



1. Multiple - Choice Test

1 Which type of membrane would be present in the largest quantity in a prokaryotic cell?

- A cell surface membrane
- B mitochondrial cristae
- C nuclear envelope
- D smooth endoplasmic reticulum

2 Which type of cell would contain the greatest relative numbers of mitochondria?

- A bacterial cell
- B mesophyll cell
- C muscle cell
- D parenchyma cell

3 In a cell that is specialised for secreting protein, which of the following would be present in relatively large amounts?

- A cell surface membrane
- B Golgi vesicles
- C lysosomes
- D smooth endoplasmic reticulum

4 Which structure could be described as a microtubule-organising centre?

- A centriole
- B Golgi apparatus
- C nucleus
- D spindle

5 What are microtubules made of?

- A cellulose
- B DNA
- C lipid
- D protein

6 Which structure could be found in a plant cell but not in a prokaryotic cell?

- A 20 nm ribosomes
- B cell surface membrane
- C circular DNA
- D thylakoid

7 Which organelle makes lysosomes?

- A Golgi apparatus
- B nucleus
- C ribosome
- D smooth endoplasmic reticulum

8 A protein that is to be secreted from a cell would pass through a sequence of cell organelles in the following order:

- A Golgi apparatus → rough endoplasmic reticulum → secretory vesicle
- B Golgi apparatus → secretory vesicle → rough endoplasmic reticulum
- C rough endoplasmic reticulum → Golgi apparatus → secretory vesicle
- D secretory vesicle → Golgi apparatus → rough endoplasmic reticulum

9 A scientist calibrating an eyepiece graticule would notice what change when switching from a low-power lens to a high-power lens?

- A The eyepiece units would appear closer together.
- B The eyepiece units would appear further apart.
- C The stage micrometer units would appear closer together.
- D The stage micrometer units would appear further apart.

10 What explains the fact that an increase in the voltage used in a transmission electron microscope results in an increase in the resolution obtained?

- A The electromagnetic lenses function more efficiently.
- B Increasing the voltage increases the magnification.
- C The electron beam can penetrate the specimen more easily.
- D The wavelength of the electrons is shortened.

1. Which **one** of the following cell structures can be seen with a light microscope?

- A. mitochondrion
- B. ribosome
- C rough ER
- D smooth ER

2. The use of electrons as a source of radiation in the electron microscope allows high resolution to be achieved because electrons:

- A are negatively charged.
- B can be focused using electromagnets.
- C have a very short wavelength.
- D travel at the speed of light.

3. Which **one** of the following structures is found in animal cells, but not in plant cells?

- A centriole
- B chloroplast
- C Golgi apparatus
- D cell surface membrane

4. Copy an complete the following table, which compares light microscopes with electron microscopes. Some boxes have been filled in for you.

Feature	Light microscope	Electron microscope
Source of radiation		
Wavelength of radiation		About 0.005 nm
Maximum resolution		0.5 nm in practice
Lenses	Glass	
Specimen		Non-leaving or dead
Stains	Coloured dyes	
image	coloured	

5. List **ten** structures you could find in an electron micrograph of an animal cell which would be absent from the cell of a bacterium.

6. **Advice on answering question 6:** If you are asked to distinguish between two things, it is likely that it is because they have certain things in common and that they may even be confused with each other. In your answer it is helpful where relevant to point out similarities as well as differences. Remember that for organelles there may be differences in both structure and function.

Distinguish between the following pairs of terms:

- a magnification and resolution
- b light microscope and electron microscope
- c nucleus and nucleolus
- d chromatin and chromosome
- e membrane and envelope
- f smooth ER and rough ER
- g prokaryote and eukaryote
- h tissue and organ (include one example of each in an animal and in a plant)
- i xylem and phloem
- j epidermis and epithelium
- k palisade mesophyll and spongy mesophyll

7 List:

- a three organelles each lacking a boundary membrane
- b three organelles each bounded by a single membrane
- c three organelles each bounded by two membranes (an envelope).

