**Year 10 Biology Exam revision HIGHER ANSWERS**

**Q1.**

(a)     electron (microscope)

**1**

(b)

*an answer of 150 (μm) scores* ***2*** *marks*

**1**

150 (μm)

*if answer is incorrect allow for* ***1*** *mark sight of 0.015 / 0.15 / 1.5 / 15*

*allow ecf for incorrect measurement of line* ***X*** *for max* ***1*** *mark*

**1**

(c)     **either**

large surface area

*allow (vacuole contains) cell sap that is more concentrated than soil water (1)*

**1**

for more / faster osmosis

*create / maintain concentration / water potential gradient (1)*

**or**

allow thin (cell) walls

for short(er) diffusion distance

**1**

(d)     (on hot day) more water lost

*allow converse for a cold day if clearly indicated*

**1**

more transpiration

**or**

more evaporation

**1**

so more water taken up (by roots) to replace (water) loss (from leaves)

**1**

(e)     (aerobic) respiration occurs in mitochondria

*do* ***not*** *accept anaerobic respiration*

**1**

(mitochondria / respiration) release energy

*do* ***not*** *accept energy produced / made / created*

**1**

(energy used for) active transport

**1**

to transport ions, against the concentration gradient

**or**

from a low concentration to a high concentration

**1**

**[12]**

**Q2.**

(a)     diffusion

**1**

active transport

**1**

*this order only*

(b)     (i)      concentration (of sugar) in the bag was higher (than in the drink)

*allow concentration (of sugar) in the drink was lower (than in the bag)*

**or**

higher concentration of water outside the bag **or** in the drink / boiling tube

*allow higher water potential outside the bag* ***or*** *lower water potential inside the bag*

**1**

(so) water moved in (to the tubing)

*allow water moves down* ***its*** *concentration gradient*

*do* ***not*** *allow sugar moving*

**1**

by osmosis

*allow diffusion (of water)*

*do* ***not*** *allow sugar moving by osmosis* ***or*** *water moving by active transport*

**1**

(ii)     **B**

**1**

(iii)     close(st) to the concentration in the bag **or** to 5%

*allow small(est) diffusion gradient* ***or*** *close(st) to an equilibrium*

**1**

(so rate of) diffusion / osmosis is slow

*allow (so) less water moves in (to the bag)*

*ignore ref. to sugar*

**1**

**[8]**

**Q3.**

(a)     hold cells together **or** prevent flow of cells **or** trap cells

**1**

(b)     12500

*if correct answer, ignore working / lack of working*

*for* ***1*** *mark*



*ignore any units*

**2**

(c)     (i)      size RBC approximately same size capillary **or**no room for more than one cell **or**only one can fit **or**RBC is too big

*allow use of numbers*

*do* ***not*** *accept capillaries are narrow*

**1**

(ii)     more oxygen released (to tissues) **or**more oxygen taken up (from lungs)

**1**

         and any **two** from:

•        slows flow **or** more time available

•        shorter distance (for exchange) **or** close to cells / capillary wall

•        more surface area exposed

**2**

**[7]**

**Q4.**

any **four** from

          molecules / ions

*do not credit mineral salts*

          move(d) through / across the cell

          wall / membrane

          against (a / the) concentration

          gradient

          by a series of chemical

          reactions

          (because) diffusion cannot occur

          energy (required)

          (supplied by) respiration

          oxygen required for respiration (to occur)

**[4]**

**Q5.**

(a)     (i)      change in weight was due to changes in potato
**or** osmosis **or** not due to outside liquid

*ignore ‘to make fair test’*

**1**

(ii)     beaker 2 = 15.1(%) gain

*allow 15%*

**1**

         beaker 4 = 21.8(5) loss

***not*** *21.7
allow –22%
if no minus or no ‘loss’ check graph*

**1**

         beaker 5 = 29.8(%) loss

*allow –30%*

**1**

(b)     (i)      both axes correct values
and scales > ½ of each axis

*ignore lack of minus signs on vertical axis*

**1**

         points correct
<  ½ square

*allow answers in (a)(ii)*

**1**

         line correct

*allow curve of best fit which can miss 10, 15****or*** *straight lines between points
do* ***not*** *allow one straight line or sketched line
bar graph zero marks*

