



BTEC
June 2018

**Level 3 National in Animal
Management : Animal Biology
(31645H)**



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June 2018

Publications Code 31645H_1806_ER

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Grade Boundaries

What is a grade boundary?

A grade boundary is where we set the level of achievement required to obtain a certain grade for the externally assessed unit. We set grade boundaries for each grade, at Distinction, Merit and Pass.

Setting grade boundaries

When we set grade boundaries, we look at the performance of every learner who took the external assessment. When we can see the full picture of performance, our experts are then able to decide where best to place the grade boundaries – this means that they decide what the lowest possible mark is for a particular grade.

When our experts set the grade boundaries, they make sure that learners receive grades which reflect their ability. Given grade boundaries is conducted to ensure learners achieve the grade they deserve to achieve, irrespective of variation in the external assessment.

Variations in external assessments

Each external assessment we set asks different questions and may assess different parts of the unit content outlined in the specification. It would be unfair to learners if we set the same grade boundaries for each assessment, because then it would not take accessibility into account.

Grade boundaries for this, and all other papers, are on the website via this link:

<http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx>

Animal Biology: Unit 2 31645H

Grade	Unclassified	Level 3			D
		N	P	M	
Boundary Mark	0	11	23	39	55

Introduction

June 2018 was the third series of the new specification for Animal Management, when this mandatory unit has been assessed via an external assessment rather than via centre based internal assessment.

The question paper followed the format identified in the additional sample assessment materials published on the Pearson website.

The paper had eight questions. Each question was based on an area of the specification. Learners were required to demonstrate knowledge and understanding of a range of specification topics and to apply this knowledge to the specific question scenarios. The intention was to offer as broad coverage as possible for all areas of the unit content. Questions had varying weightings attached to them, with 1 to 3 marks for the lower demand questions and 4 to 8 marks for questions where an extended response was required.

The extended response, eight mark, questions were marked using a 'levels based' approach to assessment. The overall quality of the response was considered rather than the specific number of points gained.

There was also a focus on the use of suitable technical and vocational language and terminology within each response. The remainder of the questions on the paper were assessed using a range of indicative content and on the quality and clarity of the explanation provided.

Individual Questions

The following section considers each question on the paper, providing examples of popular learner responses and a brief commentary of why the responses gained the marks they did. This section should be considered with the live external assessment and corresponding mark scheme.

Question 1

Almost 50% of learners scored 4 marks for question 1a through being able to recall the four functions of the skeletal system as per the unit content A1.1. The mean mark for this question was 3.3

Q1(a)

Answer ALL questions. Write your answers in the spaces provided.

1 (a) State four functions of the skeletal system.

(4)

- 1 It allows locomotion
- 2 Blood production in bone marrow.
- 3 Protection of the organs
- 4 Mineral storage.

4 marks

The learner has stated four functions of the skeletal system

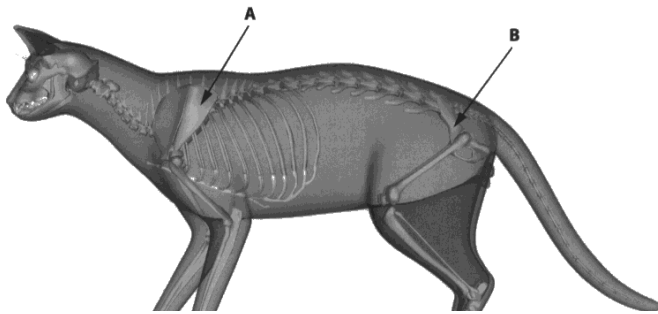
- 1 Ribcage protects organs as its a cage around them.
- 2 Strong jaw bones for ripping food.
- 3 ~~Foot~~ Bones in feet adapted to grip ground and prey as well as walking on ~~and~~.
- 4 Thoracic vertebrae to hold the body up and create good posture.