8 Identify each cell structure or organelle from its description below.

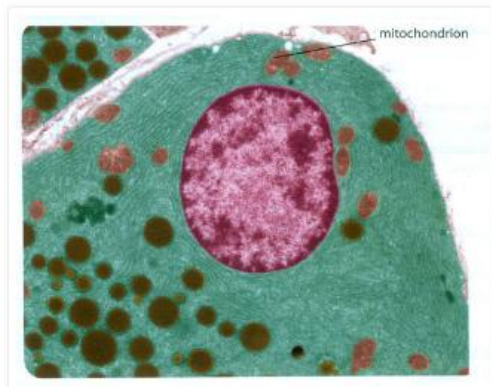
- a manufactures lysosomes
- b manufactures ribosomes
- c site of protein synthesis
- d can bud off vesicles which form the Golgi apparatus
- e can transport newly synthesised protein round the cell

- f manufactures ATP in animal and plant cells
- g controls the activity of the cell, because it contains the DNA
- h carries out photosynthesis
- i can act as a starting point for the growth of spindle microtubules during cell division
- j contains chromatin
- k partially permeable barrier only about 7 nm thick

1 organelle about 25 nm in diameter

9 The electron micrograph shows part of a secretory cell from the pancreas. The secretory vesicles are Golgi vesicles and appear as dark round structures. The magnification is x 8 000.

a Copy and complete the table. Use a ruler to help you find the actual sizes of the structures. Give your answers in micro metres.



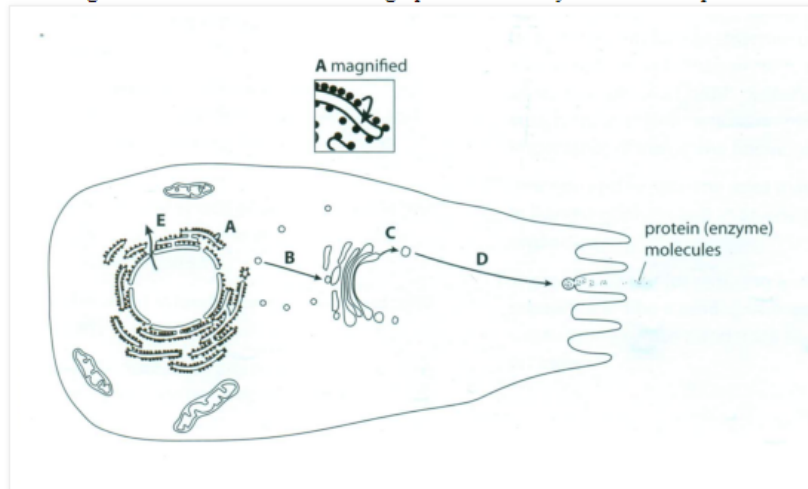
Structure	Observed diameter (measured with ruler)	Actual size
maximum diameter of a Golgi vesicle		
maximum diameter of nucleus		
maximum length of the labelled mitochondrion		

[9]

b Make a fully labelled drawing of representative parts of the cell. You do not have to draw everything, but enough to show the structures of the main organelles. Use a full page of plain paper and a sharp pencil. Use Figures 1.16 and 1.17 in this book and the simplified diagram in d below to help you identify the structures.

[14]

- c The mitochondria in pancreatic cells are mostly sausage-shaped in three dimensions. Explain why some of the mitochondria in the EM appear roughly circular. [1]
- d The figure below shows a diagram based on an electron micrograph of a secretory cell from the pancreas.



This type of cell is specialised for secreting (exporting) proteins. Some of the proteins are digestive enzymes of the pancreatic juice. The cell is very active, requiring a lot of energy. The arrows show the route taken by the protein molecules.

- Describe briefly what is happening at each of the stages A, B, C and D. [8]
- Name one molecule or structure which leaves the nucleus by route E. [1]
- Through which structure must the molecule or structure you named in ii pass to get through the nuclear envelope? [1]
- Name the molecule which leaves the mitochondrion in order to provide energy for this cell. [1]

10 One technique used to investigate the activity of cell organelles is called differential centrifugation. In this technique, a tissue is homogenised (ground in a blender), placed in tubes and spun in a centrifuge. This makes organelles sediment (settle) to the bottom of the tubes. The larger the organelles, the faster they sediment. By repeating the process at faster speeds, the organelles can be separated from each other according to size. Some liver tissue was treated in this way to separate ribosomes, nuclei and mitochondria. The centrifuge was spun at 1000g, 10 000g or 100 000g ('g' is gravitational force).

- In which of the three sediments - 1000 g, 10 000 g or 100 000 g - would you expect to find the following?
 - ribosomes
 - nuclei
 - mitochondria

b Liver tissue contains many lysosomes. Suggest why this makes it difficult to study mitochondria using the differential centrifugation technique.

Note :-

- **Get the hardcopy of the syllabus – 9700/ 2019.**
- **Get spirally bound past year papers –**

9700/11,12,13,21,22,23,31,32,33 / F/M, M/J, O/N series for 2015-2017

- **With reference to syllabus- Do research on INFECTIOUS DISEASES & make a report.**