**1**

(ii)     point where line crosses axis (eg 15-16% sucrose)

*allow point from candidate’s graph ( 0.5%)*

**1**

(iii)     any **two** from:

*looking for understanding that water in equilibrium*

         no change in mass

         not **net** movement of water
**or** water entry and exit are equal

         because sucrose solution same
concentration as cell sap **or** sucrose has
same water potential as cell contents

*allow because the concentrations are the same (inside and out)*

**2**

**[10]**

**Q6.**

(a)     a catalyst / speeds up a reaction

*ignore it is not used up*

**1**

it is a protein **or** it is specific / described **or** it has an active site

*allow it only acts on one molecule*

**1**

(b)     cytoplasm

**1**

(c)     **Advantage:**

any **one** from:

•        heat would denature proteins in milk

•        heat alters texture or flavour of milk

•        catalase / enzyme is specific **or** only affects hydrogen peroxide

•        less energy / fuel / lower temperature used so less expensive **or** less pollution

**1**

**Disadvantage:**

any **one** from:

•        (some pathogens may survive) causing illness

•        catalase / enzyme left in milk **or** may cause allergies **or** may alter taste

**1**

**[5]**

**Q7.**

(a)     (i)      glycerol

**1**

(ii)     pancreas / small intestine

*accept duodenum / ileum*

*ignore intestine unqualified*

**1**

(b)     any **two** from:

•         type of milk

•         volume / amount of milk

•         vol. bile equals vol. water

•         volume of lipase

•         concentration of lipase

•         temperature

*ignore time interval*

*ignore solution unqualified*

*do* ***not*** *allow pH*

*ignore starting pH*

*ignore volume / amount of bile / water*

*ignore concentration of bile*

*accept amount of lipase if neither volume nor concentration given*

**2**

(c)     (i)      fatty acid (production)

**1**

(ii)     faster reaction / digestion (with bile)
**or**pH decreases faster (with bile)
**or**takes less time (with bile)
**or**steeper fall / line (with bile)

*allow use of data*

*ignore easier*

**1**

(iii)    all fat / milk digested
**or**same amount of fatty acids present
**or**(lower pH) denatures the enzyme / lipase

*allow all reactants used up*

*ignore reference to neutralisation*

*allow enzyme won’t work at low pH*

*do* ***not*** *allow enzyme killed*

**1**

**[7]**

**Q8.**

(a)     A - atrium

*ignore references to right / left*

**1**

B - ventricle

**1**

(b)     (i)      muscular

**1**

(ii)     push blood

*accept pump / force*

**1**

(c)

*arrows approx as indicated*

**1**

arrow(s) showing flow from A to B
from B out / up / to artery

**1**

(d)     (i)       male

**1**

65 and over

**1**

(ii)     fatty deposits / material in (coronary) arteries

*allow correct points made about heart attacks*

**1**

narrows / blocks / reduces flow

**1**

decreases oxygen supply (to heart muscle)

**1**

**[11]**

**Q9.**

(a)    **B**

*no mark for “B” alone, the mark is for B* ***and*** *the explanation.*

large(r) surface / area **or** large(r) membrane

*accept reference to microvilli*

*ignore villi / hairs / cilia*

*accept reasonable descriptions of the surface eg folded membrane / surface*

*do* ***not*** *accept wall / cell wall*

**1**

(b)    (i)      any **one** from:

•        (salivary) amylase

•        carbohydrase

**1**

(ii)     many ribosomes

*do* ***not*** *mix routes. If both routes given award marks for the greater.*

**1**

ribosomes produce protein

*accept amylase / enzyme / carbohydrase is made of protein*

**or**

(allow)

many mitochondria      (1)

mitochondria provide energy to build / make protein      (1)

