Practice Question Set For A-Level
Subject : Biology
Paper-1 Topic: 2 Cells

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Name of the Student:_____
Max. Marks : 22 Marks **Time : 22 Minutes**

Q1.

(a) What is a tumour?

_____

_____

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(2)

(b) Describe how you would determine a **reliable** mitotic index (MI) from tissue observed with an optical microscope.

Do **not** include details of how you would prepare the tissue observed with an optical microscope.

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(3)
(Total 5 marks)

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Q2.

A student investigated the effect of two antimicrobial substances, **J** and **K**, on the growth of *E. coli* bacteria.

She transferred *E. coli* cells using a sterilised pipette to make three identical cultures, **1**, **2**, and **3**. She then added:

- no antimicrobial substance to culture **1**
- antimicrobial substance **J** to culture **2**
- antimicrobial substance **K** to culture **3**.

She incubated the cultures for 24 hours, after which she determined the number of cells per mm^3 in each culture.

(a) The student used a sterilised pipette to transfer *E. coli* into each culture.

Suggest why the number of *E. coli* cells per mm^3 in each culture after 24 hours might have been lower if the student had **not** used a sterilised pipette. Explain your answer.

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(2)

(b) The student diluted 3 cm^3 of culture **1** with 12 cm^3 of water. She observed a sample of this diluted mixture using an optical microscope and counted 24 cells in 0.000 25 mm^3 of the diluted mixture.

Use this information to calculate the number of cells per mm^3 in **undiluted** culture **1**.

Number of cells = _____ per mm^3

(2)

(c) After 24 hours, the student compared the number of cells per mm^3 in cultures **1**, **2** and **3**. She found:

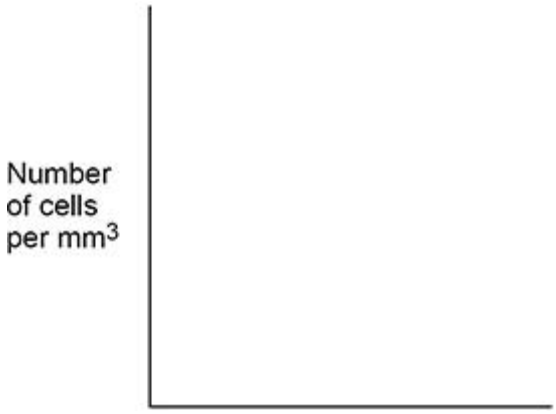
- substance **J** killed 80% of the cells
- substance **J** killed twice as many cells as substance **K**.

Using the axes shown in below figure, **sketch** a bar chart showing the results the student obtained from cultures **1**, **2** and **3**.

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Do **not** draw a grid on the chart.

Do **not** include figures for the number of cells per mm^3

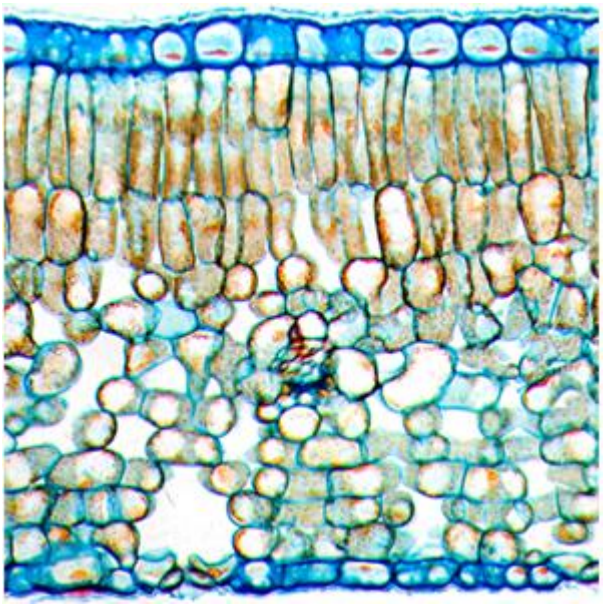


(3)
(Total 7 marks)

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Q3.

The figure below is a photograph of a vertical section through a leaf observed using an optical microscope.



(a) In the box below:

- produce a scientific drawing of the arrangement of tissues shown in the figure above
- label **one** of the tissues in your drawing

Do **not** draw individual cells.

(3)

A scientist investigated factors that affect the shelf life of cut flowers.
A cut flower is the part of the stem with the flower bud attached after it has been cut from a plant.

The shelf life is the number of days the cut flowers are in good enough condition to be sold.

He:

- took 12 cut flowers from a rose plant
- determined the mean number of stomata per mm^2 on the leaves
- determined the transpiration rate for each cutting
- stored the cut flowers on a shelf in a brightly lit room
- determined the shelf life of the cut flowers.

The table below shows his results.

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Month cut flowers were obtained	Mean number of stomata / mm^{-2} (± 2 SD)	Mean transpiration rate / cm^3 day^{-1} (± 2 SD)	Mean shelf life / days (± 2 SD)
December	23 (± 2)	22 (± 3)	5 (± 1)
April	20 (± 3)	15 (± 2)	16 (± 2)

A value of ± 2 SD (standard deviations) from the mean includes over 95% of the data.

(b) Using information in the table, what can you conclude about the effect of different factors on the mean shelf life of cut flowers?

Explain your conclusions.

(4)

(c) Other than a change in temperature, give **one** change the scientist could make to the environmental conditions to increase the cut flowers' shelf life.

Explain your answer.

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(3)

(Total 10 marks)

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