EDEXCEL GCSE BIOLOGY (360SCIENCE)

BIOLOGY



EXAM QUESTION PACK

UNIT B3 5029 PAPERS

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Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						5	0	2	9	/	0	1	Signature	

Paper Reference(s)

5029/01

Edexcel GCSE

Biology

B3 – Topics 1 and 2

Thursday 19 May 2011 – Afternoon

Time: 1 hour

Examiner's use only

Team Leader's use only

Question Number	Leave Blank
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
Total	

Materials required for examination
Nil

Items included with question papers
Nil

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initial(s) and signature.
Check that you have the correct question paper.
Answer ALL the questions. Write your answers in the spaces provided in this question paper.
Do not use pencil. Use blue or black ink.
Show all stages in any calculations and state the units. Calculators may be used.
Include diagrams in your answers where these are helpful.

Information for Candidates

The marks for individual questions and the parts of questions are shown in round brackets: e.g. **(2)**.
There are 14 questions in this question paper. The total mark for this paper is 60.
There are 20 pages in this question paper. Any blank pages are indicated.

Advice to Candidates

You are reminded of the importance of clear English and careful presentation in your answers.

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1. The photographs show a bear and a moose.



bear



moose

(a) Suggest **two** features shown in the photograph which show that the bear is a carnivore.

1 .....

2 .....

(2)

(b) Moose are herbivores.
Suggest **two** ways the moose may be adapted to avoid being eaten by predators.

1 .....

2 .....

(2)

Q1

(Total 4 marks)

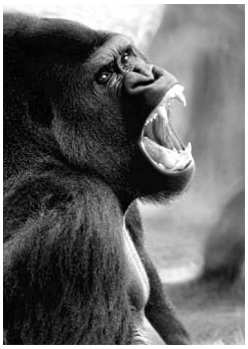
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2.









Use the words in the box to complete the sentences.

colour		hand gestures
sound	body posture	pheromones
facial expression		language

The moth attracts a mate from a long distance using ..... .

The human seen in the picture is using ..... and

..... to communicate anger.

The gorilla can be seen in the picture to be using ..... to communicate with other gorillas.

The cat is using ..... to make itself look bigger to scare off a predator.

Q2

(Total 4 marks)

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3. People with a body mass index (BMI) of over 30 are said to be obese.



Gustoimages / Science Photo Library

Suggest **two** possible health risks of being obese.

1 .....

2 .....

Q3

(Total 2 marks)

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4. Draw one straight line from each drug to the plant from which it can be extracted.

drug	**plant from which it can be extracted**
artemisinin	Pacific Yew tree
taxol	*Cinchona* tree
quinine	Chinese plant *Artemisia annua*
aspirin	bark of the willow tree
	seaweed

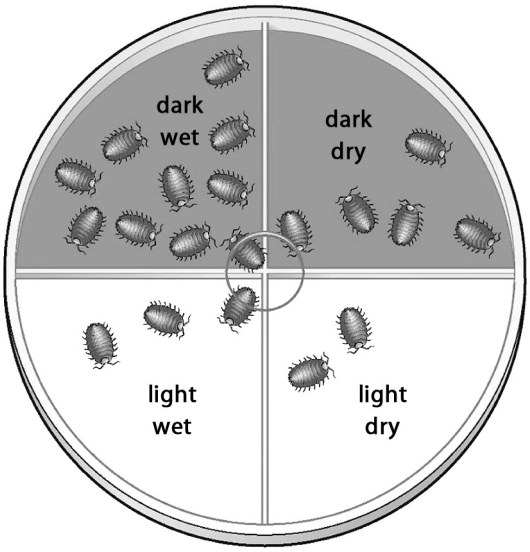
Q4

(Total 4 marks)

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5. Choice chambers can be used to study the behaviour of woodlice.



(a) Twenty woodlice were put into the choice chamber through the hole in the top. They were then left for several minutes.

Describe the behaviour shown by these woodlice.

.....

.....

.....

.....

(2)

(b) Name **two** stimuli that the woodlice are responding to.

1 .....

2 .....

(2)

(c) Name the type of behaviour shown by the woodlice in this investigation.

.....

(1)

Q5

(Total 5 marks)

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6. Some margarine-type spreads may have health benefits.



