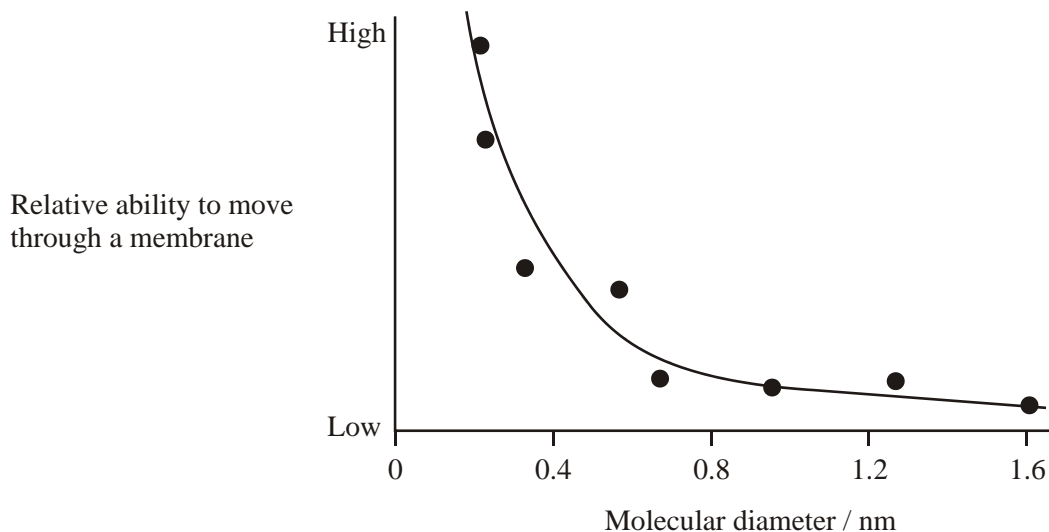


1. A study was carried out to determine the relationship between the diameter of a molecule and its movement through a membrane. The graph below shows the results of the study.



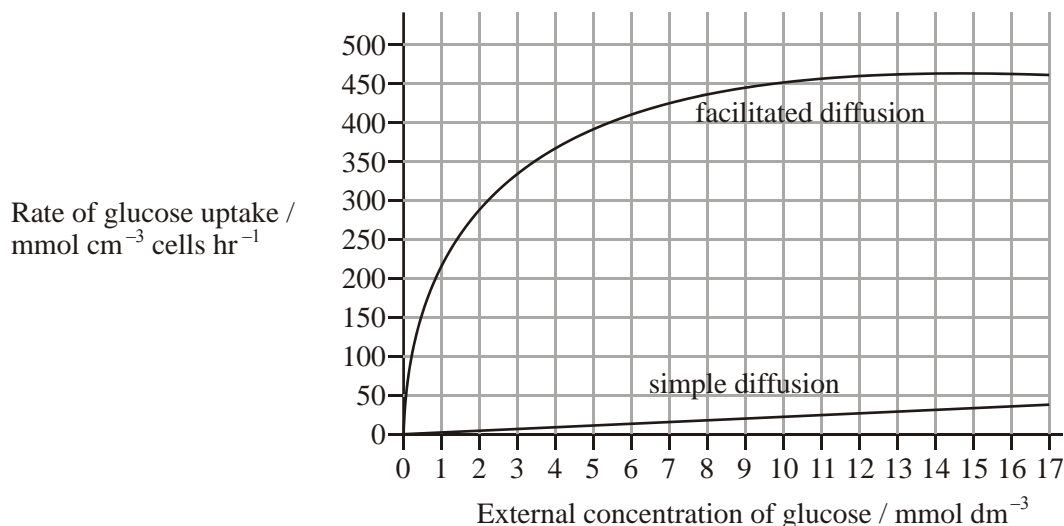
[Source: Knox, *et al.*, *Biology*, McGraw Hill, Sydney, 1994, page 65]

- (a) From the information in the graph alone, describe the relationship between the diameter of a molecule and its movement through a membrane.

.....  
 .....

(2)

A second study was carried out to investigate the effect of passive protein channels on the movement of glucose into cells. The graph below shows the rate of uptake of glucose into erythrocytes by simple diffusion and facilitated diffusion.



- (b) Identify the rate of glucose uptake at an external glucose concentration of 4 mmol dm<sup>-3</sup> by
- (i) simple diffusion; .....(1)
- (ii) facilitated diffusion. ....(1)

- (c) (i) Compare the effect of increasing the external glucose concentration on glucose uptake by facilitated diffusion and by simple diffusion.

.....  
.....  
.....

(3)

- (ii) Predict, with a reason, the effect on glucose uptake by facilitated diffusion of increasing the external concentration of glucose to  $30 \text{ mmol dm}^{-3}$ .

.....  
.....  
.....  
.....

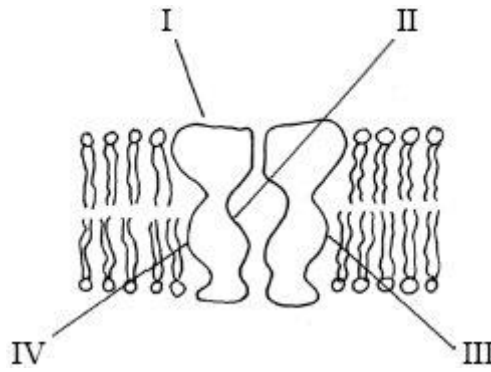
(2)

(Total 9 marks)

2. Draw a labelled diagram of the fluid mosaic model of the plasma membrane.

(Total 5 marks)

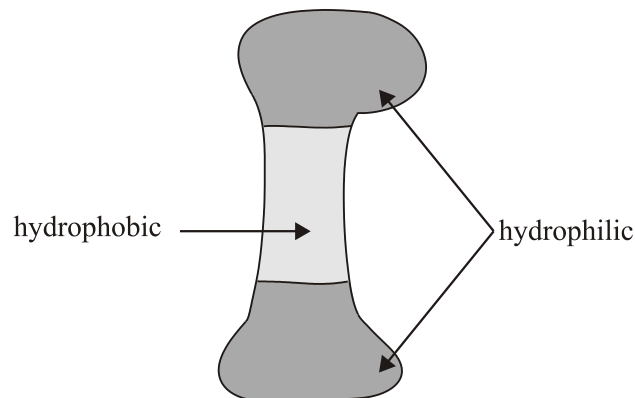
3. The diagram below shows a channel protein in a membrane. Which parts of the surface of the protein would be composed of polar amino acids.