2 marks

This learner has been credited with one mark for 'ribcage protecting organs' and one mark for 'holding the body up and creating good posture' as per points 1 and 2 in the mark scheme

Q1(b)

This question was answered well with 50% of learners scoring 2 marks



(b) Give the name of bones **A** and **B** on the cat skeleton.

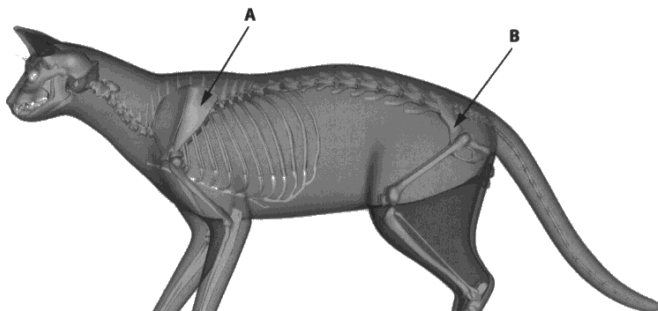
(2)

A scapula

B pelvis

2 marks

The learner has given the correct names for bones A and B



(b) Give the name of bones **A** and **B** on the cat skeleton.

(2)

A Shoulder

B femur

0 marks

This learner has given incorrect names for bones A and B.

'Shoulder blade' and 'hip bone' were credited with one mark for each as per the mark scheme, but no marks were awarded for 'shoulder' or 'hip'.

Q1(c)

The mean mark for this question was 1 mark out of 3 as a result of learners not being familiar with the term 'integumentary system' (as stated in the unit content A1.3)

(c) Give **three** functions of the integumentary system.

(3)

- 1 protects body from pathogens/bacteria
- 2 Encloses ~~holds~~ the body's contents
- 3 Retains heat within the body

3 marks

The learner has given three correct functions of the integumentary system

(c) Give **three** functions of the integumentary system.

(3)

- 1 ~~movement~~ locomotion
- 2 to absorb ~~impact~~ weight
- 3 to help muscles move

0 marks

This learner has been unable to identify what the integumentary system is and has therefore given three incorrect answers and gained no marks.

Question 2

Question 2 parts (a) (b) and (c) were all related to the eye and required a demonstration of understanding as well as memory recall

Q2(a)

The majority of learners scored 1 mark for this question mainly from identifying the function of either the cornea as protection or the iris controlling light entering the eye whereas the functions of the lens and retina were not known.

2 (a) Complete the table by giving the functions of each part of the eye.

(4)

PART	FUNCTION
Iris	controls the amount of light coming through pupil (dilation)
Lens	The lens focuses the light to allow send the photoreceptors in retinal to detect ^{be detected}
Retina	Photoreceptors found by the retina are then sent form information that is sent through the optic nerve to brain
Cornea	Cornea maintains the eyes circular shape. but most importantly protects lens and pupil.

4 marks

The learner has given correct functions of each part of the eye with 'photoreceptors sending information through the optic nerve' being accepted for a function of the retina

2 (a) Complete the table by giving the functions of each part of the eye.

(4)

PART	FUNCTION
Iris	Controls the amount of light that is let in
Lens	Protects the eye from foreign contaminants
Retina	Flips what the eye is seeing (allows the brain to understand the image)
Cornea	Dampens light coming into the eye

1 mark

This learner has been able to correctly recall a function of the iris only.

Q2(b)

The majority of learners scored 0 for this question through being unable to describe the role of the tapetum lucidum

(b) Describe the role of the tapetum lucidum.

(2)

The tapetum lucidum is a reflective layer located behind the retina that allows the animal increased vision in lower light.

2 marks

The learner has correctly described the role of the tapetum lucidum

(b) Describe the role of the tapetum lucidum.

(2)

Helps stop the eye from drying out and produces tears.

0 marks

Although the learner has attempted the question it is evident that they do not know the role of the tapetum lucidum and therefore scored 0 marks.

