CHEMISTRY ONLINE
TUITION

Phone: +442081445350

www.chemistryonlinetuition.com

Email:asherrana@chemistryonlinetuition.com

BIOLOGY

FOUNDATIONS IN BIOLOGY

Level & Board	OCR (A-LEVEL)
TOPIC:	CELL STRUCTURE MICROSCOPES
PAPER TYPE:	QUESTION PAPER - 1
TOTAL QUESTIONS	6
TOTAL MARKS	/30

Cell Structure – Microscopes - 1

1.

A bacterial infection causes activated white blood cells to undergo mitosis and proliferate. Higher quality photos are required to examine the behavior of chromosomes during mitosis.

(a) Fill in the microscope and picture table that follows. **(2)**

	Laser scanning confocal microscope	Scanning electron microscope	Transmission electron microscope
Maximum resolution	200 nm	3–10 nm	0.5 nm
Image appearance	2D / 3D	.....	.....
Image colour	.....	.....	black and white

(b) A white blood cell picture captured with a transmission electron microscope was examined. At the G2 checkpoint, it was determined that the cell had ceased dividing. Identify two observations that would have brought this to light. **(2)**

2.

(a) Which of the following, from A to D, is a characteristic shared by confocal and light microscopy? **(1)**

can be used to observe ribosomes ☐

can be used with live tissues ☐

obtain images using laser light ☐

require a great deal of training to use ☐

3.

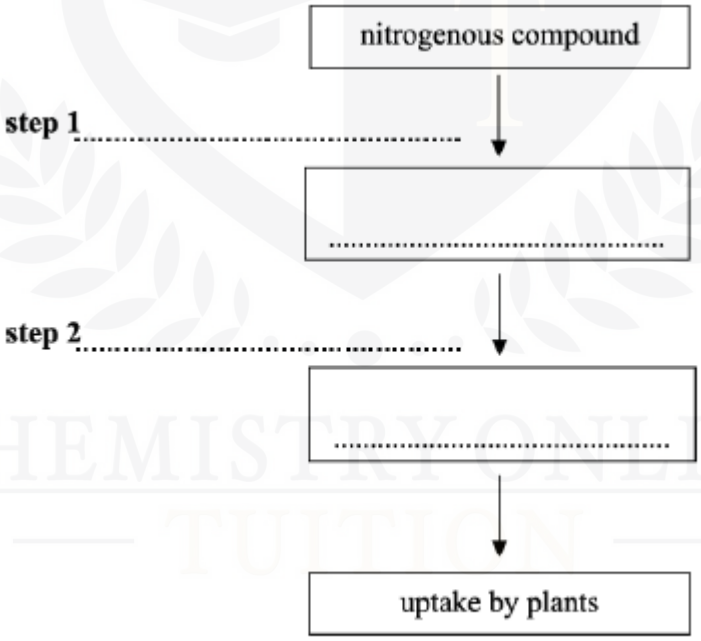
(a) A climax community of producers (algae and aquatic plants) and consumers (bacteria, Protoctista, worms, snails, arthropods, and tiny vertebrates like fish and newts) inhabits a small, permanent pond. What makes this a "climax community," according to ecologists? **(2)**

(b) The typical length of the protoctist Paramecium caudatum is 200–300 µm. Measuring precisely might aid in correctly identifying a specimen from this pond. Which laboratory apparatus would you choose to measure Paramecium caudatum's length accurately? **(2)**

A creature tumbled into the pool. It withered and drowned. Its body's biological components were entirely recycled in a year.

(c) From the decomposers, which nitrogenous excretory molecule would advance to the following nitrogen cycle stage? **(2)**

(d) Fill in the flow chart to illustrate the transformation of this nitrogenous molecule into a form that plants can use, noting the kinds of bacteria that are engaged at steps 1 and 2. **(4)**



4.

An illustration of a liver Kupffer cell is shown in Fig. 17.2.

