Model Answers: Medium

1

The correct answer is **C** because:

- The epidermis is the topmost layer and from the electron micrograph it is more darkly stained
- The xylem can be seen as hollow vessels in the picture

A is incorrect as it is not possible to comment on the function of xylem from the image.

B is incorrect as the vascular bundles are not arranged in a regular pattern.

D is incorrect as the epidermis is not a single layer of cells.

2

The correct answer is **C** because vesicles transport substances that are needed to be released from the cell by exocytosis.

A is incorrect as facilitated diffusion does not require ATP (most ATP is produced in the mitochondria.

B is incorrect as lysosomes are not involved in DNA synthesis.

D is incorrect as ribosomes are not involved in phospholipid production.

3

The correct answer is **B** because:

- The structure is the Golgi apparatus, it's function is to modify proteins and package them for export
- The cell is secreting glycoproteins, the proteins will need to be modified with sugars (carbohydrate); this will take place in the Golgi apparatus.

A is incorrect as this is the vesicles secreting the glycoproteins by **exocytosis.**

C is incorrect as this is the **rough endoplasmic reticulum.**

D is incorrect as this is the **nucleus.**

4

The correct answer is **C** because:

- The first step in making the mucus is the addition of the carbohydrate to the protein
- The next step is to form a vesicle around the glycoprotein
- For the protein to be secreted into the trachea, the vesicle needs to fuse with the cell membrane

A & **B** are incorrect as the glycoprotein needs to be synthesised by the **Golgi apparatus** before it can be packaged into a **vesicle** and secreted.

D is incorrect as the vesicle needs to fuse with the membrane during the process of **exocytosis.**

5

The correct answer is **C** because:

- The nucleus, chloroplast and mitochondria all have a double membrane
- A nucleus is surrounded by a double membrane, which connects directly with the lumen of the rough endoplasmic reticulum
- The chloroplast has a double membrane, the outer and inner membrane. There is the third membrane of the thylakoids which is where chlorophyll (and other pigments are located) for the light-dependent reactions in photosynthesis
- The mitochondria have a double membrane, the inner membrane is folded to form structures called the cristae, which contains many of the structures needed to synthesis ATP.

The endoplasmic reticulum and lysosomes have single membranes.

6

The correct answer is **D** because products of **metabolism (**such as enzymes) can work intracellularly or extracellularly.

A is incorrect as **lysosomes** contain **hydrolytic** enzymes. They break down waste material in cells.

B & **C** are incorrect as enzymes are products of metabolism and can work internally (catalysing the huge number of intracellular reactions) or externally (for example digestive enzymes like salivary amylase).

7

The correct answer is **B** because:

- A **mesosome** is a fold in the cell membrane in a prokaryotic cell
- Prokaryotic cells produce **proteins** using 70S ribosomes
- A prokaryotic cell has a **cell surface membrane** to separate the cell from the environment.

A & **C** are incorrect as **cell walls** in prokaryotes are made of **peptidoglycan** (**murein)** not cellulose.

D is incorrect as prokaryotes do not contain membrane-bound organelles. **Chloroplasts** have a double membrane structure.

8

The correct answer is **C** because:

- Eukaryotic cells have **membrane-bound** organelles, so will have endoplasmic reticulum in the cytoplasm
- The DNA in eukaryotic cells is wound around proteins called **histones** to make chromatin that forms the chromosomes
- The ribosomes in eukaryotic cells are found freely in the cytoplasm or associated with an endoplasmic reticulum forming RER.

9

The correct answer is **C** because the organelles that have a double membrane are **mitochondria** and the **nucleus**

The other structures listed all have single membranes surrounding them.

10

The correct answer is A because this is the cytoplasm, the cytoplasm is the site of chemical reactions in the cell…and all cells contain cytoplasm!

B is incorrect as this structure is likely to be the chloroplast, the site of photosynthesis. After the nucleus and vacuole, the chloroplast is the next biggest cellular organelle. It could be a mitochondrion, another membrane-bound organelle like the chloroplast. It is far too large a structure (and membrane-bound) to be a ribosome! Prokaryotic cells do not contain membrane-bound organelles.

C is incorrect as this is the vacuole. The vacuole stores the cell sap, it is surrounded by the tonoplast which again is a membrane; prokaryotic cells do not contain membrane-bound organelles!

D is incorrect as this is the nucleus which is surrounded by the nuclear membrane; in eukaryotic cells this is a double membrane.