Q2(c)

This question scored similarly to the previous one as it was also about the tapetum lucidum with which the majority of learners were unfamiliar.

(c) Explain how the structure of the tapetum lucidum helps its function.

(3)

The tapetum lucidum is semi permeable which ^{can} absorb light and reflect it back sufficiently. It is also located at the back of the retina which is sufficient as the light has to be absorbed by the retina within the cone and rod cells.

3 marks

This learner was credited with 3 marks for identifying that the tapetum lucidum is at the back of the eye and it reflects light and allows absorption

(c) Explain how the structure of the tapetum lucidum helps its function.

(3)

The structure of tapetum lucidum helps its function beings as it allows animals to be seen in the dark as well as make a object more clearer to see.

0 marks

Although the learner has attempted the question they have not demonstrated an understanding of the structure / function of the tapetum lucidum and therefore scored 0 marks.

Question 3

Questions 3(a) 3(b) and 3(c) relate to section A5 in the unit content and the majority of learners were unable to demonstrate an accurate understanding of the hormones involved in oestrous, the male reproductive tract or the incubation period for an egg, consequently scoring 0 marks for these questions.

Q3(a)

3 (a) State the change in the level of each of the following hormones immediately after ovulation. (4)

(i) LH

LH levels drop

(ii) FSH

FSH levels lower gradually

(iii) Oestrogen

Oestrogen levels drop

(iv) Progesterone

Progesterone levels rise due to drop in LH

4 marks

The learner has correctly stated the change in level of each hormone to achieve 4 marks.

Levels of hormones change during the oestrous cycle.

3 (a) State the change in the level of each of the following hormones immediately after ovulation. (4)

(i) LH

~~levels drop~~
rises

(ii) FSH

lower

(iii) Oestrogen

levels rise

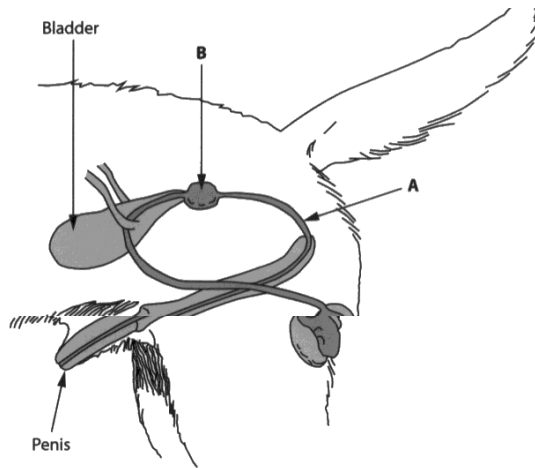
(iv) Progesterone

levels lower

1 mark

This learner has been awarded one mark for identifying that FSH is 'lower'.

Q3(b)



(b) Identify structures **A** and **B** of the male reproductive tract of a dog.

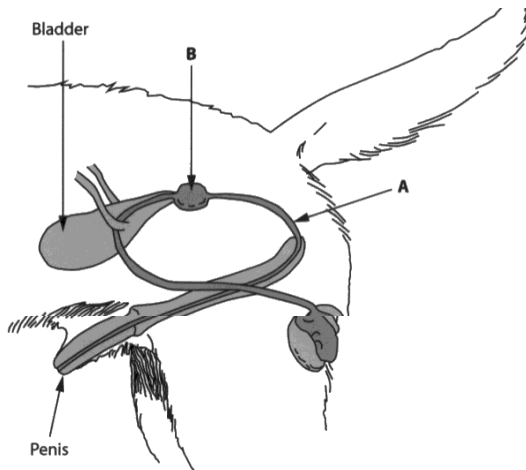
(2)

A ~~Vas deferens~~ urethra

B Prostate gland

2 marks

The learner has correctly identified the structures A and B



(b) Identify structures **A** and **B** of the male reproductive tract of a dog.

(2)

A Prostate gland.

B Vas deferens

0 marks

This learner has incorrectly identified the structures A and B

Q3(c)

(c) State the incubation period of a chicken egg.