*accept ATP instead of energy*

**1**

**[4]**

**Q10.**

(a)     vena cava

**1**

(b)     0.5 mm = 0.05 cm

**1**

time =

*allow alternative correct substitution*

**1**

24.875

**1**

25 (s)

*an answer of 25 (s) scores* ***4*** *marks*

*allow 24 for* ***3*** *marks (no conversion of mm to cm)*

*allow 23.8 / 23.75 for* ***2*** *marks (no conversion of mm to cm and incorrect sf)*

**1**

(c)     (blood) travels through (the) pulmonary vein

**1**

(blood) enters left atrium

**1**

(blood) enters (the) left ventricle

**1**

(blood) leaves the heart via / through (the) aorta

*allow blood travels through arterioles*

*allow blood (travels round the body and) reaches the cells / tissues via / in capillaries*

**1**

*ignore ref to valves / systole / diastole throughout*

(d)     **Level 3 (5-6 marks):**

Relevant points (reasons / causes) are identified, given in detail and logically linked to form a clear account.

**Level 2 (3-4 marks):**

Relevant points (reasons/causes) are identified, and there are attempts at logical linking. The resulting account is not fully clear.

**Level 1 (1-2 marks):**

Points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.

No relevant content (0 marks)

**Indicative content**

**S = structural F = functional**

•   (S) both have a large surface area

•   (S) villi have many microvilli

•   (S) alveolar walls are not flat / are folded

•   (F) to maximise diffusion (of gases) / absorption of (food) molecules

•   (S) both have many capillaries / good blood supply / capillaries near the surface

•   (F) to maintain concentration / diffusion gradient

•   (S) both have thin walls / walls that are one cell thick / one cell thick surface

•   (F) to provide a short diffusion distance (for molecules to travel)

•   (S) villi have many mitochondria

•   (F) to provide energy for active transport (of food molecules)

•   (S) cells of the villi have microvilli / more projections

•   (F) to further increase the surface area / increase the number of proteins in the membrane / to allow more active transport to take place

**[15]**

**Q11.**

(a)  toxins / poisons (secreted by / from / in bacteria)

**1**

(b)  any **two** from:

•   wash hands after using toilet / being sick

**or**

wash hands before preparing / handling food

**or**

do not prepare food (whilst infected)

*ignore ‘wash hands’ unqualified*

*ignore reference to coughing / sneezing*

•   isolate yourself

*allow examples of how isolation could be achieved*

•   disinfect clothes / surfaces

•   do not share utensils / cutlery / towels

**2**

(c)  antibiotics

*allow named examples of antibiotics*

**1**

(d)  immune system is damaged / weakened **or** immune system doesn’t function properly

*allow immunocompromised*

*allow lack of / no white blood cells*

**1**

white blood cells cannot kill bacteria / *Salmonella* (as effectively)

*allow no / fewer antibodies so bacteria not killed* ***or*** *less phagocytosis so bacteria not killed* ***or*** *no / fewer antitoxins to counter toxins*

**1**

(e)  any **one** from:

•   (give chickens) antibiotics

*allow (give chickens) monoclonal antibodies*

•   don’t sell infected chickens / eggs

*allow don’t sell the chickens / eggs*

*ignore don’t sell chickens / eggs*

•   keep infected chickens isolated / indoors

*allow keep the chickens indoors*

*ignore keep chickens indoors*

•   slaughter the infected chickens

*ignore vaccination / chlorination / disinfection*

**1**

(f)   (cleaning liquid) B

**and**

greater reduction in number of bacteria (after cleaning) in both locations

*ignore few bacteria in both locations*

*allow neither / both* ***and*** *idea of experimental error*

**1**

(g)  radius (of area with no bacteria growing)

*allow diameter (of the area with no bacteria growing)*

*ignore πr2 unqualified*

*allow idea of placing agar plate onto graph paper and counting the squares not covered with bacteria*

