

SECTION A – Multiple-choice questions

TOTAL SCORE :

/ 50

Instructions for Section A

Answer **all** questions.

Choose the response that is **correct** for the question.

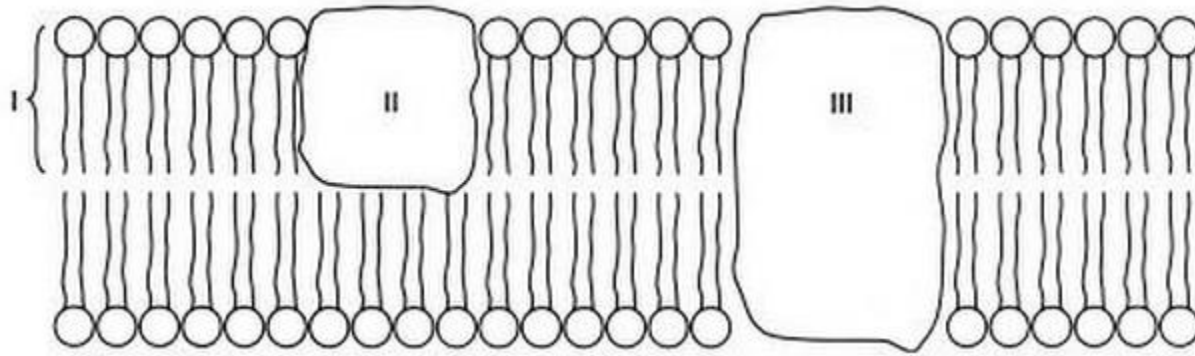
A correct answer scores 1, an incorrect answer scores 0.

Marks will **not** be deducted for incorrect answers.

No marks will be given if more than one answer is completed for any question.

Question 1

Below is a diagram of the fluid mosaic model of the plasma membrane.



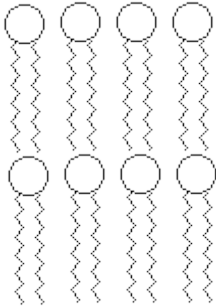
Structure III is

- A. a phospholipid.
- B. a cholesterol molecule.
- C. a protein.
- D. a glycolipid.

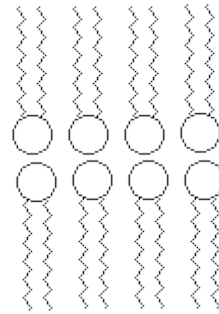
Question 2

Which of the following diagrams correctly shows the arrangement of the phospholipid bilayer?

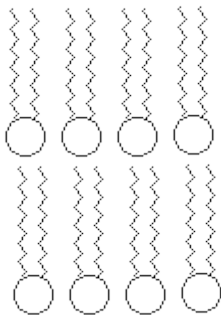
A.



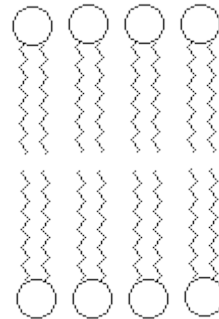
B.



C.



D.



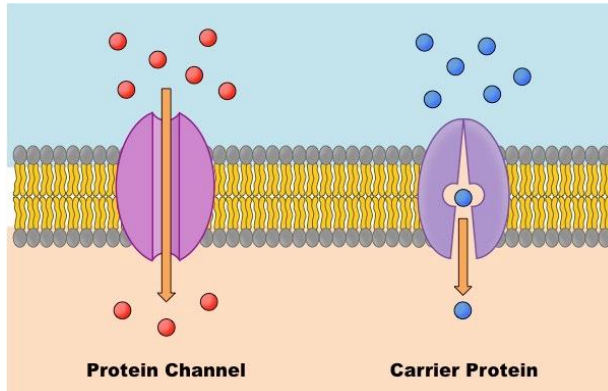
Question 3

Which of the following molecules would be able to simply diffuse through the phospholipid bilayer?

- A.** glucose.
- B.** sodium ions.
- C.** ethanol.
- D.** amino acids.

Question 4

The following diagram shows the process of facilitated diffusion.

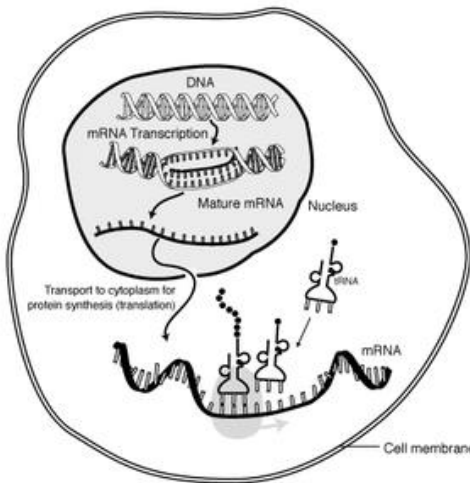


Which of the following correctly describes the type of substances that require this process to cross the plasma membrane?

