

Multiple Choice Answers

Q28: D

Q29: D

Q40: C

2	1 independent variable different intensities of exercise / different exercises / exercise for different lengths of time ; 2 dependent variable after / during, exercise measure, heart rate / pulse rate ; 3 and 4 detail of method ;; - description of named exercise of different intensities - ensuring heart rate returns to resting rate - use of a heart rate monitor 5, 6 and 7 constant variables ;;; - same speed / distance / time, of exercise - same age of people - same sex of people - same, person / fitness level / mass of person / height of person / BMI - same, place / time of day / temperature / weather 8 at least three trials / two more repeats ; 9 relevant safety precaution ;
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Multiple Choice Answers

Q30: B

Multiple Choice Answers

Q30: A

3(a)(i)	27 ;;
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3(a)(ii)	<i>any three from:</i> - ref to solvent / described ; - for digestion / named example ; - for excretion / named example ; - for transport / named example ; - temperature regulation ; - support, cells / tissues ; - AVP ;
3(b)(i)	L cell membrane ; M ribosome ;
3(b)(ii)	<i>any two from:</i> cell wall ; circular DNA ; plasmid(s) ; AVP ;;
3(b)(iii)	bacterium ;
3(b)(iv)	<i>Vibrio</i> ;
3(b)(v)	<i>any three from:</i> cholera produces a toxin that causes secretion of chloride ions, into, (small) intestine / gut or out of the small intestine cells ; causing osmotic movement of water into the, gut / (small) intestine or out of the (small intestine) cells ; causing diarrhoea / described ;
3(b)(vi)	sticky ends ; (DNA) ligase ; recombinant ;

Multiple Choice Answers

Q24: B

Q25: C

Q27: C

Multiple Choice Answers

Q22: D

Q25: B

Q37: B

2(a)(i)	single clear unbroken outline ; size greater than half of space provided ; detail 1: proportions plumule vs radical ; detail 2: two outermost curved leaves ;
2(a)(ii)	31 ±1(mm) ; (×) 3.4 ;;

2(a)(iii)

one similarity from:

- root / radicle / AW, present
- (any) structure, pointing / AW, downwards
- seed coat / seed covering / testa / AW, present / split
- side roots / root hairs, present

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two differences from:

P		Q
marks on / darker, seed coat / AW	OR	no marks on / paler, seed coat / AW
shoot / plumule / stem / stalk	OR	no, shoot / plumule / stem / stalk
(root is) not, hairy / furry / fibrous / feathery / branched	OR	(root is) hairy / furry / fibrous / feathery / more branched
thick (side) roots / AW	OR	thin (side) roots / AW
has leaves	OR	has no leaves
oval, seed / AW	OR	round, seed / AW
larger / longer	OR	smaller / shorter

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2(b)	<i>starch</i>: iodine solution ; <i>reducing sugar</i>: Benedict's solution ; heat ;
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2(c)	<i>any six from:</i> 1 <i>independent variable</i>: use at least two different light intensities ; 2, 3 and 4 <i>variables kept constant</i> ;; <i>max three from:</i> • age of plant • type / species, of plant • (starting) surface area / number of leaves / size / height • temperature • wind speed / humidity • light, wavelength / colour • soil type / AW / fertiliser / soil minerals / soil pH • volume / amount, of water supplied • time 5 and 6 <i>detail of method</i> ;; <i>max two from:</i> • method of changing the light intensity e.g. different lamp distances / dimmer switch altered / different bulbs / different lamps / different power lamps / different light sources • method of measuring angle of seedling e.g. use a protractor / measure on a photograph / use a ruler to measure from the soil to the top of the seedling • use of a heat shield 7 repeat the whole investigation at least two more times ; 8 relevant safety point ;
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Multiple Choice Answers

Q28: B

2(a)(i)	<i>any one from:</i> to get a representative sample ; to avoid bias ; to, identify / exclude, anomalies / outliers ; to increase confidence in results / to increase reliability / to check reliability ;
2(a)(ii)	value indicated on graph ; 3.3 (m ²) ;
2(a)(iii)	57(%) ;;;
2(b)	59 ; cm ² ;
2(c)	<i>method:</i> (add) Benedict's (reagent) ; heat ; <i>positive test:</i> green / yellow / orange / (brick) red / red-brown / brown ;
2(d)	outline – single clear unbroken line ; size – at least 65mm wide ; detail 1: five lobes ; detail 2: one main leaf vein in each lobe ;

