

Question Number	Answer	Additional Guidance	Mark
1(a)	<ol style="list-style-type: none"> idea that {body / core / eq} temperature drops after death ; (rate / extent) of temperature drop depends on {ambient / eq} temperature ; idea that ambient temperature {fluctuates (over time) / does not stay constant} ; idea that the sooner after death the more accurate the (estimate of) time of death ; 	<p>2 IGNORE body temperature drops to ambient temperature ACCEPT idea that if body temperature has already reached ambient temperature there will be no further fall</p>	(3)

Question Number	Answer	Additional Guidance	Mark
1(b)(i)	<ol style="list-style-type: none"> correct values read from graph (37.5 & 36.27) ; (correct subtraction) = 1.23(°C) ; 	<p>Correct answer only scores 2 marks</p> <p>2 IGNORE + or – signs ACCEPT ECF for 36.26 to 36.28 e.g. 36.28 = 1.22(°C)</p>	(2)

Question Number	Answer	Additional Guidance	Mark
1(b)(ii)	<ol style="list-style-type: none"> idea that calculations of time of death are based on {average body temperature / 37° C} ; body temperature at time of death will depend on time of day / eq ; idea that therefore the calculated value for time of death may not be accurate ; 	<p>3 ACCEPT therefore the estimate will have to be a range of times ACCEPT take into account 1.23°C range</p>	(2)

Question Number	Answer	Additional Guidance	Mark
*1(c)	<p>(QWC – Spelling of technical terms must be correct and the answer must be organised in a logical sequence)</p> <ol style="list-style-type: none"> 1. idea of using {a range / at least five} temperatures ; 2. description of temperature control e.g. water bath, incubator ; 3. idea that timing starts when eggs hatch into first instar maggots ; 4. and ends when the (third instar) maggots begin to pupate / eq ; 5. idea that several {eggs / maggots} should be used at each temperature ; 6. idea of providing food for maggots ; 7. reference to appropriate controlled variable e.g. humidity. mass of food, species ; 8. reference to plotting data on a graph of temp against time (for first instar to become a pupa); 	<p>Emphasis is on clarity of expression</p> <p>1 ACCEPT a min of -10°C and a max of 50°C</p> <p>5 ACCEPT minimum of 3 eggs / maggots</p> <p>7 IGNORE light, pH, amount of food, oxygen</p>	<p>(5)</p>

Question Number	Answer	Additional guidance	Mark
2(a)	<ol style="list-style-type: none"> reference to increase in {metabolic rate / enzyme activity / eq} as temperature rises ; reference to increase in {kinetic / eq} energy of molecules (as temperature rises) / eq ; reference to increase in {enzyme-substrate complexes / energy of collisions / eq} (as temperature rises) ; idea of {inactivation at lower temperatures/ denaturation at higher temperatures} of enzymes ; idea that temperature affects {differentiation / growth /division / eq} ; 	<p>1. Accep converse argument for mp 1 – 3</p> <p>2. Acce movement</p> <p>4. Accept the idea that enzyme-substrate complexes cannot be made if denaturing</p>	(3)

Question Number	Answer	Additional guidance	Mark
2(b)	<ol style="list-style-type: none"> idea that temperature affects {survival / development / growth / metabolism / cell division / eq} ; idea that enzymes affect {development / growth / metabolism / cell division/ eq} ; idea that temperature affects enzymes ; idea that different frogs have different enzymes ; 		(2)

Question Number	Answer	Additional guidance	Mark
2(c)	<i>sylvatica,</i> <i>pipiens,</i> <i>palustris,</i> <i>clamitans ; ;</i>	if order correct but reversed = 1 mark	(2)

Question Number	Answer	Additional guidance	Mark
2(d)	<ol style="list-style-type: none"> 1. idea that different species are reproductively isolated ; 2. idea of different breeding { times / seasons / eq } ; 3. idea of different { breeding / courtship / eq } { behaviour / rituals / displays / colour / songs / croaks / eq } ; 4. idea that population at { northerly / southerly } limit of range may not develop (to adulthood) ; 5. idea that breeding between different species results in infertile offspring ; 	3. Acce idea of incompatible { genitalia / gametes }	(3)

Question Number	Answer	Additional guidance	Mark
2(e)	<ol style="list-style-type: none"> 1. idea that global warming will increase the temperature (at the latitudes) ; 2. idea that temperatures (at these latitudes) may become too high for any of the species ; 3. idea that new temperature may be above the maximum to complete development or above the upper lethal limit ; 4. idea that species move { north / to cooler regions / eq } ; 5. ref to change in { food source / predators / competition / eq } ; 	2.Accept become extinct	(3)

Question Number	Answer	Mark
3(a)	<ol style="list-style-type: none"> 1. more {muscle contraction / respiration} / eq ; 2. idea that heat energy released ; 3. idea that more heat produced than lost ; 	(2)

Question Number	Answer	Mark
3(b)	<ol style="list-style-type: none"> 1. ref to {detection of temperature change / temperature receptors} ; 2. reference hypothalamus ; 3. more sweating / eq ; 4. loss of heat due to evaporation (of water) / eq ; 5. vasodilation (of arterioles) / eq ; 6. loss of radiant heat / eq ; 7. heat gained equal heat lost / eq ; 8. reference negative feedback ; 9. behavioural heat loss mechanism described / eq ; 	(5)

Question Number	Answer	Mark
3(c)	<ol style="list-style-type: none"> 1. idea of dehydration ; 2. no longer sweating / eq ; 3. cooling mechanisms failing / eq ; 4. heat production greater than heat loss / eq ; 5. increase of pace / eq ; 	(2)