(a) They contain an ingredient that is said to reduce the absorption of cholesterol.

(i) Name this ingredient.

.....

(1)

(ii) Explain how reducing the absorption of cholesterol has health benefits.

.....

.....

.....

.....

(2)

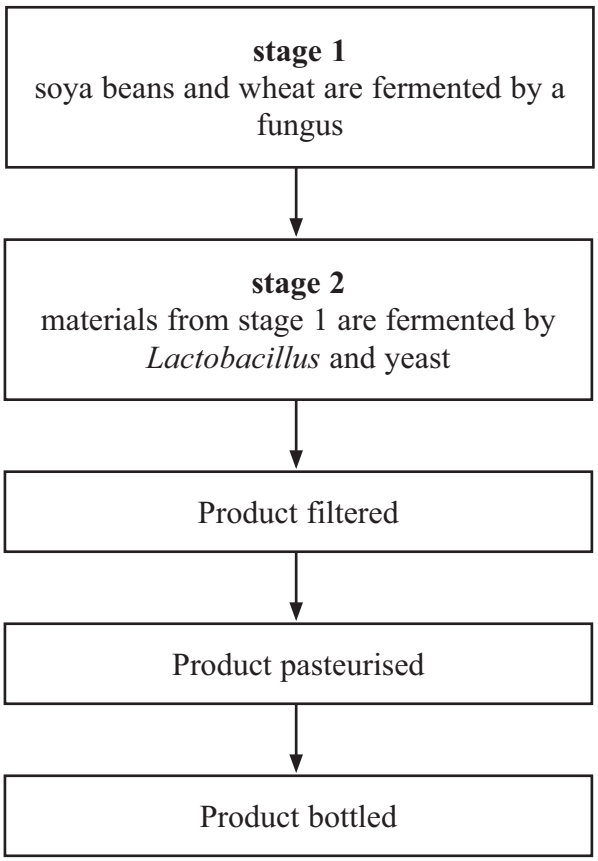
Q6

(Total 3 marks)

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7. The diagram shows the two fermentation stages in the production of soy sauce.



(a) Name the fungus (mould) used in stage 1.

.....

(1)

(b) What type of microorganism is *Lactobacillus*?

.....

(1)

(c) What effect will *Lactobacillus* have on the fungus used in stage 1?

.....

.....

(1)

(d) State why soy sauce is pasteurised.

.....

.....

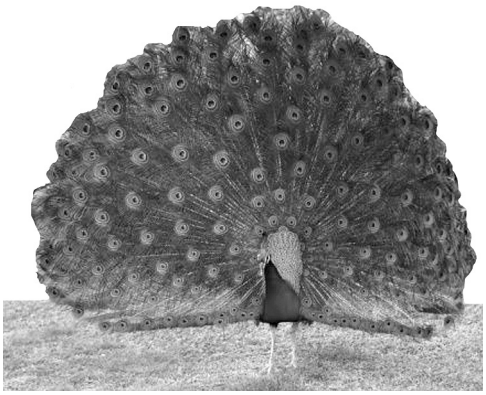
(1) **Q7**

(Total 4 marks)

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8. The photograph shows a peacock displaying his tail feathers.



(a) Suggest one reason why the peacock is displaying his tail feathers.

.....

(1)

(b) Suggest how this type of behaviour increases the chances of survival of a species.

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.....

(3)

Q8

(Total 4 marks)

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9. Wolves are wild dogs that hunt in packs.



(a) State **two** ways that hunting in packs helps wolves to survive.

1 .....

.....

2 .....

.....

(2)

(b) It is thought that, about twenty thousand years ago, the first domesticated animals were dogs.

Suggest **two** ways that dogs helped humans to survive.

1 .....

.....

2 .....

.....

(2)

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(c) The table shows the percentage of animals eaten by humans in one area of Europe from 11000 to 5000 years ago.

time from present day (years ago)	domesticated cattle and pigs (%)	domesticated sheep and goats (%)	wild cattle and pigs (%)	wild deer (%)
11 000	27	0	45	28
9 000	37	26	22	15
7 000	31	28	10	31
5 000	56	36	3	5

(i) Describe the overall trend for domesticated animals shown in the table.

.....

.....