(1)

21 days

1 mark

The learner had stated the correct incubation period for a chicken egg

(c) State the incubation period of a chicken egg.

(1)

30-40 days

0 marks

This learner was unable to recall / did not know the incubation period for a chicken egg and scored 0 marks.

Question 4

Q4(a)

The majority (70.5%) of learners scored two marks for this question through correctly identifying two types of skeletal joints from the complete list in the mark scheme

4 (a) Identify **two** types of skeletal joint.

1 Saddle

2 Ball and socket

2 marks

The learner has correctly identified two types of skeletal joints

4 (a) Identify **two** types of skeletal joint.

1 ball and socket

2 knee

1 mark

This learner has only identified one skeletal joint correctly as per the mark scheme to be awarded 1 mark.

Q4(b)

The majority (61.5%) of learners scored 0 marks for this question through not understanding the involvement of acetylcholine in muscle contraction. However where learners were aware of acetylcholine in muscle contraction they provided a complete answer fully deserving of the 4 marks awarded

(b) Describe how the release of acetylcholine results in muscle contractions.

(4)

~~Protein~~ Acetylcholine causes depolarisation, which releases positive calcium ions. Ca^{2+} binds with troponin on the actin (thin filament) which causes the tropomyosin to change shape and expose the myosin binding sites. Myosin (thick filament) heads, bind to the sites, with energy from hydrolysis of ATP. myosin heads pull actin, filaments slide past each other, sarcomere shortens, muscle contracts.

4 marks

The learner has fully described how the release of acetylcholine results in muscle contractions to achieve 4 marks

(b) Describe how the release of acetylcholine results in muscle contractions.

(4)

~~This is released through~~
When acetylcholine is released this causes ~~the~~ muscle contractions beings as the nervous impulses send information to the brain which causes the muscle to contract.

0 marks

This learner clearly does not understand the involvement of acetylcholine in muscle contraction and therefore gained 0 marks

Q4(c)

Many learners were able to explain that ATP provides energy for 1 mark but unable to expand their answer further to achieve the 4 available marks for this question

(c) Explain the role of ATP (adenosine triphosphate) in muscle contraction.

(4)

ATP releases energy which brings together actin and myosin. ATP is released from mitochondria. ATP is a chemical that gets turned into mechanical. Actin and myosin bind together and unbind this causes the contraction. ATP turns into ADP and P_i.

3 marks

The learner has explained the role of ATP in muscle contraction by addressing the first three points in the mark scheme but did not complete their answer with the last point re 'the filaments sliding / allowing the process to recycle' and was therefore credited with 3 marks

(c) Explain the role of ATP (adenosine triphosphate) in muscle contraction.

(4)

It reacts with the acetylcholine that is released making the blood flow change making the muscle to contract.

0 marks

Although the learner has attempted the question they have not demonstrated an understanding of the role of ATP in muscle contraction and was awarded 0 marks.

Question 5

Q5(a)

This was the first of two competency based questions with marks awarded for the response being at Level 1, Level 2 or Level 3. If no rewardable material was evident the learner scored 0 marks. The mean mark for this question was 4 which is a mid-Level 2 answer and demonstrated an understanding of some aspects of the structure and or function of blood but the discussion was only partially developed with limited links between the structure and function.

5 (a) Discuss the structure and functions of blood.

(8)

Red Blood cells are biconcave shape, which is a disc like shape that has large surface area. They have no nucleus so that increases the surface area so that haemoglobin is able to hold more oxygen molecules. They are flexible to allow them to get into small vessels. They are used to deliver oxygen around the body. The white blood cells come in a range of shapes and contain a nucleus, and sometimes have a cytoplasm. They are used to fight foreign bodies in the body as a method of one of the immune responses. Platelets are small structures shape and are covered in proteins so that they stick together when needed. In case of a wound they come together using proteins (on surface) to stick together and form a blood clot or scab to stop the body from losing too much blood. The fourth component of the blood is plasma. This is the fluid in the blood and is used to transport the blood's contents and things such as nutrients, waste gases.