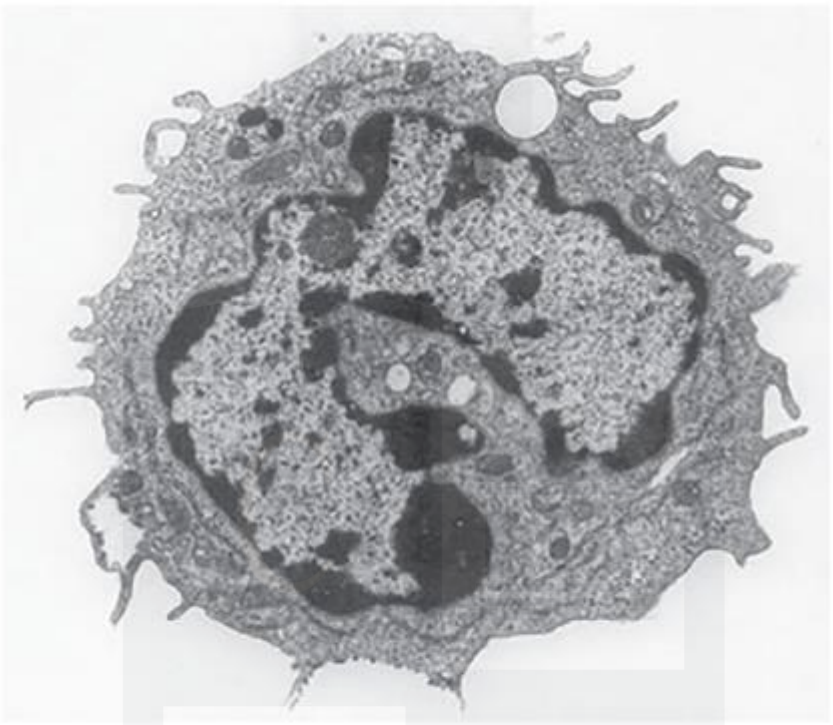


Fig. 17.2

(a) The Kupffer cell in the picture has a diameter of 9.1 cm. Determine the true volume of this cell, assuming it is spherical. Provide four meaningful figures for your response. Display your work. **(3)**

I am Sorry !!!!!

(b) With what kind of microscope was this image captured? Give an explanation for your response. **(2)**

5.

I am Sorry !!!!!

An aquatic plant that thrives throughout the world is called sago pondweed. A transmission electron micrograph of a sago pondweed cell is displayed in Fig. 1.1.

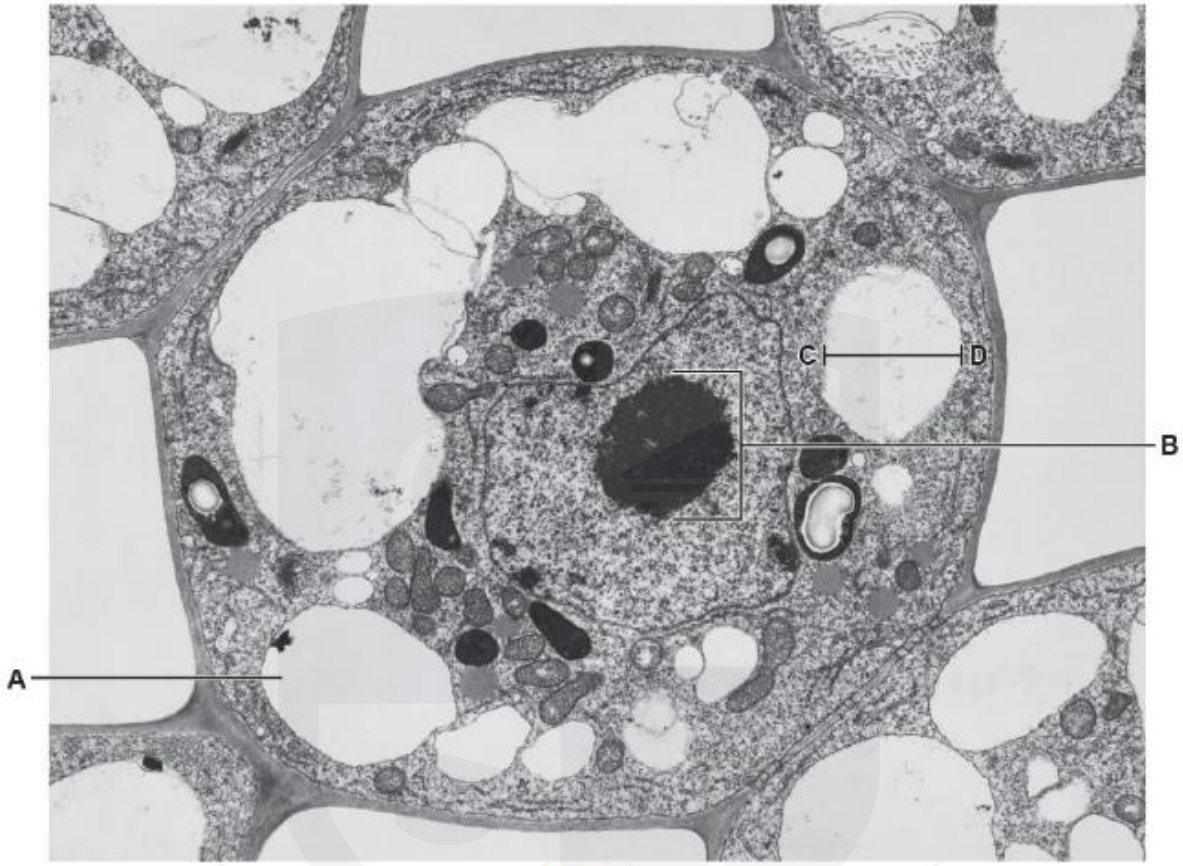


Fig. 1.1

(a) Determine which cellular elements are displayed at A and B. **(2)**

(b) The actual length of the line in Fig. 1.1 between C and D is 1.4×10^{-6} m. Determine the magnification that was applied to create the picture shown in Figure 1.1. Provide two major figures in your response**. (2)**

(c) A student's illustration of a different sago pondweed cell that was examined with a light microscope is displayed in Figure 1.2. The pupil drew something with a sharp pencil but left it unlabeled.