(1)

(ii) Suggest why the percentage of deer eaten increased between 9000 and 7000 years ago.

.....

.....

(1)

Q9

(Total 6 marks)

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10. The first stage in making yoghurt is adding a starter culture of microorganisms to milk.

(a) Name the microorganisms that are used in the starter culture.

.....

(1)

(b) Describe how these microorganisms change the milk into yoghurt.

.....

.....

.....

.....

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.....

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(3)

(c) Explain why prebiotics are added to some yoghurts.

.....

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.....

.....

(2)

Q10

(Total 6 marks)

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11. Complete the table by stating what each term means.
Give one example of each.

	term	what it means	example
(a)	conditioned behaviour		
(b)	habituation		
(c)	anthropomorphism		

Q11

(Total 6 marks)

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12. Loggerhead and green turtles are marine turtles. They are hunted by tiger sharks.



loggerhead turtle
Porterfield Chickering / Science Photo Library



green turtles
Georgette Douwma / Science Photo Library

Tiger sharks hunt turtles by swimming very fast (30 km/hr), attacking from below and biting through their shells.

The table shows some facts about loggerhead and green turtles.

species	colour	time spent at surface breathing (s)	relative shell strength	speed (km/hr)	ability to withdraw into shell
loggerhead turtles	brown on top, white underneath	56	stronger	20	no
green turtles	brown and green on top, white underneath	2	weaker	22	no

(a) Use the information in the table to suggest the most likely reason why tiger sharks attack ten times as many loggerhead turtles compared to green turtles.

.....

.....

(1)

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(b) Green turtles lay eggs in the sand on beaches.
The young turtles hatch out, walk to the sea and then swim away to return years later to lay their own eggs.

The table shows some details of the reproductive strategies of four species.

species	number of eggs produced per mating	time spent with young after hatching (days)
green turtles (reptile)	100 – 120	none
crocodiles (reptile)	30 – 60	3
great tit (bird)	10 – 12	26
robin (bird)	5 – 6	35

Explain how the time spent with the young after hatching affects the different number of eggs laid.

.....

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.....

(2) **Q12**

(Total 3 marks)

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13.



(a) (i) Name the type of behaviour being shown in the picture.

.....

(1)

(ii) Explain how this type of behaviour can help the duckling survive.

.....

.....

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(3) **Q13**

(Total 4 marks)

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14. *Agrobacterium tumefaciens* and *Bacillus thuringiensis* are both used to increase crop yields in different ways.
Describe how each of these bacteria are used to modify plants to increase crop yield.

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Q14

(Total 5 marks)

TOTAL FOR PAPER: 60 MARKS

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Mark Scheme (Results)

June 2011

360Science

GCSE Biology
Structured Paper B3 (5029/01)

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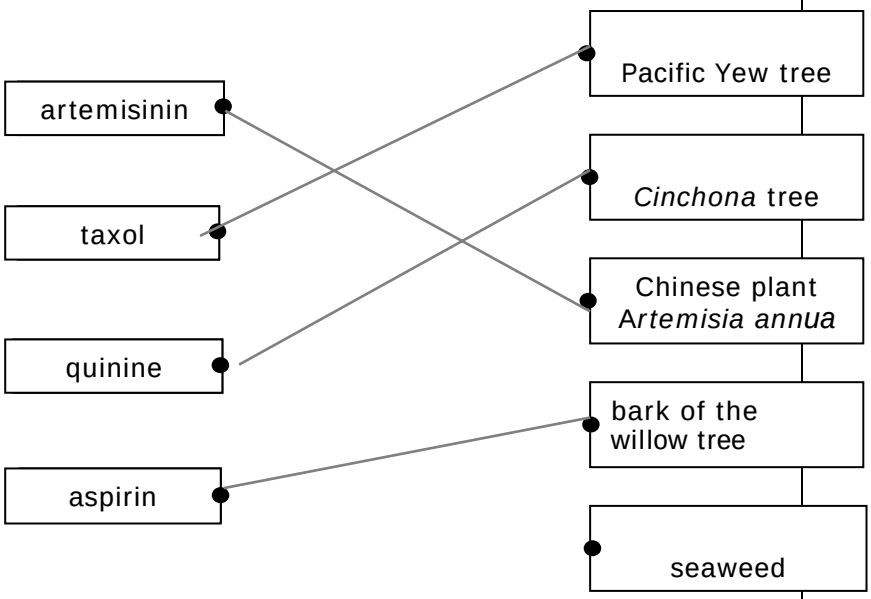
5029 Mark Scheme
June 2011