**1**

(h)  repeat **and** look to see if results are similar

*ignore repeat unqualified*

*allow repeat* ***and*** *look to see if results are different*

*allow repeat and see if there are anomalies*

*ignore repeat and identify anomalies*

*ignore repeat and compare unqualified*

**1**

(i)   any **one** from:

•   toxicity / side / health effects

*ignore harmful / dangerous*

*allow reference to allergies*

•   effect on other types of bacteria / pathogens

*allow not tested on other types of bacteria*

*ignore germs*

•   interaction with other cleaners

•   ease of use

•   dilution factor of each cleaner (vs. cost)

*ignore concentration unqualified*

•   time cleaner is effective for

*ignore how long the cleaner lasts for*

*allow reference to odour of cleaning liquid*

*ignore reference to cost unqualified*

*ignore environmental effects / flammability*

**1**

**[11]**

**Q12.**

(a)     testing for toxicity / see if it is safe /see if it is dangerous / to see if it works

*ignore side effects unqualified*

**1**

(b)     (i)     testing for side effects / testing for reactions (to drug)

*ignore to see if it works*

*do* ***not*** *accept dosage*

**1**

(ii)    any **one** from

*ignore immune system*

•        dose too low to help patient

•        higher risk for patient

•        might conflict with patient’s treatment / patient on other drug

•        effect might be masked by patient’s symptoms / side effects clearer

**1**

(c)     to find optimum dose

*allow testing on larger sample* ***or*** *it makes results more reliable*

*allow to find out if drug is effective /find out if drug works on ill people (not just if drug works)*

**1**

(d)     (i)     (tablet / drug / injection) that does not contain drug

*allow control / fake / false*

*allow tablet / injection that does not affect body*

*do* ***not*** *accept drug that does not affect body*

**1**

(ii)     neither patients nor doctors

**1**

**[6]**

**Q13.**

(a)     any **two** from

•        live inside / infect body cells

•        difficult for drugs to enter (body) cells / drug would kill (body) cell

•        antibiotics ineffective against viruses

•        viruses mutate **frequently**

**2**

(b)     (i)      420

*correct answer with* ***or*** *without working*

*if answer incorrect evidence of ‘number of deaths’ × 7* ***or*** *60 seen gains* ***1*** *mark*

*ignore 6 000 000*

**2**

(ii)     any **three** from:

•        virus / flu mutates

•        people no longer / not immune

*ignore resistance*

•        white blood cells / memory cells / immune system do not
recognise virus

•        relevant reference to antibodies / antigens

•        current vaccine ineffective **or** no vaccine available then
**or** takes time to develop new vaccine

*allow no tamiflu / anti-viral drugs*

•        conditions less hygienic / lack of hygiene

•        people in poor health (following world wars)

*allow people had ‘weak’ immune system*

**3**

**[7]**

**Q14.**

(a)     antibodies;

*if incorrect term used then penalise in (a) then regard as continuous error for rest of question*

**1**

(b)     antibodies remain (for several years)
**or** are not removed

*accept last a long time* ***or*** *not destroyed****or*** *continues to make antibodies****or*** *causes increased number of
antibodies* ***or*** *more antibodies****or*** *stays in body* ***or*** *person has
made own antibodies****o****r if memory cells named must
link to antibody production*

**1**

(c)     antibodies removed (from blood);

*accept destroyed* ***or****unable to make* ***or****replace antibodies* ***or****they are not human antibodies* ***or****person has not made own antibodies*

**1**

(d)     so more antibodies made;

*accept so enough antibodies made****or*** *so correct amount of antibodies
present* ***or*** *to keep antibodies high****or*** *so body keeps making
antibodies*

**1**

(e)     any **two** from

          already has tetanus bacteria in body;

*accept could boost infection* ***or*** *make it worse*

          would take too long **or**a long time for antibodies to be made;

*accept too slow forming antibodies****or*** *cannot form correct amount of
antibodies*

          disease would have effect before
antibodies made;

