1)	implication of non-linear e.g. curved OR not proportional OR gradient increases as height increases OR gradient decreases as pressure increases	
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Question number	Answer	Additional guidance	Mark
(ii)	accept any answer from 30 to 34 (kPa) (1)		(1) AO3.2

Question number	Answer	Additional guidance	Mark
(iii)	substitute into % calculation (1) $\frac{74 - 104}{104} \times 100$ evaluation (1) (-) 29 (%)	$\frac{104 - 74}{104} \times 100$ any number rounding to (-)29(%) e.g. (-)28.8(%) award full marks for the correct answer without working award 1 mark for (-)0.29 OR (-)0.288 award 1 mark for (-)40(.54) (%) or (-)41 (%) award 1 mark for 71 (%)	(2) AO2.1