Question Number	Answer	Additional guidance	Mark
1(a)	Any **two** from: 1. pointed/sharp (canine) teeth ; 2. eyes on front of head /binocular vision; 3. strong jaws ;	 Ignore: Large powerful/ muscular ignore large	 **(2)**

Question Number	Answer	Additional guidance	Mark
1(b)	Any **two** from: 1. eyes on side of head / wide field of view / peripheral vision; 2. camouflaged ; 3. run fast / have long / strong legs (for running) 4. good sense of {hearing / smell} ; 5. antlers (for defence) ; 6. tough / thick skin ; 7. live in herds;	 stamina Horns Ignore: tusks tough hide	 **(2)**

Question Number	Answer	Additional guidance	Mark
2	1. pheromones ; 2. hand gestures (and) facial expressions ; 3. facial expression ; 4. body posture;	colour/sound accept reverse order body posture body posture	**(4)**

Question Number	Answer	Additional guidance	Mark
3	Any **two** from: 1. heart disease; 2. shorter life expectancy / earlier death ; 3. breathing problems; 4. circulation problems/ stroke/ high blood pressure; 5. fertility problems ; 6. diabetes ; 7. arthritis; 8. cancer;	 heart attack / failure Ignore: heart problems out of breath (easily)/not able to exercise for long, accept: varicose veins/clog up arteries Joint problems If a cancer is named then must be one of the following: colon, breast, uterine, kidney, oesophagus gallbladder, ovaries, and pancreas	**(2)**

Question Number	Answer	Mark
4	**drug** **plant from which it can be extracted**  **Note:** 1 mark for each correct line; reject if two lines from same drug box	**(4)**

Question Number	Answer	Additional guidance	Mark
5(a)	1. more in the dark/move into the dark/ stay in the dark / ORA ; 2. more in the wet (area)/move into the wet (area)/ stay in the wet (area)/ORA;	Accept: prefer / liked for move into Accept: prefer / liked for move into	**(2)**

Question Number	Answer	Additional guidance	Mark
5(b)	1. water; 2. light;	humidity Ignore all references to wet/wetness/ dryness /dampness Ignore all references to dark/darkness tactile / forming groups	**(2)**

Question Number	Answer	Additional guidance	Mark
5(c)	instinctive / innate / inherited (behaviour) ;	(negative) photokinesis / phototaxis (positive) hydrokinesis / hydrotaxis	**(1)**

Question Number	Answer	Additional guidance	Mark
6(a)(i)	plant stanol ester ;	plant ester sterol sterol ester stanol stanol ester	**(1)**

Question Number	Answer	Additional guidance	Mark
6(a)(ii)	Any **two** from: 1. (less cholesterol) less (risk of) blocked arteries ; 2. reduces risk of heart disease / heart attack ; 3. reduces blood pressure ; 4. reduces risk of blood clots / (deep vein) thrombosis / strokes; 5. reduces risk of /size of gallstones	blood flows more easily / less arteriosclerosis / less atheromas Ignore references to fat	**(2)**

Question Number	Answer	Additional guidance	Mark
7(a)	*Aspergillus* ;	Accept: koji	**(1)**

Question Number	Answer	Additional guidance	Mark
7(b)	bacteria ;		**(1)**

Question Number	Answer	Additional guidance	Mark
7(c)	stops it secreting enzymes / reduces /stops its action;	Ignore kills it / breaks it down / digests it	**(1)**

Question Number	Answer	Additional guidance	Mark
7(d)	to stop any further fermentation / destroys / kills microorganisms / kills bacteria / kills fungus /extends shelf life of (product) ;	Ignore sterilise Ignore germs **Reject** remove / get rid of (bacteria)	**(1)**

Question Number	Answer	Additional guidance	Mark
8(a)	attracting a female / mate / courtship;	scaring away /feels threatened	**(1)**