8 marks

This learner has demonstrated accurate and detailed knowledge of the structure and function of the different components of blood through a well-developed and logical discussion which considers how they interrelate. It is a top level 3 answer which was credited with 8 marks.

5 (a) Discuss the structure and functions of blood.

(8)

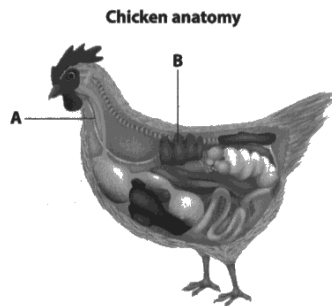
to pass oxygen around the body. Transmitt
Chemical waste to the liver to be cleansed
and deoxygenated. keep the body warm.
Blood is pumped around the body via the
pulmonary vein and through the pulmonary
artery, feeding cells.

2 marks

This learner has attempted the question demonstrating isolated knowledge and understanding of the subject with major omissions re the components of blood. The discussion is limited with generic assertions rather than developing and linking statements. This is a level 1 answer and was awarded 2 marks.

Q5(b)

Most learners scored one out of the two available marks for this question through identification of one of the two structures from the chicken's respiratory system



(b) Identify structures **A** and **B** in the respiratory system of a chicken.

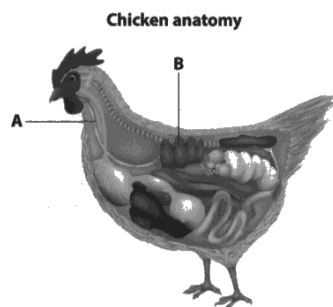
(2)

A trachea

B LUNGS

2 marks

The learner has correctly identified the structures labelled A and B in the diagram



(b) Identify structures **A** and **B** in the respiratory system of a chicken.

(2)

A air way trachea

B Air sacks / LUNGS

1 mark

This learner has correctly identified structure A, was unsure about structure B and opted for the wrong answer to only be credited with one mark.

Question 6

Questions 6(a) 6(b) 6(c) 6(d) and 6(e) relate to section B in the unit content with 6(a) 6(d) and 6(e) from B3.4 re different methods of transporting substances in and out of cells with diffusion being the method that the majority of learners were able to define

Q6(a)

Very few learners were able to fully describe the process of osmosis to achieve 4 marks as per the mark scheme – the mean mark was 1 with 44% scoring 0

6 (a) Describe the process of osmosis.

(4)

Osmosis is the movement of water through a partially permeable membrane to balance out the concentration. ~~It~~ Goes from a low to a high concentration.

4 marks

The learner has correctly described all aspects of the process of osmosis to achieve the 4 available marks

6 (a) Describe the process of osmosis.

(4)

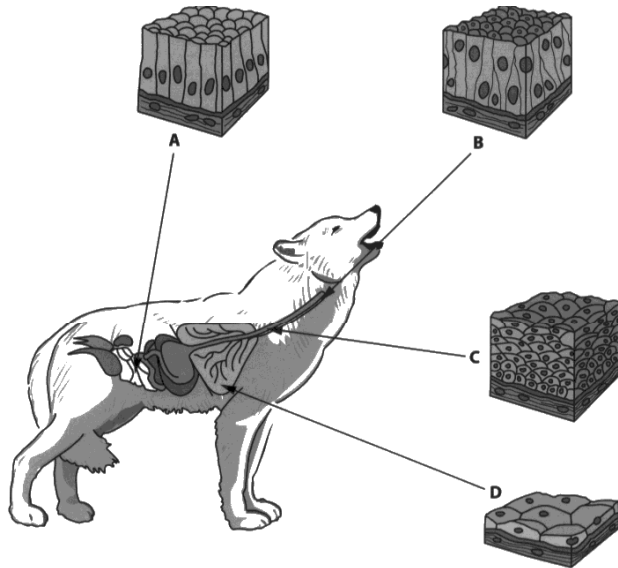
Osmosis is when water moves from a high concentration to a low concentration, over a partially permeable membrane.