- A. I and II only
- B. II and III only
- C. III and IV only
- D. I and IV only

(Total 1 mark)

4. The diagram below shows which areas on the surface of a protein are composed of hydrophobic amino acids and which areas of hydrophilic amino acids.



Where in a cell would the protein be located?

- A. In a nuclear pore
- B. In the space between the inner and outer mitochondrial membranes
- C. In the matrix of a mitochondrion
- D. In a phospholipid bilayer

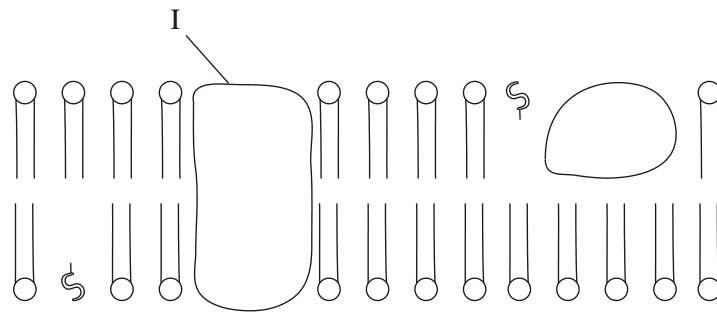
(Total 1 mark)

5. Which two molecules are the principal components of membranes?

- A. Glycogen and protein
- B. Lipid and glycogen
- C. Cellulose and protein
- D. Protein and lipid

(Total 1 mark)

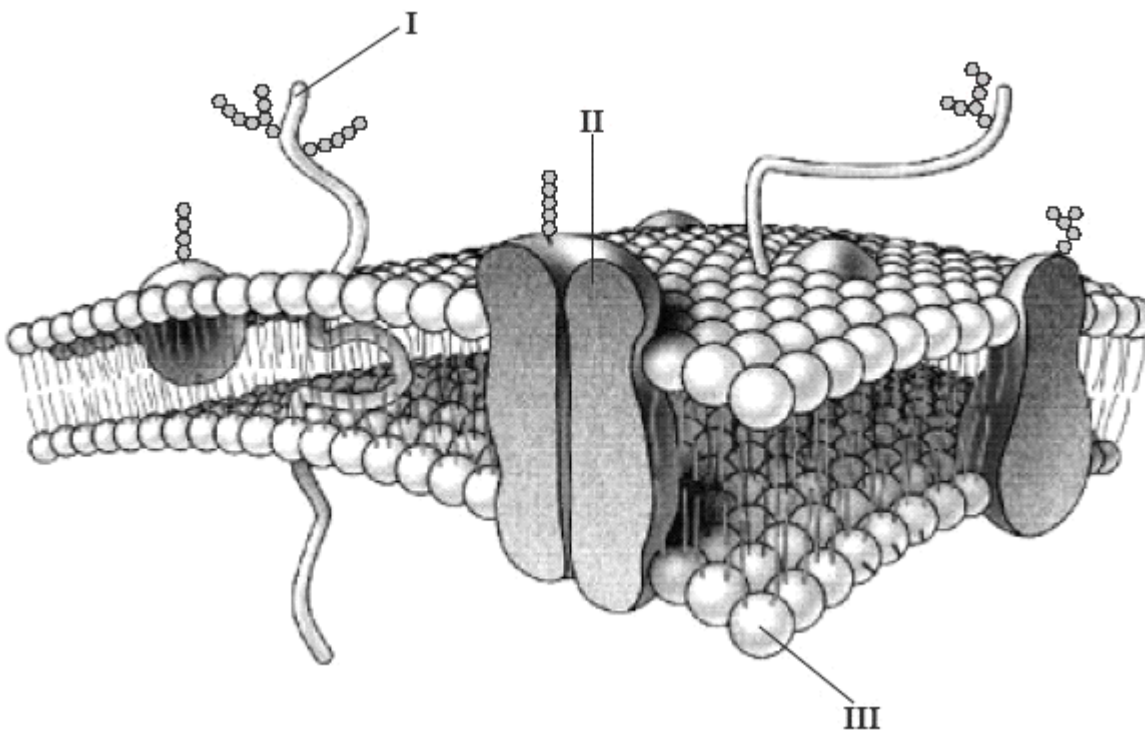
6. The diagram below shows part of a plasma membrane. What label should be used for structure I?



- A. Peripheral protein
- B. Phospholipid
- C. Cholesterol
- D. Integral protein

(Total 1 mark)

7. The diagram shows a model of a biological membrane. What do labels I, II, and III illustrate?



	I	II	III
A.	Integral protein	Peripheral protein	Hydrophobic phosphate head
B.	Peripheral protein	Glycoprotein	Hydrophilic phosphate head
C.	Glycoprotein	Integral protein	Hydrophilic phosphate head
D.	Glycoprotein	Peripheral protein	Hydrophobic phosphate head

(Total 1 mark)  
[Total 19 marks]