Question Number	Answer	Additional guidance	Mark
8(b)	Any **three** from: 1. (female) selects the fittest / healthiest /best genes / attractive features (of male) e.g. big tail ; 2. increases the chances of mating /reproduction; 3. young inherit 'best / good' genes ; 4. young have good characteristics / named characteristic 5. idea of survival of the fittest (referred to individual / or species) ; 6. appears larger ; 7. predator / male competitors scared away ; 8. young protected / peacock less likely to be eaten ;		**(3)**

Question Number	Answer	Additional guidance	Mark
9(a)	Any **two** from: 1. more chance of finding prey / make a kill /getting food; 2. attack larger animals ; 3. can surround prey ; 4. can share task of hunting/some rest while others continue chase / less energy used by any one wolf; 5. one can distract prey (while others attack) / chasing away scavengers;	Ignore just 'protection'! Accept: can spot larger predators and warn pack of danger (while hunting) ;	**(2)**

Question Number	Answer	Additional guidance	Mark
9(b)	Any **two** from: ideas/descriptions of 1. hunting / detecting prey / retrieving prey; 2. guarding / warning / protection 3. herding e.g. sheep ; 4. eaten for food / skins used for clothes; 5. pulling loads	companionship (company)	**(2)**

Question Number	Answer	Additional guidance	Mark
9(c)(i)	(% of domesticated animals) increase /credit manipulated figures ;	**Reject** if manipulated figures are wrong	**(1)**

Question Number	Answer	Additional guidance	Mark
9(c)(ii)	Less cattle and pigs /number of deer increased / habitat changed which suited wild deer rather than pigs / food preference for venison / better hunting weapons /techniques	Ignore vague answers referring to shortage of food, Ignore just quoted figures.	**(1)**

Question Number	Answer	Additional guidance	Mark
10(a)	bacteria / *Lactobacillus (bulgaricus /acidophilus /sp)/* *Streptococcus (thermophilus/lactis/cremoris/sp);*	Credit other correctly named species **Reject** virus/fungi/yeast/mould	**(1)**

Question Number	Answer	Additional guidance	Mark
10(b)	Any **three** from: 1. bacteria multiply ; 2. produce lactic acid ; 3. lowers pH/ makes more acidic; 4. milk thickens / coagulates / clots / solidifies/ sets ; 5. *Streptococcus* and *lactobacillus* work together ; 6. both produce other chemicals /acetaldehydes that give yoghurt its distinctive flavour/ taste ;	*Streptococcus sp* grows first / stimulate *lactobacillus* / *lactobacillus* grows (second); Accept: casein / proteins Ignore: curds	**(3)**

Question Number	Answer	Additional guidance	Mark
10(c)	Any two from: 1. contain oligosaccharides ; 2. we can't digest oligosaccharides ; 3. (the oligosaccharides) can be used by (beneficial) bacteria (to multiply) ; 4. (that) outcompete the harmful bacteria ;	ignore refs to probiotics	**(2)**

Question Number	Answer			Mark
11				
	term	**what it means**	**example**	
(a)	conditioned behaviour	a behaviour shown more often due to **repeated** stimulus OR to train an animal to display a specific behaviour (more often) by rewards/punishments	Pavlov's dogs / dog training / parrots talking /eq	
(b)	habituation	getting used to/learning not to react to, **non harmful** stimuli	birds becoming used to traffic noises /eq	
(c)	anthropomorphism	attributing human qualities/characteristics to non human objects / animals	cartoons of dogs talking / cartoons of dogs dressed in clothes/ saying "my cat loves me" ignore e.g. just dressing dogs in clothes	
	One mark for each correct box			**(6)**

Question Number	Answer	Additional guidance	Mark
12 (a)	(more likely to be attacked because they) spend more time at surface ;	Ignore refs to speed Accept figures if show comparison – e.g. loggerheads spend 54s more at surface / greens only spend 2s at surface	**(1)**

Question Number	Answer	Additional guidance	Mark
12 (b)	Any **two** from: 1. as time spent with young after hatching increases number of eggs laid decreases ; 2. (with fewer young) more parental care can be shown; 3. which increases the % of young that survive 4. (because) less likely to be lost to predators / more food can be supplied to each young;	Idea of: If too many young to look after the parents would not have enough time for all of them Ignore just 'protect'	**(2)**