2 marks

This learner has described the movement of water over a partially permeable membrane but the levels of concentration are the wrong way round and so was credited with 2 marks.

Q6(b)

This was a memory recall question from section B4.3 of the unit content and 55% of learners scored 0



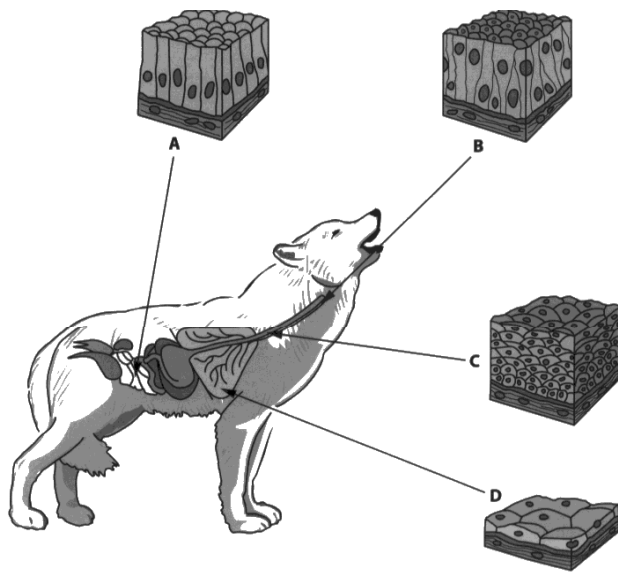
(b) Identify each of the epithelial tissues labelled **A** to **D** on the image of the dog above.

(4)

- A simple columnar epithelial tissue
- B pseudostratified epithelial tissue
- C Stratified squamous epithelial tissue
- D simple squamous epithelial tissue

4 marks

The learner has identified all the epithelial tissues correctly to achieve 4 marks



(b) Identify each of the epithelial tissues labelled **A** to **D** on the image of the dog above.

(4)

- A Striated
- B Nervous
- C Muscular Cellular
- D ~~Cellular~~ Muscular

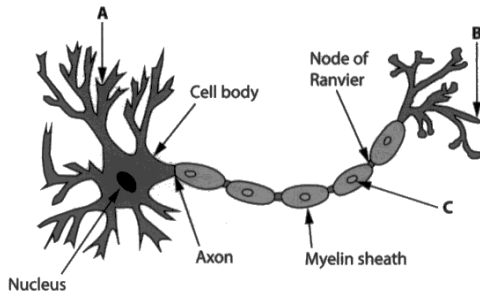
0 marks

This learner has been unable to identify any of the epithelial tissues in the images.

Q6(c)

This was a memory recall question on the structure of a neuron and almost 50% of learners scored 0.

The image shows a neurone.



(c) Identify the structures labelled A to C.

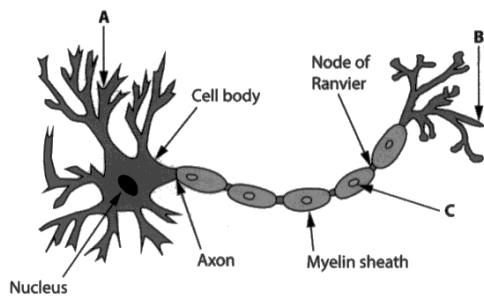
(3)

- A Dendrite
- B Axon terminae
- C Schwann cell.

3 marks

The learner has correctly identified the structures labelled A to C in the diagram of a neuron

The image shows a neurone.



(c) Identify the structures labelled A to C.

(3)

- A ~~mitochondria~~ receptors
- B muscular function
- C nucleotide

0 marks

This learner has been unable to correctly identify the three labelled parts of a neuron.

