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9700 / CAIE A level Biology / Paper-1/ Multiple Choice Questions

1.1.4-Light-Electron-Microscope-Set-2-qp

Total Questions: 11

Questions

Question 1:

The diagram below is drawn from an electronmicrograph of an animal cell.

Which represents the same cell, seen under a light microscope at ×400 magnification?

A

B

C

D

Question 2:

A light microscope is used to observe two membranes that are 200 nm apart.

How far apart are the membranes when the objective lens is changed from low power (×40) to high power (×400)?

A 2 μm **B** 20 μm **C** 200 nm **D** 2000 nm

Questions (Continued)

Question 3:

Which group of structures are visible in a suitably stained plant cell using a high power (x400) light microscope?

	centriole	chromosomes	mitochondria	starch grains
A	✓	✓	✗	✓
B	✓	✓	✗	✗
C	✗	✓	✓	✗
D	✗	✗	✓	✓

key
✓ = visible
✗ = not visible

Question 4:

Which statement about the light microscope is correct?

A As the smallest distance to see two points as distinct separate points decreases, the resolution also decreases.

B If the resolution is 220 nm, then a bacterium 0.2 μm in diameter will not be visible.

C If the wavelength of light is 600 nm, then two membranes 300 nm apart will be visible as two distinct membranes.

D Using visible light of a longer wavelength, such as red light, will improve the resolution.

Question 5:

When making measurements in experiments, which methods could have parallax errors?

1 using a calibrated eyepiece graticule to measure length

2 using a measuring cylinder to measure volume

3 using a ruler to measure length of a shoot

A 1 and 2 only **B** 1 and 3 only **C** 2 and 3 only **D** 1, 2 and 3

Questions (Continued)

Question 6:

Which statements about light microscopes are correct?

1 To calculate the magnification of a light microscope the eyepiece lens and objective lens magnifications are added together.

2 As the magnification increases the resolution decreases.

3 The resolution of a light microscope is limited by the wavelength of light.

4 The scale on a stage micrometer is resolved more clearly than an eyepiece graticule.

A 1, 2, 3 and 4

B 1, 3 and 4 only

C 2 and 3 only

D 2 and 4 only

Question 7:

What best describes an electron microscope in comparison with a light microscope?

	magnification	resolution
A	higher	higher
B	higher	lower
C	lower	higher
D	lower	lower

Question 8:

In the following table, which is the correct comparison between light and electron microscopes?

	light microscope		electron microscope	
	resolution	magnification	resolution	magnification
A	high	high	low	low
B	high	low	low	high
C	low	high	high	low
D	low	low	high	high

Questions (Continued)

Question 9:

Plant cells are stained and then viewed through a light microscope.

Which structures would be clearly visible at a magnification of ×400?

A chloroplast grana

B lysosomes

C nucleoli

D ribosomes

Question 10:

Which statement explains why it is necessary to use an electron microscope to see the cristae of a mitochondrion?

A The magnification of the electron microscope is greater than that of the light microscope.

B The membranes of the cristae are separated by a distance greater than 200 nm.

C The resolution of a student microscope using daylight is too low.

D The wavelength of an electron beam is longer than the wavelength of light.

Question 11:

Which eyepiece and objective lens combination of a light microscope enables you to see the greatest number of cells in the field of view?

	eyepiece lens	objective lens
A	×5	×10
B	×5	×40
C	×10	×10
D	×10	×40