Question Number	Answer	Additional guidance	Mark
13 (a)(i)	imprinting ; maternal /paternal/parental		**(1)**

Question Number	Answer	Additional guidance	Mark
13(a)(ii)	Any **three** from: 1. stays near parent ; 2. less likely to be preyed on ; 3. taken to a food supply ; 4. learn (species specific) behaviour from parent; 5. credit one example of MP4 e.g. how to fly / attract mate;	Ignore: given food copies parent's behaviour	**(3)**

Question Number	Answer	Additional guidance	Mark
14.	1. to make crops herbicide /pest resistant / drought resistant/eq ; ***Agrobacterium tumefaciens*:** Maximum of 3 marks 2. *Agrobacterium tumefaciens* is used as a vector / to transport genes into (crop) plant; 3. gene for desired characteristic / named characteristic e.g. herbicide resistance / gene for larger fruit identified / cut out; 4. gene put into plasmid/ *Agrobacterium (tumefaciens)* ; 5. which infects/put into plant ; 6. plant produces crown gall ; 7. (crown gall) is used /tissue culture used to grow new plants (with desired characteristic); ***Bacillus thuringiensis:*** Maximum of 3 marks 8. *Bacillus thuringiensis* produces toxin/pesticide/ is a source of the gene for producing toxins / pesticides ; 9. gene cut out of bacterium / *B.thuringiensis ;* ONLY CREDIT THIS POINT ONCE ref mp3 10. gene put into plasmid /vector that takes the wanted gene into plant cells ; ONLY CREDIT THIS POINT ONCE ref mp4 11. gene (for toxins) incorporated into DNA/genome/eq of crop plant /plant produces pesticide so less eaten/insects killed;	Accept 'tumour' for crown gall	**(5)**

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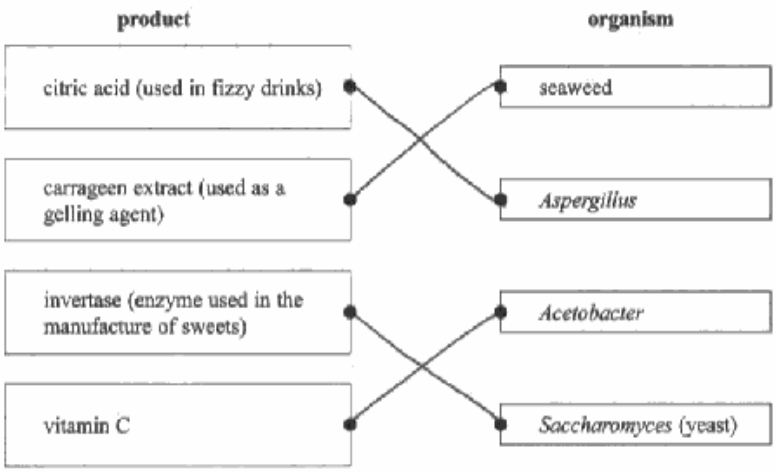
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Biology 5029/01
B3 Mark Scheme

Question Number	Answer	Mark
1(a)	**Two from:** arched back / eye staring / eyes wide open / tail down / tucked in / tail curled / close to body / ears forward / ears up / making itself look big / hair standing on end / bristling fur;; ignore: changed body language / changed facial expression	**(2)**

Question Number	Answer	Mark
1(b)	aggression / anger / feeling threatened / fear / stay away / go away;	**(1)**

Question Number	Answer	Mark
1(c)	**Any two:** 1. body language / examples of body language; 2. facial expression / examples of facial expression; 3. sign language / mime / hand signals; 4. drawing / art / music / dance; 5. morse code / semaphore ; 6. pheromones / perfumes / do not accept just smell; 7. video / movies; ignore: personality moods / texting / emails	**(2)**

Question Number	Answer	Mark
2	2. Draw **one** straight line from each product to the organism used in its production.  3 or 4 correct = 3 marks 2 correct = 2 marks 1 correct = 1 mark if two or more lines come from one product award no mark for that product	**(3)**

Question Number	Answer	Mark
3	1. thinking ; 2. instinctive ; 3. conditioning ; 4. learned ;	**(4)**

