

Name of the Student: _____

Max. Marks : 20 Marks

Time : 20 Minutes

Q1.

- (a) Molasses is a solution obtained from sugar beet plants. The sugars present in molasses are sucrose, glucose and fructose.

Give the number of different types of monosaccharides present in molasses.

(1)

- (b) A student used the biochemical test for reducing sugars on a clear sample of molasses.

Describe the biochemical test for a reducing sugar.

Explain the result expected from the test on the sample of molasses.

Description of biochemical test _____

Explanation of expected result _____

(3)

- (c) 'Free sugar' is the sugar in food and drinks released when food is crushed or when sugar is added to food at home or by manufacturers.

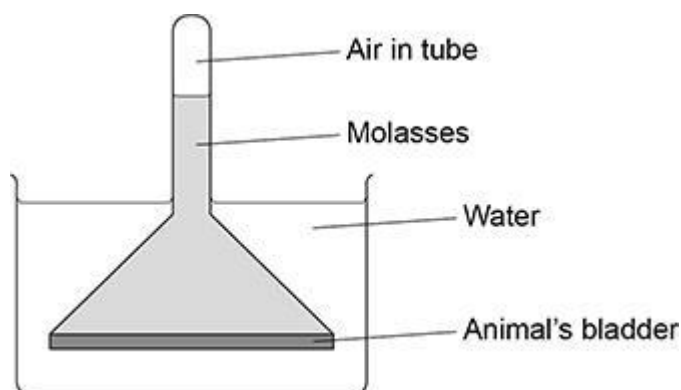
Scientists recommend that no more than 5% of the energy consumed per day should come from 'free sugar'.

The mean daily energy requirement for a 10-year-old child is 8100 kJ

The 'free sugar' in one tablespoon of molasses contains 250 kJ of energy.

Calculate the number of tablespoons of molasses required for a 10-year-old child to reach the recommendation for energy consumed in 'free sugar' per day.

- (d) A scientist used the apparatus in below figure to investigate osmosis.



Use your understanding of osmosis to explain why the air pressure in the tube increased.

(3)

- (e) The scientist repeated the investigation, but made **one** change to the molasses. The scientist did **not** change the volume of molasses at the start of the investigation.

The scientist observed that the air pressure inside the tube increased by 160 kPa compared with 800 kPa in the first investigation.

Suggest the change the scientist made to the molasses to cause this smaller increase in air pressure.

Use the air pressure figures in a calculation to support your answer.

Suggested change _____

(2)

(Total 10 marks)

Q2.

- (a) Describe the appearance **and** behaviour of chromosomes during prophase and during anaphase of mitosis.

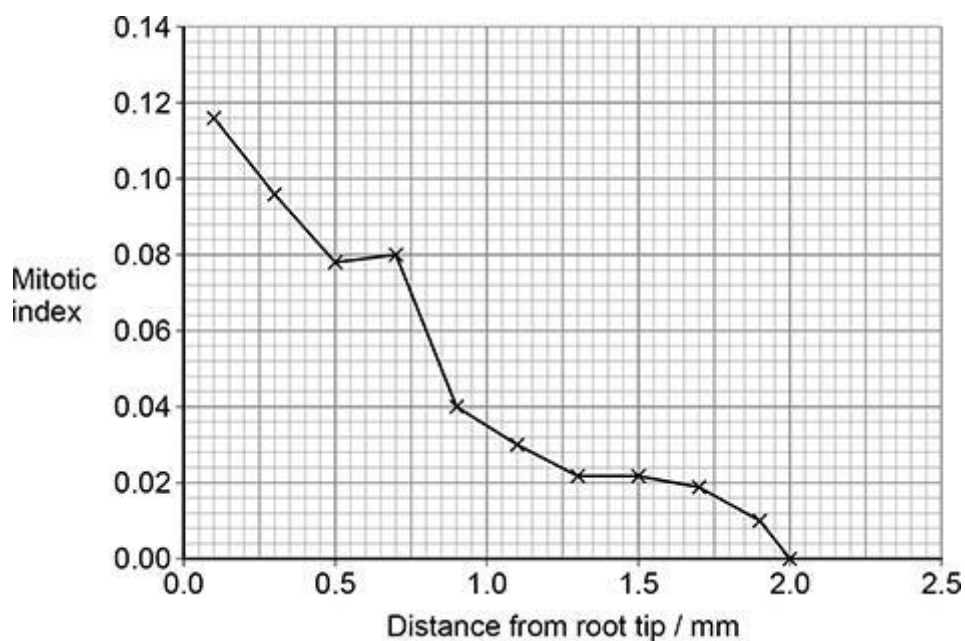
Prophase _____

Anaphase _____

(4)

- (b) A scientist used an optical microscope to determine the mitotic index in cells at different distances from the tip of onion roots.

The graph below shows the results.



Complete the word equation used to determine each mitotic index in the graph above.

Mitotic Index =

(1)

- (c) The scientist used data from the graph above to calculate a correlation coefficient (r). The scientist then used a statistical test to determine the probability (P) associated with the value of r .

$$r = -0.98 \text{ (} P < 0.05 \text{)}$$

What can you conclude from this result?

(2)

- (d) What can you conclude about the effect that distance from the root tip has on the proportion of cells in different stages of the cell cycle?

Use information in the graph above.

(3)

(Total 10 marks)