*accept antibodies are specific****or*** *will work for one disease but not another*

**2 max**

(f)      injection of ready made antibodies;

*accept does not have to wait for antibody formation* ***or*** *has large amount of antibodies quickly****or*** *has enough antibodies quickly****or*** *antibodies start working straight away*

**1**

**[7]**

**Q15.**

(a)     any **three** from:

•        vaccine is inactive / dead form of (pathogen)

*allow antigens*

•        stimulates antibody production

•        stimulates antitoxin production

•        by white cells

•        antibodies kill (pathogen)

•        antitoxins neutralise poisons

•        antibodies quickly produced on reinfection

*ignore antibodies remain in blood*

•        reference to ingestion by white cells

**3**

(b)     (i)      (no)

         any **two** from

•        sample size small / only 12

•        conclusion based on hearsay from parents

•        only 8 parents linked autism to MMR

•        no control used

**2**

(ii)     (yes)
being paid by parents / lawyers

**1**

**[6]**

**Q16.**

Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information in the Marking Guidance and apply a ‘best-fit’ approach to the marking.

**0 marks**No relevant content.

**Level 1 (1−2 marks)**The apparatus needed to measure the leaf is identified
**or**the apparatus needed to measure light intensity is identified
**or**an appropriate use of the tape measure is identified.

**Level 2 (3−4 marks)**There is a description of a leaf being measured at different locations
**or**light being measured at different locations.

**Level 3 (5−6 marks)**There is a description of a leaf **and** light being measured at different locations
**and**repetitions are included
**or**a control variable is described
**or**appropriate mathematical treatment of the data is described.

**Examples of points made in the response:**

•        use of tape measure to produce transect

•        transect placed coming out of shady area (e.g. woodland) into lighter area

•        repeat transects

•        samples at same height above ground

•        samples at same aspect (N / E / S / W) on trees

•        measurement of length, or width, of leaves using ruler

•        measure several leaves at each location

•        use of light meter to measure light intensity

•        repeat measurements of light intensity on several days

•        measure light intensities at same time of day

•        calculate mean for each location

•        plot graph of mean leaf length, or width, vs. light intensity.

*allow attempt to overcome other variables − eg soil water / soil pH / temperature*

**[6]**

**Q17.**

(a)  there is an uneven distribution of dandelions

**or**

(more) representative / valid

**or**

avoid bias

**or**

more accurate / precise mean

*ignore accurate / precise unqualified*

*ignore repeatability / reproducibility / reliability / fair test*

**1**

(b)  (correct mean per m2 =) 6 or 6.0

**1**

(correct field area =) 55 000 (m2)

**1**

mean × area − e.g. 6(.0) × 55 000

*allow incorrect calculated values for mean and / or field area*

**1**

330 000

*allow correct calculation from previous calculation*

**1**

3.3 × 105

*allow calculated value in standard form*

**1**

*an answer of 3.3 × 105 scores* ***5*** *marks*

*an answer of 330 000 scores* ***4*** *marks*

(c)  **Level 3:** The method would lead to the production of a valid outcome. All key steps are identified and logically sequenced.

**5−6**

**Level 2:** The method would not necessarily lead to a valid outcome. Most steps are identified, but the method is not fully logically sequenced.

**3−4**

**Level 1:** The method would not lead to a valid outcome. Some relevant steps are identified, but links are not made clear.

**1−2**

**No relevant content**

**0**

**Indicative content**

•   placing of quadrat

•   large number of quadrats used

•   how randomness achieved − e.g. table of random numbers **or** random number button on calculator **or** along transect

•   quadrats placed at coordinates **or** regular intervals along transect

•   in each of two areas of different light intensities **or** transect running through areas of different light intensity

•   for each quadrat count number of dandelions

•   for each quadrat measure light intensity

•   compare data from different light intensity

to access **level 3** the key ideas of using a large number of quadrats randomly, or along a transect, and counting the number of dandelions in areas of differing light intensity need to be given to produce a valid outcome