Question Number	Answer	Mark
4(a)(i)	proteins / carbohydrates or named examples e.g. sucrose /starch / maltose; ignore: lactose, glucose, sugar	**(1)**

Question Number	Answer	Mark
4(a)(ii)	1. amino acid / (poly)peptides; 2. sugar, glucose; ignore: lactose, sucrose, proteins	**(2)**

Question Number	Answer	Mark
4(b)	stops its action/ stops it secreting enzymes; ignore: kills it / breaks it down / digests it	**(1)**

Question Number	Answer	Mark
4(c)	to stop any further fermentation / destroys / kills microorganisms / kills bacteria / extends shelf life; ignore: germs /sterilise reject: remove / get rid of (bacteria)	**(1)**

Question Number	Answer	Mark
5(a)	40 ;	**(1)**

Question Number	Answer	Mark
5(b)(i)	number of visits increased (from 11/12 to 54/55/56);	**(1)**

Question Number	Answer	Mark
5(b)(ii)	more food needed by young ;	**(1)**

Question Number	Answer	Mark
5(c)	Repeat test / compare to other people's results / take readings more often ;	**(1)**

Question Number	Answer	Mark
5(d)	less risk of disturbing the birds / reduces unnatural behaviour/ get to inaccessible areas / ability to record / store results / continuous / accurate record;	**(1)**

Question Number	Answer	Mark
6(a)	more predictable results / acceptable to vegetarians / animals not hurt / large scale production; ignore: safer / more hygienic / faster	**(1)**

Question Number	Answer	Mark
6(b)	the milk sets / forms (solid) curds / clots / lumps / coagulates / separates solid from liquids; ignore: thickens / speeds up fermentation / speeds up cheese making	**(1)**

Question Number	Answer	Mark
6(c)	the chymosin is not GM / the cheese does not contain the GM organism / yeast; ignore: references to not harming animals	**(1)**

Question Number	Answer	Mark
7(a)	**two from:** 1. separate the X & Y sperms / use X **or** Y sperm; ignore: use X **and** Y sperm / IVF 2. separate male and female embryos / embryo screening ; 3. use ultrasound then terminate / retain; 4. cloning;	**(2)**

Question Number	Answer	Mark
7(b)	**Advantage (one of)** faulty genes can be eliminated / reduce risk of sex linked genetic disorders / named sex linked genetic disorder / fewer terminations / fewer girl killing in named country / family issues e.g. balance of previous children ; ignore social comments e.g. picking coloured clothes in advance **Disadvantage (one of)** may skew gender balance / risk of designer babies / reduce gene pool / more terminations; ignore: unnatural / religious references	**(2)**

Question Number	Answer	Mark
8(a)	to find areas of new food / used up food /overgrazed where they are; ignore: escape predators / find shelter	**(1)**

Question Number	Answer	Mark
8(b)	**three from:** 1. herbivores / wildebeest eat plants / grass ; 2. plant material / herbivore food low in proteins / amino acids / nutrients / energy ; 3. plant material / cellulose harder to digest (than meat) ; 4. lions are carnivores/predators /eat meat ; 5. so food rich in protein / amino acids / energy / nutrients ;	**(3)**

Question Number	Answer	Mark
8(c)(i)	good eyesight / eyes at front of head / binocular vision / judge distance well / good night vision / large claws / sharp claws / good sprinters / powerful front limbs / powerful enough to overcome prey / hunt in groups / pointed teeth / large canines / powerful jaws /camouflage / ability to creep forward low / stay upwind when hunting; ignore: sharp / long / large teeth /run fast / see in the dark	**(1)**

Question Number	Answer	Mark
8(c)(ii)	good sense of smell / eyes on side of head / all round vision / horns /quick to run away / good long distance runner / fast runner / idea of herd acts as many eyes / form protective circle;	**(1)**

Question Number	Answer	Mark
9(a)	omega 3 / stanol (esters)/statins; ignore benecol as trade name	**(1)**

Question Number	Answer	Mark
9(b)	**two of:** 1. reduces (cholesterol / fat) deposits in arteries / no (further) build up of deposits; ignore veins 2. reduces atheromas / arteriosclerosis / atherosclerosis; 3. improve blood flow / circulation; 4. heart has to work less hard / less chance of heart strain / attack / failure / disease / stroke; ignore heart problems / diabetes 5. Lowers high blood pressure;	**(2)**

