(c) Small molecules move into and out of the blood.

Which statements about how this happens are **true**, and which are **false**?

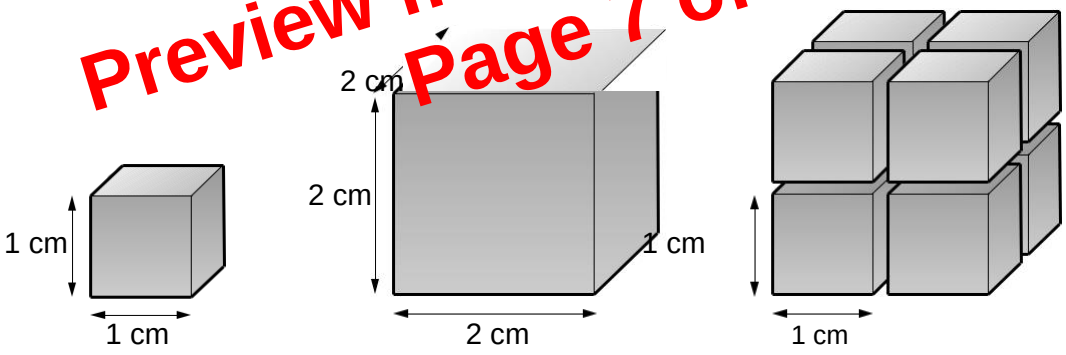
Tick (✓) **one** box in each row.

	True	False
Carbon dioxide and urea move out of cells into the blood.	☐	☐
Oxygen and carbon dioxide move between blood in capillaries and air in alveoli.	☐	☐
Urea is filtered into the blood by the kidneys.	☐	☐
Water and food molecules are absorbed from the digestive system into blood in capillaries.	☐	☐

[3]

(d) Exchange surfaces affect the surface area:volume ratio of multicellular organisms. Alex uses cubes as models for different organisms.

Organism **A** represents a small organism.
Organism **B** represents a large organism **without** exchange surfaces.
Organism **C** represents a large organism **with** exchange surfaces.



A **B** **C**

(i) Calculate the surface area:volume ratio of organism **B**.

Give your answer in its simplest form.

Surface area:volume ratio = ... : ..... **[4]**

3

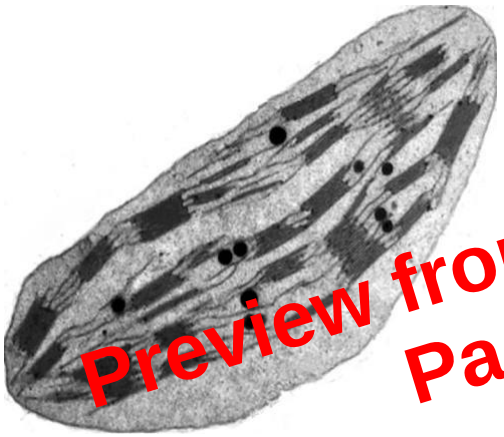
(a) Complete the table about sub-cellular structures.

Tick (✓) **one** box for each row.

Structure	**Only** found in eukaryotic cells	**Only** found in prokaryotic cells	Found in **both** types of cell
Chloroplast			
Mitochondria			
Nucleus			
Plasmid			

[3]

(b) The image is of a chloroplast.



(i) Draw a scientific drawing of the chloroplast in the box.

[2]

(ii) A doctor reports that people living with HIV/AIDS have had access to better medicines for their condition over the last 20 years.

Identify evidence from the table that supports the doctor's statement.

.....

.....

.....

..... **[2]**

(iii) The number of new infections with HIV has been decreasing since 1995.

Suggest **one** reason why.

.....

..... **[1]**

(i) Calculate the **rate** of change in insulin concentration during the first hour after the high carbohydrate meal was eaten.

Give your answer to **2** decimal places.

Rate = ... mg / dm^3 / min **[3]**

(ii) Describe the relationship between the blood glucose and insulin concentrations between hours **6** and **7**.

.....

..... **[1]**

(iii) Explain why the glucose concentration changes between hours **6** and **7**.

Use ideas about insulin and glucagon in your answer.

.....

.....

.....

..... **[2]**

9

(a) Describe **two** ways in which fossils have provided evidence of evolution.

1 .....

.....

2 .....

.....

[2]

(b) Scientists have discovered a new species of dinosaur called *Natovenator polydontus*.

(i) The discovery was published in a scientific journal.

Explain why it is important for scientific ideas and research to be published in scientific journals.

.....

.....

.....

..... **[2]**

(ii) Some students discuss how the discovery of this dinosaur changes our understanding of the ecosystem in which the dinosaur lived.

Which **two** statements are correct?

Tick (✓) **two** boxes.

The discovery of a single fossil will not tell you how abundant the species was. ☐

Discovering this new species causes a large increase in the known biodiversity. ☐

This fossil tells us exactly how the species was distributed within the ecosystem. ☐

We now know the biodiversity of the ecosystem was greater than we thought. ☐

When the dinosaur was alive, the new species was an abiotic component of the ecosystem. ☐

[2]

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OCR

Higher

GCSE

Combined Science B Twenty First Century Science

J260/05: Biology (Higher Tier)

General Certificate of Secondary Education

Mark Scheme for June 2024

Question			Answer	Marks	AO element	Guidance
1	(a)		regulate menstrual cycle / ovulation ✓	1	1.1	**ALLOW** any correct reference to a part of human reproduction eg mature follicle/egg / thicken uterus lining / produce gametes / sperm production Any named hormone must have the correct role **IGNORE** ideas of puberty/secondary sexual characteristics
	(b)	(i)	3 ✓	1	2.1	**ALLOW** ovulation
		(ii)	**Any one from** less risk of catching a sexually transmitted disease ✓ risk of becoming pregnant is higher/1% higher ✓ idea larger decrease of risk of catching an STD than increase from getting pregnant ✓	2	3.1b	Answer must be comparative **ORA** for contraceptive implant contraceptive implant has more risk of catching a sexually transmitted disease contraceptive implant, risk of becoming pregnant is lower idea of contraceptive implant has a larger increase of risk of catching an STD than a decrease from getting pregnant
		(iii)	acts as a barrier (to sperm and to pathogens) ✓	1	2.1	**ALLOW** descriptions of a barrier eg stops sperm entering **IGNORE** condom breaking

Question			Answer	Marks	AO element	Guidance
9	(a)		**Any two from:** (evidence of) similarities/differences/comparison between fossil and living organisms ✓ fossils/evidence of transitional species ✓ fossil/evidence of common ancestor(s) of modern species ✓	2	1.1	**DO NOT ALLOW** the fossil record unqualified. **ALLOW** example of transitional species (e.g. *Archaeopteryx)*
	(b)	(i)	**Any two from:** to inform other scientists (who may be working on the topic) ✓ to see if other scientists can replicate the work / peer reviewed ✓ to allow recognition for their work ✓	2	1.1	**ALLOW** communicate scientific rationale/methodology for investigations / share ideas with other scientists / allow other scientists to develop work/compare data/challenge existing research. **ALLOW** check/prove/reproduce results **IGNORE** to let people know / spread it more widely / to make it be accepted as fact
		(ii)	The discovery of a single fossil will not tell you how abundant the species was ✓ We now know the biodiversity of the ecosystem was greater than we thought ✓	2	3.2a	