Q6(d)

41.9% of learners scored the 2 available marks for this question

(d) Define 'diffusion'.

(2)

Diffusion is the process by which particles are moved across a concentration gradient from a high to low concentration. Diffusion does not require energy.

2 marks

The learner has correctly defined diffusion to be awarded 2 marks

(d) Define 'diffusion'.

(2)

Diffusion is where a low concentration moves to a high concentration.

0 marks

This learner has attempted the question but has confused the movement of concentrations and therefore scored 0 marks.

Q6(e)

This question was answered well by the few learners who understood the concept of active transport but 50% of learners demonstrated a lack of understanding and scored 0

(e) Explain active transport in animal cells.

(4)

Active transport in animal cells is when substances ~~are~~^{and} are transported into and out of cells passing through the plasma membrane and this ~~requires~~ energy input in the form of ATP. In active transport, energy is required as the particles travel against the concentration gradient. Within the plasma membrane, there are channels made from the cell membrane and these use ATP to open to allow substances and particles through going into or out of the cell. Types of active transport can include endocytosis and ectocytosis.

4 marks

The learner has identified that energy is required from ATP, particles travel against the concentration gradient, channels in the plasma membrane and given two examples i.e. endo and ecto cytosis to be credited with the full 4 marks for this question

(e) Explain active transport in animal cells.

(4)

Active transport is the movement of cells. This is the movement of cells through processes such as diffusion and osmosis where the concentration goes from high to low and low to high. This involves the passing of cells and impulses from the synapse of the ~~cell~~ neurone.

0 marks

Although the learner has attempted the question they have not demonstrated an understanding of active transport in animal cells and therefore gained 0 marks.

Question 7

Questions 7(a), (b) and (c) relate to section C1 in the unit content and allowed learners to gain marks from these questions being accessible to most learners especially 7(b) which had a mean mark of 3 out of 4

Q7(a)

This was a memory recall question with almost 40% of learners gaining the 2 available marks

7 (a) Complete the table by writing in the **two** missing vertebrate classes.

Mammalia
Aves
Pices
Amphibia
Reptilia

2 marks

The learner has completed the table correctly with the missing vertebrate classes

7 (a) Complete the table by writing in the **two** missing vertebrate classes.

Mammalia
Aves
Class ^{reptiles.} Avian
Amphibia
• Aquatics

frogs
|

0 marks

This learner has attempted the question and knows the two missing species but is unable to recall the names of the vertebrate classes to which they belong and therefore scored 0 marks.

Q7(b)

Learners were able to state any four features of amphibians and many more than are included in the mark scheme were accepted which resulted in over 30% of learners scoring 3 out of the 4 available marks for this question with a mean mark of 2.59

(b) State **four** features of amphibians. (4)

- 1 egg laying
- 2 moist skin
- 3 ectocyles / ectothermic
- 4 webbed feet

4 marks

The learner has correctly stated 4 features of amphibians. Many learners stated 'webbed feet' as a feature and, although not included on the mark scheme, they were credited with one mark as a recognized feature of some amphibians

(b) State **four** features of amphibians. (4)

- 1 cold blooded (Pikilotherm)
- 2 lungs
- 3 skin
- 4

1 mark

This learner has correctly stated that amphibians are cold blooded to be credited with 1 mark. 'Lung' and 'skin' were too generic to be accepted as features of amphibians and a fourth feature was not given.

Q7(c)

Many learners continued with 'features' rather than 'behavioural adaptations' for this question although the mean mark was 1.8 out of the 4 available marks.

(c) Explain **two** behavioural adaptations found in amphibia.

(4)

1 ability to climb in order to avoid ~~on~~ predators, or to find prey

2 ~~ability to communicate~~ ability to call, in order produce sound, in order to communicate for mating.

4 marks

The learner has identified and explained two behavioural adaptations in amphibians to gain 4 marks

(c) Explain **two** behavioural adaptations found in amphibia.