- A. Hydrophilic substances.
- B. Hydrophobic substances.
- C. Lipophilic substances.
- D. Non polar substances.

Question 5

The following diagram shows the beginning steps that are involved in the production of a protein. Starting in the nucleus the gene that is to be expressed is converted into messenger RNA (mRNA) and is exported to the cytoplasm where the next stage of protein synthesis can begin.



The organelle responsible for converting the mRNA into a polypeptide chain is called the

- A. golgi apparatus.
- B. lysosome.
- C. rough endoplasmic reticulum.
- D. ribosome.

Question 6

Proteins that are to be secreted from the cell are synthesised by

- A. golgi bodies associated with the endoplasmic reticulum.
- B. ribosomes associated with the endoplasmic reticulum.
- C. ribosomes associated with the smooth endoplasmic reticulum.
- D. lysosomes associated with the endoplasmic reticulum.

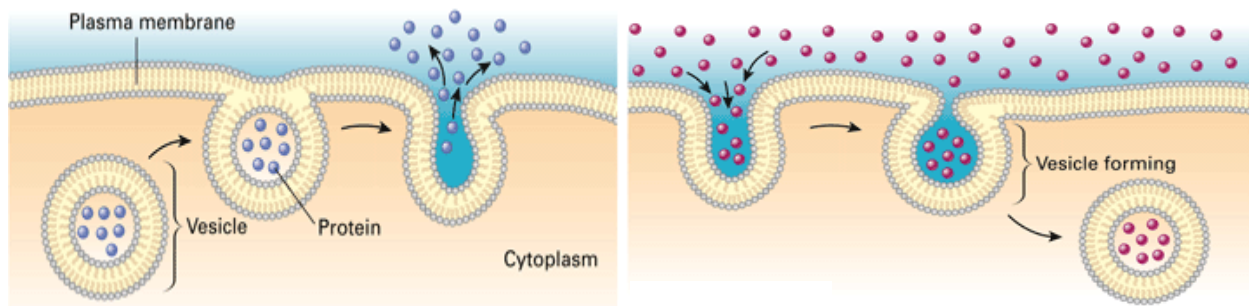
Question 7

The organelle responsible for packaging and modifying proteins for export from the cell is the

- A. golgi apparatus.
- B. lysosome.
- C. rough endoplasmic reticulum.
- D. ribosome.

Use the following diagram to answer Questions 8 – 10

The diagram below shows two types of bulk transport. One that transports substances out of the cell and another that transports substances into the cell.



Question 8

Which of the following correctly names the process of bulk transport out of the cell?

- A. Pinocytosis.
- B. Phagocytosis.
- C. Endocytosis.
- D. Exocytosis.

Question 9

The specific term for the process that encloses solid material such as food is

- A. Pinocytosis.
- B. Phagocytosis.
- C. Endocytosis.
- D. Exocytosis.

Question 10

The specific term for the process that encloses droplets of liquid is

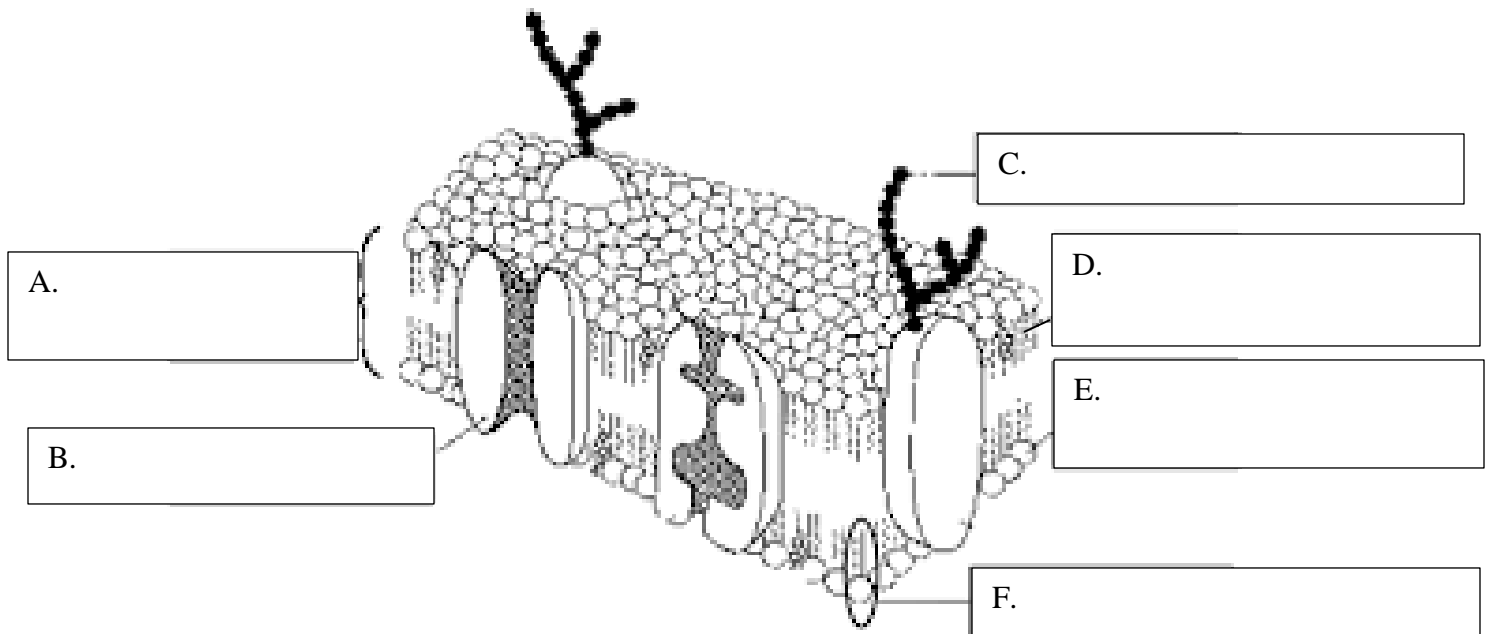
- A. Pinocytosis.
- B. Phagocytosis.
- C. Endocytosis.
- D. Exocytosis.