Question Number	Answer	Mark
9(c)	(trial on) lots of people (if numbers quoted must be at least 10)/ over long period of time (if length of time must be 3 months minimum) / test on both males and females / test various ages / range of people / use placebo / double blind test / use control group / test (cholesterol) before and after;	**(1)**

Question Number	Answer	Mark
10(a)	Fit/healthy / parasite free / parasite load low / parasite resistant / has good genes / improve gene pool / improve offspring fitness/strength / more chance of chicks surviving; Ignore: attractive /more chicks (as ORA of stem)	**(1)**

Question Number	Answer	Mark
10(b)	wouldn't be able to fly /so hard to fly that predators will catch them (easily)/ can't catch food effectively / some long tailed swallows will mate with short tail swallows / there is a maximum length for tail length because the mutation for even longer tail length has not yet occurred; ignore: males will die / harder to fly	**(1)**

Question Number	Answer	Mark
10(c)(i)	more attractive to females /attract more females /more likely to breed with fit females;	**(1)**

Question Number	Answer	Mark
10(c)(ii)	Not enough food supplied to the chicks qualified / males not fit enough to catch/supply enough food for large numbers of chicks;	**(1)**

Question Number	Answer	Mark
11(a)	**One from:** idea of: 1. some people have different alleles / versions of genes (that produce a chemical) resulting in a reaction with penicillin ; reject: genes react with penicillin / ORA ignore: people have different genes 2. some people produce different chemicals some of which may react with penicillin;	**(1)**

Question Number	Answer	Mark
11(b)	**three from:** 1. reduced allergic responses / less side effects; 2. named examples of allergic responses / side effects e.g. less damage to healthy tissues; 3. better targeting particular diseases/variants of disease / symptoms; 4. drug dosages / type of drug can be specific to patient; ignore: 'safer' as in question ignore: 'personalised medicine'	**(3)**

Question Number	Answer	Mark
11(c)	**two from:** 1. technology not perfected yet / not widely available (to all doctors) yet; 2. too expensive (for most); 3. trials to see (long term) side effects; 4. trials to see effectiveness required; 5. all genomes not yet available / may be regarded as private / withheld;	**(2)**

Question Number	Answer	Mark
12(a)	(a crop) that has had genes added / taken away ; ignore: genes altered	**(1)**

Question Number	Answer	Mark
12(b)	four from (NB at least one advantage and one concern) Advantages: 1. increased resistance to insects / pests ; 2. disease resistance ; 3. improved resistance to environmental stress / drought / extreme environments / salinity ; 4. herbicide / pesticide tolerance / resistance; reject immunity 5. reduced pesticide / fertiliser requirements – e.g. ability to fix nitrogen ; 6. improved nutritional value ; 7. biopharmaceuticals can be developed ; 8. increased yield; 9. increased shelf life; Concerns: 10. effects on human health not fully understood ; 11. reduced biodiversity / gene pool / long term effects on food chains ; 12. gene transfer to other species; 13. qualified 'not natural' arguments ; 14. corporate control arguments / countries become dependent on GM companies; 15. increased cost to farmers / consumers / countries;	**(4)**

Question Number	Answer	Mark
13(a)	1. nomadic / move from place to place / OWTTE ; 2. collect /gather / find / hunt for food;	**(2)**

Question Number	Answer	Mark
13(b)	**two of:** bushmen have: 1. better communication / use (sophisticated) language; 2. keep tools / **better** technology / better tools /specific examples e.g. weapons, traps, bows, clothes, shelters; ignore – using / making tools 3. fire / cook; 4. meet other groups for larger (social) gatherings / OWTTE; 5. travel larger distances; ignore – more intelligent / more evolved /easier to catch food	**(2)**

Question Number	Answer	Mark
13(c)	**two from:** 1. hunter-gather until 10 500 years ago / farmer after 10 500 years ago; accept any date from 11 000 to 10 500 BP 2. By/After 10 500 years ago (evidence suggests) they had domesticated sheep/goats / before 10 500 there are not many sheep and goat bones; accept any date from 11 000 to 10 500 BP 3. Farming allowed settling/houses/towns to develop;	**(2)**