(4)

1 able to hold breath under water for a long duration of time.

2 webbed feet on hind legs usefully.

0 marks

This learner has not identified behavioural adaptations and there are no explanations, so has scored 0 marks.

Question 8

This is the second competency based question and the last question on the paper which has 8 available marks awardable for the overall accuracy, thorough knowledge and understanding plus lines of reasoning evidenced in the learner response.

The majority of learners (66%) were unable to identify with the term 'nephron' confusing it with 'neuron' thereby writing about the nervous system instead of the excretory system which resulted in either 0 marks from no rewardable material being evident or 1 mark from isolated elements of knowledge where 'kidney' / 'excretion' happened to be mentioned. Learners who did understand the term 'nephron' provided complete Level 3 answers and were rewarded accordingly.

B Discuss the role of the nephron.

A nephron is found within a kidney. Nephrons allow water, sodium, chlorine and other ions and nutrients to be re-absorbed back into the blood. Blood enters the capillaries next to the nephron via the afferent arteriole. They go ^{to} the glomerulus, which is a bundle of capillaries with fast flowing blood. As this blood is fast flowing, water and other molecules can easily pass through small gaps in the membrane of the Bowman's capsule, positioned just below the glomerulus. Here, the molecules travel to the proximal convoluted tubule, where smaller ions, enzymes and other molecules are re-absorbed into the blood. Larger molecules are packaged up as vesicles and transported. The remaining water, sodium, chlorine and any waste is transported to the descending loop of Henle. The descending loop is permeable to water molecules, and the ^{water} ~~they~~ diffuses out of the nephron to the vena cava (capillaries outside the loop of Henle) via osmosis. At the loop of Henle the sodium, chlorine and waste are pushed round to the ascending loop. The ascending loop is permeable to Na^+ (sodium) and Cl^- (chlorine) ions. These ions diffuse out. Any remaining ions and water diffuse out at the distal convoluted tubule. Waste goes to collecting duct and excreted ^{via ureters as urine.}

8 marks

The learner has demonstrated detailed knowledge and understanding of the role of the nephron with all relevant points arranged in a well-developed, logical discussion which has clear links and interrelates the role within the excretory system as a whole correctly naming all the parts. This is a complete level 3 discussion which fully deserves the 8 marks awarded

8 Discuss the role of the nephron.

The role of a nephron is to carry and send impulse into a neuron and down the myline sheath until there is a reaction or contraction of the muscle.

The nephron will also send a signal to the brain, the brain then tells the body how to react.

The nephron can be the skin, nails and hair.

0 marks

There are no rewardable marks available for this learner through the nephron being confused with a neuron and a brief mention of the nervous system

Unit Summary

Based on the performance on this paper learners should:

- Be familiar with technical terms for / names of bones of the skeleton, skeletal joints, epithelial tissues, vertebrate classes and reproductive, respiratory and nervous systems of mammals and birds as per the unit content
- Address the command word 'explain' by identifying the role / function and expand the answers to explain and gain up to the marks available (2 / 4 marks). Similarly with 'describe' and 'compare' questions where several points must be included according to the available marks per question (usually 4 marks)
- Be familiar with the terms used in the unit content i.e. integumentary system, tapetum lucidum, nephron, neuron, osmosis, diffusion and active transport
- Develop a complete understanding of section B4.6 in the unit content re 'sliding filament theory of muscle contraction including the role of calcium and use of energy in the form of ATP' in order to gain marks on this topic in future
- With consecutive questions on the same topic ensure the answer given relates to the question asked in order to gain marks for knowledge on the subject e.g. questions 2b and 2c on the Tapetum Lucidum and 7b and 7c on amphibians
- Practice the levels-based, extended response questions to ensure a level 3 answer includes a well-developed and logical discussion with accurate knowledge relevant to the context of the question plus clear links which consider a range of different aspects and inter-relationships with body systems. This will then gain the 6-8 marks for each of the two levels-based questions included in the paper.

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