Answers

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Cell biology

Review It!

1 No nucleus; no membrane bound organelles; has plasmids.

2 **a** Place the specimen onto the stage; Line up the objective lens and the eyepiece lens; and focus the specimen by moving the stage with the coarse focus.

b 30 000 ÷ 10; = × 3 000

3 **a** Root hair cells have long thin hairs; and do have chloroplasts; The thin hairs increase the surface area to take up water and minerals from the soil.

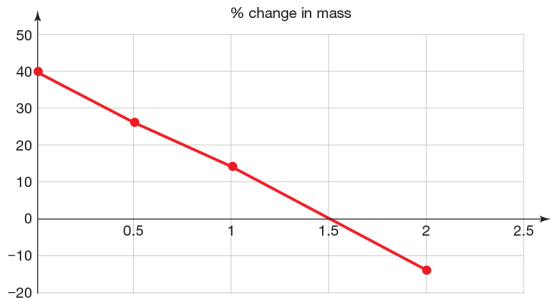
b Meristem tissue; in the root differentiates; into root hair cells.

4 **a** Weigh the mass of several cucumber slices; place each cucumber slice in a different concentration sugar solution for 24 hours; weigh the mass of the cucumber slices after being in solution.

b The independent variable is the concentration of the sugar solutions. The dependent variable is the change in mass of the cucumber slices.

c 40; 26; 14; −14

d



X axis labelled as concentration of sugar solution (%); y axis labelled as percentage change in mass (%); points plotted correctly; points connected with a straight line.

e 0%

f Keep all of the control variables the same; repeat the investigation.

5 **a** Prophase; Metaphase; Anaphase; Telophase.

b Anaphase

c Because onion root tips are growing; Root tips contain meristem tissue.

6 **a** Undifferentiated cells; that can become any type of specialised cell.

b Embryos / umbilical cords; Adult organs contain a few stem cells.

c No rejection of cells / organs by patient; Transfer of viral infection; No waiting time for transplants; Ethical / religious objections.

7 **a** Diffusion is the movement of particles from an area of high concentration; to an area of low concentration.

b The salt ions will move towards B.

c The salt ions are more concentrated on the A side of the membrane; and less concentrated on the B side of the membrane.

8 **a** Facilitated diffusion.

b In diffusion, particles move from an area of high concentration to an area of low concentration, but in active transport, the particles move from an area of low concentration to an area of high concentration; Diffusion is a passive process, but active transport requires energy.

Tissues, organs and organ systems

Review It!

1 **a** Any two from: Amylase / carbohydrase; pepsin / protease / trypsin; lipase

b Sugars

c The enzyme's active site is complementary to the shape of the substrate; The enzyme binds to the substrate; to make a product.

d The enzyme would become denatured.

2 **a** Add Benedict's reagent; and place into a hot water bath for a few minutes; If sugar is present, the solution will change to green / yellow / orange / brick-red.

b Add iodine solution to the solution; If starch is present, the solution will turn blue-black.

c Add Buiret's reagent to the solution; If protein is present, then the solution will turn lilac.

3 **a** **i** Vena cava **ii** Pulmonary vein

b The atria contract to move the blood into the ventricles; The valves in the heart prevent the backflow of blood.

c A small area of specialised cells in the right atrium acts as a pacemaker.

4 **a** Down the trachea; down the bronchi; then the bronchioles; and then into the alveoli.

b The gaseous exchange surface is one-cell thick to allow for a short diffusion pathway. There are many alveoli to give a large surface area; The blood carries the oxygen away from the alveoli to create a steep concentration gradient for oxygen.

c 10 ÷ 0.4 = 25 mm/s

5 **a** The coronary artery is blocked; and oxygen cannot reach the muscle of the heart.

b Stents hold the coronary arteries open, and allow blood flow to the heart, and statins reduce blood cholesterol levels by slowing down the rate of fatty material deposit; However, neither of these is a permanent solution. The fatty material will eventually build up if the patient does not eat a healthy diet, and the artery will need to be bypassed.