SECTION B - Short-answer questions

Instructions for Section B
Answer **all** questions in the spaces provided. Write using black or blue pen.

Question 1

Below is a diagram of the fluid mosaic model of the plasma membrane.



a.

i. Fill in the boxes above with the structure indicated.

ii. Describe the structure of **F**.

iii. Identify a function of **C**.

- iv.** For the structure you identified in **a. i.** use the terms hydrophobic and hydrophilic to describe the affinity for water of each end of the molecule.

6 + 1 + 1 + 2 = 10 marks

- b.** The plasma membrane is described as being semi-permeable because it allows some substances to pass directly through and not others.

- i.** Water (a polar molecule) is able to diffuse freely through the plasma membrane whereas glucose which is also a polar molecule is not. Provide a reason for this.

- ii.** How does a molecule such as glucose get across the plasma membrane?

- iii.** Give an example of a molecule (other than water) that is able to freely cross the plasma membrane. Describe with reference to its polarity why it is able to cross freely.

2 + 1 + 2 = 5 marks

Total 15 marks

Question 2

Ricin is an enzymatic protein that is highly toxic to animals and insects. Found as a natural toxin in the endosperm cells that line the seed coats of the castor oil plant (*Ricinus communis*), it is one of the most poisonous naturally occurring substances known. Less than 1 mg of ricin can kill an adult human. Ricin is just one of the many cytotoxic proteins produced by plants.

- a. The process by which the endosperm cells produce the protein ricin involves steps that occur in the nucleus and the cytoplasm. Describe the steps that occur in the cytoplasm including the organelles involved.

4 marks

- b. Ricin acts by blocking protein synthesis. Which organelle is affected by the protein?

1 mark

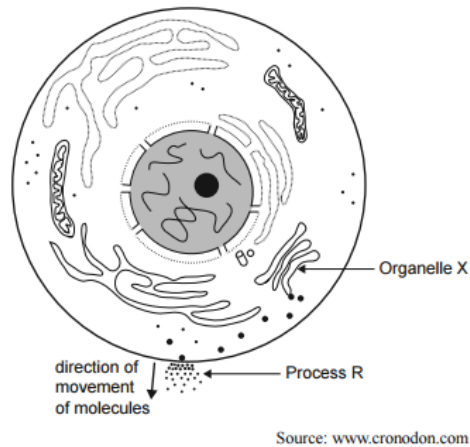
- c. What happens to proteins produced by ribosomes that are attached to the endoplasmic reticulum?

1 mark

Total 6 marks

Question 3

Consider the following diagram



a. Organelle X is involved in protein synthesis

i. Identify organelle X.

ii. Outline the function of organelle X

1 + 1 = 2 marks

b. Process R is performed when the proteins that have been synthesised are required outside the cell.

i. Identify Process R

ii. Describe using a labelled diagram, the process by which substances are taken up by cell in bulk.

1 + 1 = 2 marks

Total 4 marks

Question 6

F tcy "cpf "rdgr'j g"o clqt"wt wewt gu'hqt"qpg"qh'y g'hqmy lpi "qti cpgmu<

"

O KQJEJ QP FTK "*****EJ NQTQRNCUV*****%ekteng"{ qwt'ej qugp"qti cpgmg+

.

7 marks

Total 7 marks

Question 7

Smokers and drinkers get their highs rapidly because the molecules they inhale pass quickly through cell membranes into the blood of the capillaries lining the nose and lungs and move out of the blood (crossing the blood-brain barrier) on reaching brain cells.

a. Complete the following table

Substance	Polarity (polar/non-polar)	Diffuse through plasma membrane (Yes/No)
Ethanol		
Carbon dioxide		
Glucose		
Sodium ions		
Protein		

10 marks
Total 10 marks

END OF KEY TOPIC TEST