Paper 2 B2F Mark scheme

Question number	Answer	Mark
1(a)	C	(1)

Question number	Answer	Mark
1(b)(i)	• temperature of water (1) • Start each experiment with the same amount of carbon dioxide (1) • Start each experiment with the same amount of water (1)	(3)

Question number	Answer	Mark
1(b)(ii)	Any one improvement from: • Use a heat shield (1) • Use a water bath (1)	(1)

Question number	Answer	Additional guidance	Mark
1(c)(i)	• $\frac{23+24+22}{3}$ (1) • $69 \div 3 = 23$ (1)	award full marks for correct numerical answer without working	(1)

Question number	Answer	Mark
1(c)(ii)	Repeat the reading to get concordant results/calculate the mean without the anomalous result	(1)

Question number	Answer	Mark
1(c)(iii)	{as light intensity decreases/distance from the lamp increases} the rate of photosynthesis decreases	(1)

Question number	Answer	Mark
2(a)(i)	A	(1)

Question number	Answer	Mark
2(a)(ii)	An explanation that combines identification - application of knowledge (1 mark) and reasoning/justification - application of understanding (1 mark): • emphysema will reduce the amount of oxygen carried into the bloodstream (1) • because there is reduced alveoli, which are the gas exchange surface between the lungs and blood capillaries (1)	(2)

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Question number	Answer	Additional guidance	Mark
2(b)(i)	24 ÷ 8 (1) 3 : 1 (1)	award full marks for correct numerical answer without working	**(2)**

Question number	Answer	Mark
2(b)(ii)	maximise gas exchange/maximise oxygen uptake	**(1)**

Question number	Answer	Mark
2(b)(iii)	C	**(1)**

Question number	Answer	Mark
3(d)	An explanation that combines identification - understanding (1 mark) and reasoning/justification - understanding (2 marks): • shivering stops the body temperature falling when external temperature drops (1) • because increased muscle contraction (1) • generates heat via respiration/friction (1)	**(3)**

Question number	Answer	Mark
3(a)(i)	C	**(1)**

Question number	Answer	Mark
3(a)(ii)	D	**(1)**

Question number	Answer	Additional guidance	Mark
3(b)(i)	10 mins = 600 s (1) 12 ÷ 600 (1) 0.02 (mm^3/s) (1)	award full marks for correct numerical answer without working maximum of 2 marks if conversion not completed	**(3)**

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Question number	Answer	Mark
3(b)(ii)	An explanation that combines identification - application of knowledge (1 mark) and reasoning/justification - application of understanding (1 mark): • transpiration would be reduced (1) • as less evaporation from the surface of the leaf (1)	**(2)**

Question number	Answer	Mark
3(b)(iii)	**Any two of the following points:** • **humidity (1)** • **air speed (1)** • **light intensity (1)**	**(2)**

Question number	Answer	Mark
3(c)	An explanation that combines identification - understanding (1 mark) and reasoning/justification - understanding (1 mark): • transpiration rate is increased (1) • because water molecules have more energy/move faster (1)	**(2)**

Question number	Answer	Mark
4(a)(i)	to obtain a representative sample of the field (1)	**(1)**

Question number	Answer	Mark
4(a)(ii)	An answer that combines the following points of understanding to provide a logical description: • Oxygen moves from the air across the skin into the worm/bloodstream (1) • Carbon dioxide move from inside the worm/bloodstream to the air (1)	**(2)**

Question number	Answer	Mark
4(a)(iii)	B	**(1)**

Question number	Answer	Mark
4(b)(i)	$\frac{5+2+6+3+4+4}{6} = 4$ (1)	**(1)**

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Question number	Answer	Mark
4(b)(ii)	An answer that combines the following points of understanding to provide a logical description: • divide the field area by the quadrat size (1) • multiply by the mean number of daisies (1)	**(2)**