(d)  any **two** from:

•   temperature

*allow heat*

•   water

*allow moisture / rain*

•   (soil) pH

*allow acidity*

•   minerals / ions

*allow e.g. magnesium ions* ***or*** *nitrate*

*allow salts / nutrients*

•   winds

•   herbivores

*allow trampling*

*ignore carbon dioxide*

*ignore space*

*ignore competition unqualified*

*do* ***not*** *accept oxygen*

**2**

**[14]**

**Q18.**

(a)     (i)      any **two** from:

•        not all eaten

*allow eaten by other animals*

•        used for respiration

*ignore used / lost in heat / movement*

•        lost as CO2 / water / urea

•        lost as faeces **or** not all digested

*if neither mark awarded allow 1 mark for lost as waste*

*ignore references to energy losses*

*do not allow for growth / repair / reproduction*

**2**

(ii)     any **one** from:

•        thrushes eat other things

•        thrush numbers likely to vary (considerably)

*allow it is only an estimate (of population size)* ***or*** *only counted thrushes for 5 hours*

•        thrushes were not present all the time

•        thrushes feed on a much bigger area

**1**

(b)     (i)      any **one** from:

•        there are two dependent variables

•        there is no independent variable

•        to show the association / correlation / pattern (between the two variables)

**1**

(ii)     (snails in woodlands)

more have dark(er) colour(ed shells) **or** fewer have light-coloured shells

*allow converse for grassland, if clear*

**1**

(shells have) no / fewer stripes or have no stripes

*allow converse for grassland, if clear*

**1**

(iii)     less likely to be seen (by predators / birds / thrushes)

*allow camouflaged (from predators / birds / thrushes)*

*allow light coloured shells with stripes would be more visible (to predators / birds / thrushes in woodland (than grassland)).*

**1**

**[7]**

**Q19.**

Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should apply a ‘best-fit’ approach to the marking.

**0 marks**

No relevant content.

**Level 1 (1 – 2 marks)**

At least **one** way in which animals **and / or** plants are adapted to survive.

**Level 2 (3 – 4 marks)**

A description of ways in which animals **and / or** plants are adapted **and** an attempt to link at least **one** adaptation to how it increases the chance of survival.

**Level 3 (5 – 6 marks)**

A description of ways in which animals **and** plants are adapted **and** a description of how at least **one** adaptation increases the chance of survival.

**examples of biology points made in the response:**

**(animals)**

(A) change / decrease in surface area / example

(decrease in surface area which) reduces area from which sweat / water may be lost

(A) hump with fat / fat stores

(fat in hump) to convert to water (via respiration)

(A) long eyelashes

(long eyelashes) to keep (wind-blown) dust out of eyes

(A) nocturnal / ‘keep out of the sun’

reduce sweat loss (in heat of the day)

***extra information***

*allow adaptations of specific animals to living in specified dry conditions, eg a desert*

 *(A) change / increase in surface area / example*

*(increase in surface area which) increases area heat may be lost from (by radiation)*

 *(A) changes to thickness of insulating coat*

*(thicker coat on upper surface) increases insulation from sun’s heat*

 *(A) thin (layer) / reduced amount of body fat*

*(reduced amount of body fat which) reduces insulating layer*

 *(A) wide feet*

*(wide feet) to reduce pressure / spread weight / prevent sinking*

**(plants)**

(A) decrease in surface area

(A) leaves are spikes

(reduced area / leaves are spikes) reduces water loss / transpiration / evaporation

(A) long / wide spread / extensive roots

(long / wide spread /extensive roots) to absorb (more) water

(A) fleshy / thick stem

(fleshy / thick stem) to store water

***extra information***

*allow adaptations of specific plants to living in specified dry conditions, eg a desert*

 *(A) thick wax*

*(thick wax) to reduce evaporation / water loss / transpiration*

 *(A) few(er) stomata*

*(few stomata) to reduce evaporation / water loss / transpiration*

**[6]**