Circular Motion Mark Scheme

Q1.

Question Number	Answer	Additional guidance	Mark
	☒ B centripetal force **The only correct answer is B (correct term for circular motion)** **A** is not correct – incorrect term **C** is not correct – incorrect term **D** is not correct – incorrect term		**(1)**

Q2.

Question	Answer	Mark
(i)	**D** **A** is not correct there is no vertical force **B** the centripetal force acts inward **C** is not correct there is no force acting at right angles to the radius	**1** **AO1.1**

Question	Answer	Additional guidance	Mark
(ii)	any **one** from:- direction (of ball is) (continuously) changing (1) there is a resultant force acting on the ball (1) velocity/it is a vector (1)	ignore changing force /acceleration / centripetal force velocity/it has direction	**1 AO1.1**

Q3.

Question Number	Answer	Additional guidance	Mark
(i)	single arrow towards centre of the circle applied to the object (1)	judge by eye	**(1)**

Question Number	Answer	Additional Guidance	Mark
(ii)	an explanation including velocity is a vector (1) (because) direction changes (1)	 velocity has (magnitude and) direction / velocity is speed in a (certain) direction	**(2)**

Q4.

Question Number	Answer	Acceptable answers	Mark
(a)(i)	D towards the centre of the circle		**(1)**

Question Number	Answer	Acceptable answers	Mark
(a)(ii)	centripetal (force)	reject centrifugal force accept misspellings where meaning is clear e.g. centripedal	**(1)**

Question Number	Answer	Acceptable answers	Mark
(a)(iii)	Any two of the following :- ball slows down (1) ball / it drops (down) / circles at a lower height (1) go in smaller circles (1)	 less **kinetic** energy / momentum any lowering / less **potential** energy stops going in circles the ball/it would not make complete circles (not just 'stops')	**(2)**

Q5.

Question number	Indicative content	Mark
*	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. **A01 (6 marks)** • force needed to keep an object moving in a circle • when moving in a circle, direction of velocity changes • must be an acceleration • moving in a straight line with no resultant force at constant velocity **A02 (6 marks)** • the woman changing direction while circling the man • she is changing velocity (but not changing speed) • therefore she is accelerating • this requires a force towards the centre of her orbit • this is a centripetal force • when the man releases the woman, the centripetal force ceases • there is no resultant force on the woman (if friction from the ice can be ignored) • the woman therefore continue in a straight line • she is now travelling at a constant velocity	**(6)**

Level	Mark	Descriptor
	0	No awardable content
Level 1	1-2	• Demonstrates elements of physics understanding, some of which is inaccurate. Understanding of scientific ideas lacks detail. (AO1) • 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	• Demonstrates physics understanding, which is mostly relevant but may include some inaccuracies. Understanding of scientific ideas is not fully detailed and/or developed. (AO1) • 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	• Demonstrates accurate and relevant physics understanding throughout. Understanding of the scientific ideas is detailed and fully developed. (AO1) • 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)