Question number	Answer	Mark
4(b)(iii)	An explanation that combines identification - application of knowledge (1 mark) and reasoning/justification - application of understanding (1 mark): • less daisy plants are likely to be growing in this area (1) • because the trees would cause lower light levels for photosynthesis/lower mineral levels for growth/less water available for photosynthesis (1)	**(2)**

Question number	Answer	Mark
4(b)(iv)	Any two of the following: Temperature (1) pH (1) pollutants (1) water (1)	**(2)**

Question number	Answer	Mark
5(a)(i)	B	**(1)**

Question number	Answer	Mark
5(a)(ii)	to pump blood around the body under higher pressure	**(1)**

Question number	Answer	Mark
5(a)(iii)	An answer that combines the following points of understanding to provide a logical description: • blood would flow backwards from the ventricle to the atrium/blood will leak through (1) • less (oxygenated) blood would be pumped to the body (1)	**(2)**

Question number	Answer	Mark
5(b)	An explanation that combines identification - application of knowledge (1 mark) and reasoning/justification - application of understanding (1 mark): • the blood vessel has thick walls/small lumen (1) • to carry oxygenated blood/to carry blood under higher pressure (1)	**(2)**

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Question number	Answer	Mark
5(c)	• the fish heart has two chambers rather than four chambers (1) • the fish heart only has one ventricle and one atrium rather than two ventricles and two atria (1) • only deoxygenated blood flows through the fish heart (1) • the fish heart shows a single circulatory system rather than a double circulatory system (1)	**(4)**

Question number	Answer	Mark
6(a)(i)	• person 2 had a slightly higher blood glucose level than person 1 after fasting (by up to 0.2 mmols/l) (1)	**(1)**

Question number	Answer	Mark
6(a)(ii)	• person 2 had a much higher blood glucose level than person 1 two hours after taking glucose (up by 2.6 mmols/l) (1)	**(1)**

Question number	Answer	Mark
6(a)(iii)	Insulin (1)	**(1)**

Question number	Answer	Mark
6(b)(i)	An answer that combines points of interpretation/evaluation to provide a logical description: • levels remain low up until day 14 then rise (1) • they continue to rise to day 23 and drop at day 24 (1)	**(2)**

Question number	Answer	Mark
6(b)(ii)	An explanation that combines identification - understanding (1 mark) and reasoning/justification - understanding (1 mark): • As ovulation occurs (1) • The levels of progesterone released from the corpus luteum increases to maintain the lining of the uterus (1)	**(2)**

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Question number	Indicative content	Mark
6(c)*	Answers will be credited according to 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 the material that is indicated as relevant. Additional content included in the response must be scientific and relevant. **AO3 (6 marks)** • during typical use the barrier methods are considerably less effective than hormonal methods • during perfect use the barrier methods are less effective than hormonal methods • manipulation of data from the table to show these relationships • perfect use of both barrier and hormonal methods are significantly more effective • manipulation of data from the table to show this relationship • the use of the combined pill and combined patch are the most effective contraceptive method • with perfect use only 0.2% result in pregnancy pregnancies and with typical use 8% result in pregnancy • the least effective contraceptive method is the female condom • 21% pregnancy with typical use and 16% pregnancy with perfect use • the most effective method of contraception is a hormonal method • the combined pill or combined patch are the most effective • perfect use is more effective than typical use • it may be easier to use the combined patch rather than the combined pill as it is less effected by digestive problems	**(6)**

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Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1-2	• Deconstructs scientific information but understanding and connections are flawed. An unbalanced or incomplete argument that provides limited synthesis of understanding. • Judgements are supported by limited evidence. (AO3)
Level 2	3-4	• Deconstructs scientific information and provides some logical connections between scientific concepts. An imbalanced argument that synthesises mostly relevant understanding, but not entirely coherently. • Judgements are supported by evidence occasionally. (AO3)
Level 3	5-6	• Deconstructs scientific information and provide logical connections between scientific concepts throughout. A balanced, well-developed argument that synthesises relevant understanding coherently. • Judgements are supported by evidence throughout. (AO3)

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