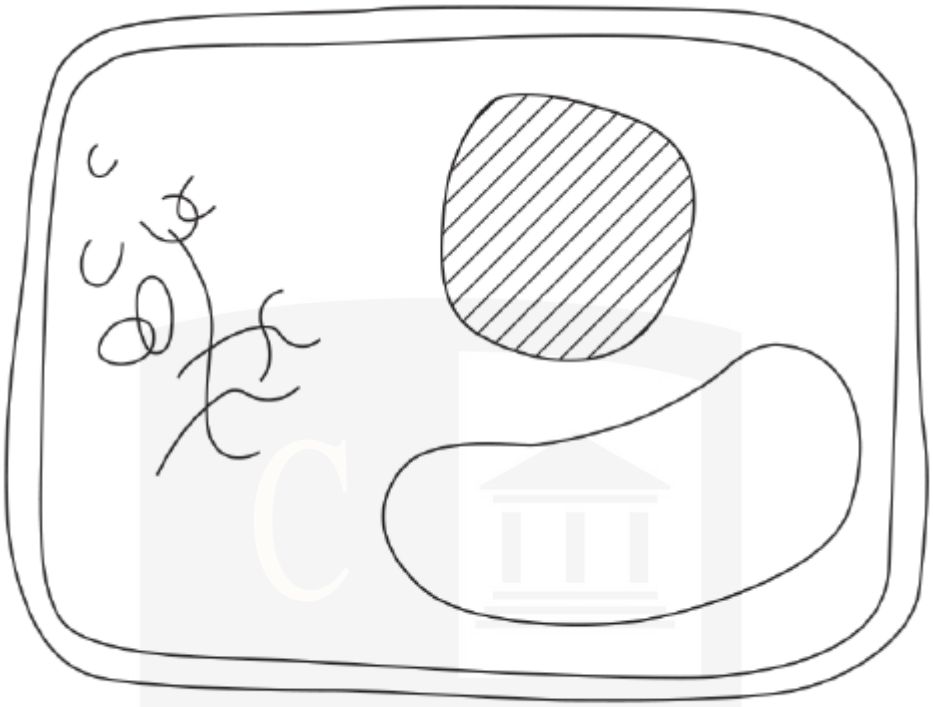


Fig. 1.2

Give two more suggestions about how to make the drawing better. **(2)**

I am Sorry !!!!!

(d) In order to enhance the contrast between cellular components when viewed under a microscope, the student dyed a sample of sago pondweed.

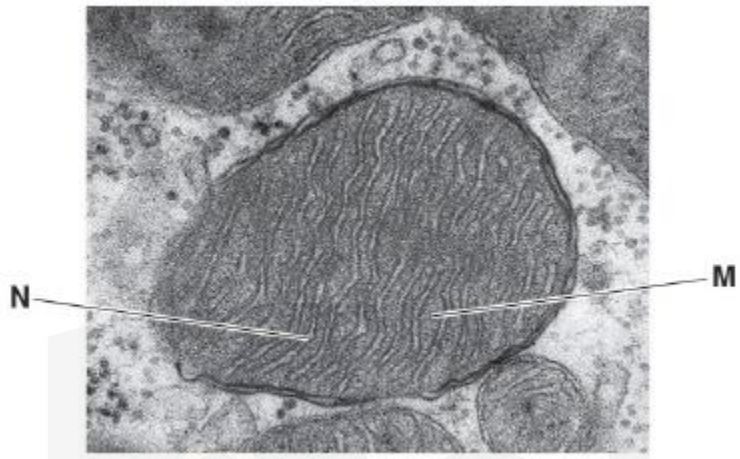
The student stained the sample by following these steps:

• Transfer the sample to a glass slide using forceps.

• Carefully put a cover slip onto the sample, making sure it is parallel to the slide as it is lowered. • Use a pipette to place two drops of the stain in the center of the sample. **(2)**

6.

A photomicrograph of a mitochondrion can be seen below.



(a) Describe the kind of microscope that was used to create this image. **(2)**

(b) Determine which structures in the photomicrograph are designated M and N. **(2)**

www.chemistryonlinetuition.com asherrana@chemistryonlinetuition.com

DR. ASHAR RANA

CHEMISTRY ONLINE TUITION

Phone: +442081445350
www.chemistryonlinetuition.com
Email: asherrana@chemistryonlinetuition.com

- Founder & CEO of Chemistry Online Tuition Ltd.
- Tutoring students in UK and worldwide since 2008
- Chemistry, Physics, and Math's Tutor

CONTACT INFORMATION FOR **CHEMISTRY ONLINE TUITION**

- UK Contact: 02081445350
- International Phone/WhatsApp: 00442081445350
- Website: www.chemistryonlinetuition.com
- Email: asherrana@chemistryonlinetuition.com
- Address: 210-Old Brompton Road, London SW5 OBS, UK