

Mark scheme – Beyond Earth (F)

Question			Answer/Indicative content	Marks	Guidance
1			B ✓	1 (AO 2.1)	<p>Examiner's Comments</p> <p>This question assessed P8.3e and was answered correctly by around 40% of candidates. All three distractors were chosen with equal frequency.</p>
			Total	1	
2			A	1	
			Total	1	
3			C	1	
			Total	1	
4	a	<p>Recall weight = mass × gravitational field strength (1)</p> <p>Substitute: 185×3.75 (1)</p> <p>694 to 3 sig.figs (2)</p> <p>N (1)</p>	5	<p>ALLOW 693.75 (1) but no marks for significant figures</p>	
	b	'g' is greater on Earth than Mars / weight is bigger as 'g' is greater on Earth (1)	1		
	c	Moon (1)	1		
	d	Gravitational / centripetal (force) (1)	1	ALLOW 'gravity' (1) Ignore 'weight force'	
			Total	8	
5	a	<p>spoon A</p> <p>AND</p> <p>(More radiation emitted) at higher temperature / hotter objects (emit more radiation) / spoon A is hotter / AW / ORA✓</p>	1(AO1.1)	<p>ALLOW spoon A is heated (more)</p> <p>Examiner's Comments</p> <p>Many candidates correctly ticked Spoon A but did not explain their answer correctly. It was expected that they would state that objects at higher temperatures would emit more radiation.</p>	
	b	<p>Any one from:</p> <p>Eye can only detect visible light / eye cannot detect IR ✓</p>	1 (AO1.1)	<p>ALLOW see for detect</p> <p>ALLOW spoon is not hot enough for a change in colour AW</p> <p>Examiner's Comments</p>	

					The common incorrect answer to this question was to refer to the spoons not melting rather than stating that infrared radiation cannot be detected by the eye.
			Total	2	
6		i	Nuclei join (in fusion) ✓	1 (AO 1.1)	ALLOW fuse / combine <u>Examiner's Comments</u> There were many vague answers in terms of hydrogen reacting to produce large amounts of energy. Ideally candidates should understand that fusion is where nuclei join together.
		ii	Any two from: High temperature ✓ High pressure ✓ Large gravitational forces (due to large mass) ✓	2 (AO 2×2.1)	IGNORE heat <u>Examiner's Comments</u> Examiners were keen that correct physics terms were used. Answers such as a lot of heat were not credited. Some candidates did mention very high temperatures. Other acceptable answers included high pressure and large gravitational forces. There needed to be some idea of size, e.g. high, large Often only one comment was made when the mark bracket was [2] which indicates two points need to be made.
		iii	The sun will expand / become a red giant / (ultimately) become a white dwarf ✓	1 (AO 1.1)	ALLOW fusion of helium / heavier elements <u>Examiner's Comments</u> The question required candidates to state what would happen when the sun ran out of hydrogen. Many candidates state what would happen to the sun eventually.
			Total	4	
7			Big Bang ✓ Red shift ✓ Expanding ✓	3 (AO3 × 1.1)	
			Total	3	