2(e)

similarity:
lobed (AW) / number of lobes (AW) / presence of veins / pattern of veins / uneven edge ;

difference:

grapevine leaf / fig. 2.2 / first leaf		fig leaf / fig. 2.3 / second leaf
serrated / pointy / sharp / rough / ragged	vs	smooth / wavy / rounded
no stalk / no petiole	vs	stalk / petiole
fewer veins	or	more veins

4(a)(i)	$C_6H_{12}O_6$; $\longrightarrow 2C_2H_5OH + 2CO_2$;
4(a)(ii)	<i>any three from:</i> 1 uses wastes (from farming / forestry) ; 2 <i>idea that</i> reduces use of, fossil fuels / oil / petrol / non-renewable fuel ; 3 less (pollution / damage to environment by) mining / drilling ; 4 to conserve, fossil fuels / non-renewables, for the future ; 5 <i>idea that</i> plants grown for biomass is an example of a sustainable resource ; 6 carbon neutral / no or small carbon footprint ; 7 does not contribute to, (enhanced) greenhouse effect / global warming ; 8 less (net) air pollution / no acid rain ; 9 AVP ;
4(a)(iii)	<i>disadvantages - any two from:</i> 1 land could be used for food production ; 2 loss of habitats ; 3 loss of, species diversity / biodiversity / AW ; 4 loss of genetic diversity ; 5 uses land that could be used for, nature reserves / conservation ; 6 plants (grown in monocultures) are susceptible to, pests / disease ; 7 loss of soil nutrients / soil degradation / soil erosion / soil exhaustion / AW ; 8 need (high inputs of), herbicides / pesticides / water / fertiliser ;

4(b)(i)	<i>any three from:</i> 1 concentrations of xylose and ethanoic acid decrease, concentration of ethanol increases ; 2 steep / AW, decrease of, xylose and ethanoic acid until 62 hours ; 3 steepest change is between 6 to 12 hours ; 4 increase in ethanol concentration to 44 g dm^{-3} ; 5 small change in concentration(s), after / from, 62 hours ; 6 xylose reaches, 1 g dm^{-3} / almost zero, at 90 hours / at the end or ethanoic acid reaches 0.25 g dm^{-3}, at 90 hours / at the end ;
4(b)(ii)	<i>one from:</i> (s)lower rate of increase of ethanol / less ethanol (in same time) ; take longer to reach same concentration of ethanol ; line(s) / gradient(s) (on graph), less steep ;
5(a)(i)	all of the populations of different species in an ecosystem ;
5(a)(ii)	natural selection ; environment ;
5(b)(i)	<i>these descriptions refer to the changes in 2013, but accept ora for 1969</i> A <i>Meyer's goshawk</i> - range extends, downwards / to lower altitude ; B <i>Mackinlay's cuckoo-dove</i> - range extends, upwards / to higher altitude ; C <i>Island thrush</i> - range does not extend downwards as much / AW ; D <i>Island leaf warbler</i> - no / little, change in range ;

5(b)(ii)	<i>any three from:</i> 1 decrease in population(s) (of island thrush) ; 2 ref to competition (between species at higher altitude) ; 3 ref to, increase in population(s) / extension of range of Mackinlay's cuckoo-dove ; 4 <i>idea that</i> there is competition with other species for, breeding / nesting, sites (at higher altitudes) ; 5 habitat loss / deforestation / increased human activity / tourism ; 6 disease ; 7 predation ; 8 loss of food source ; 9 climate change / global warming / enhanced greenhouse effect ; 10 (increased) hunting (at lower altitudes) ; 11 (increased) pollution (at lower altitudes) ; 12 introduction of, alien / new / exotic, species ; 13 AVP ;
5(c)	<i>any three from:</i> difficulty finding a mate ; inbreeding ; reduced fitness ; decrease in genetic variation (within each population) / loss of alleles ; increase in, genetic / inherited, diseases ; more vulnerable to (pathogenic / infectious) disease (spreading) ; unable / less able, to adapt to change in environment ; at increased risk of extinction (as populations are so small) ; e.g. by natural catastrophes / introduced species / AW ; rarity linked to, egg stealing / poaching ; AVP ;