



# **BIOLOGY 2017**

## **Unit 3**

### **Key Topic Test 1 – Plasma membranes**

Recommended writing time\*: 45 minutes

Total number of marks available: 45 marks

## **SOLUTIONS**

**SECTION A: Multiple-choice questions (1 mark each)**

**Question 1**

*Answer: C*

*Explanation:*

Structure III represents a protein as it spans the width of the membrane and allows large hydrophilic substances to pass through.

**Question 2**

*Answer: D*

*Explanation:*

The phospholipid bilayer has the non-polar fatty acid tail facing each other and the polar phosphate head facing the water environment.

**Question 3**

*Answer: C*

*Explanation:*

Ethanol is a non-polar molecule and is therefore able to simply diffuse across the phospholipid bilayer

**Question 4**

*Answer: A*

*Explanation:*

Hydrophilic substances are unable to diffuse through the phospholipid bilayer and require protein channels to get across the membrane

**Question 5**

*Answer:* D

*Explanation:*

Ribosomes are responsible for converting mRNA into a polypeptide

**Question 6**

*Answer:* B

*Explanation:*

Proteins that are to be secreted from the cell are synthesised on ribosomes associated with the endoplasmic reticulum

**Question 7**

*Answer:* A

*Explanation:*

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

**Question 8**

*Answer:* D

*Explanation:*

Exocytosis is the bulk transport of substances out of the cell.

**Question 9**

*Answer:* B

*Explanation:*

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

**Question 10**

*Answer: A*

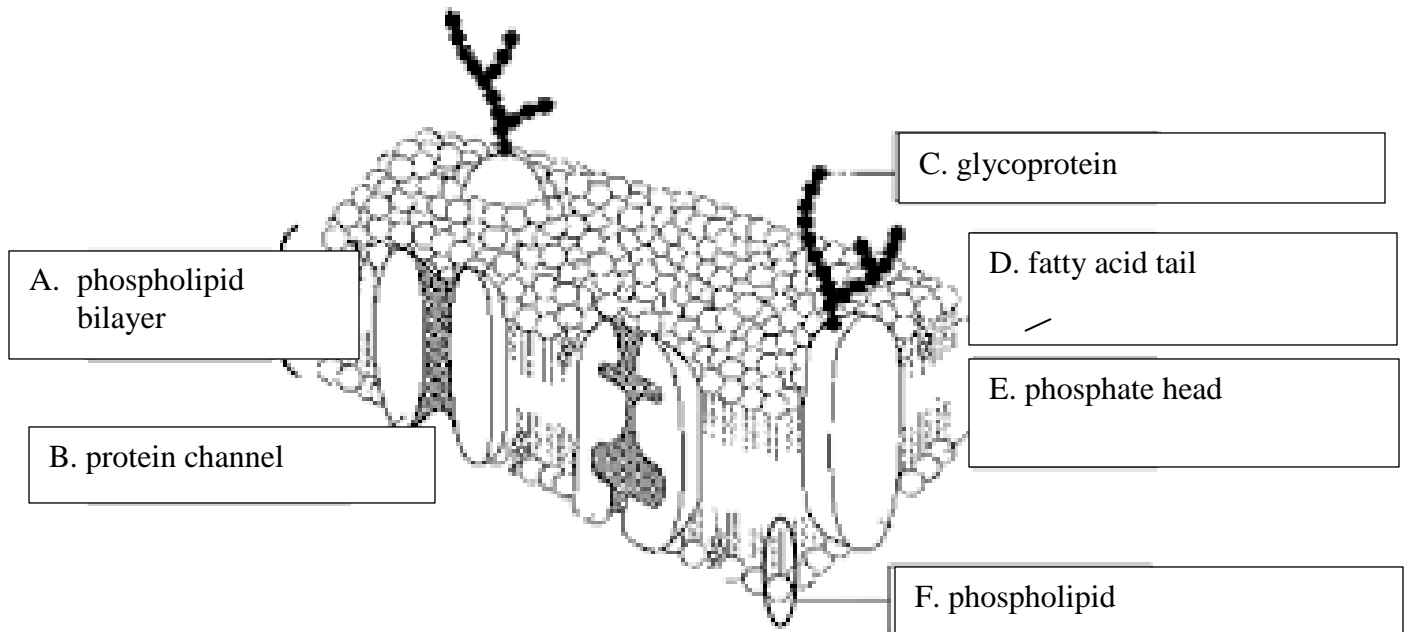
*Explanation:*

Pinocytosis is the specific term for the process that encloses droplets of liquid.

**SECTION B: Short-answer questions**

**Question 1**

- a.
  - i.



ii. Structure F has a phosphate head and a fatty acid tail

iii. cell – cell recognition

iv. phosphate head = hydrophilic  
fatty acid tail = hydrophobic

6 + 1 + 1 + 2 = 10 marks

b.

i. water is much smaller than glucose and is able to pass between phospholipids

ii. facilitated diffusion – using protein channels

iii. ethanol is a non-polar molecule which is able to dissolve across the non-polar membrane.  
Accept any suitable response.

2 + 1 + 2 = 5 marks

Total 15 marks

**Question 2**

a. mRNA travels to the ribosomes associated with the endoplasmic reticulum (1 mark) where it is converted into a polypeptide (1 mark) the polypeptide chain travels to the golgi apparatus where it is modified and packaged into vesicles (1 mark) the vesicles are then exported from the cell (1 mark)

4 marks

b. Ribosomes

1 mark

c. they are exported from the cell

1 mark

Total 6 marks

**Question 3**

a.

i. Golgi apparatus

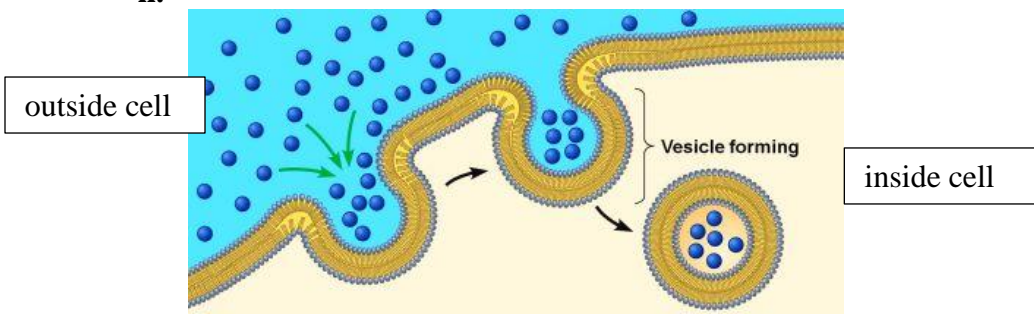
ii. Packages and modifies proteins

1 + 1 = 2 marks

b.

i. Exocytosis

ii.



1 + 1 = 2 marks

Total 4 marks

**Question 4**

**a.**

<b>Substance</b>	<b>Polarity (polar/non-polar)</b>	<b>Diffuse through plasma membrane (Yes/No)</b>
Ethanol	Non-polar	Yes
Carbon dioxide	Non-polar	Yes
Glucose	Polar	No
Sodium ions	Polar	No
Protein	Both	No

10 marks  
Total 10 marks