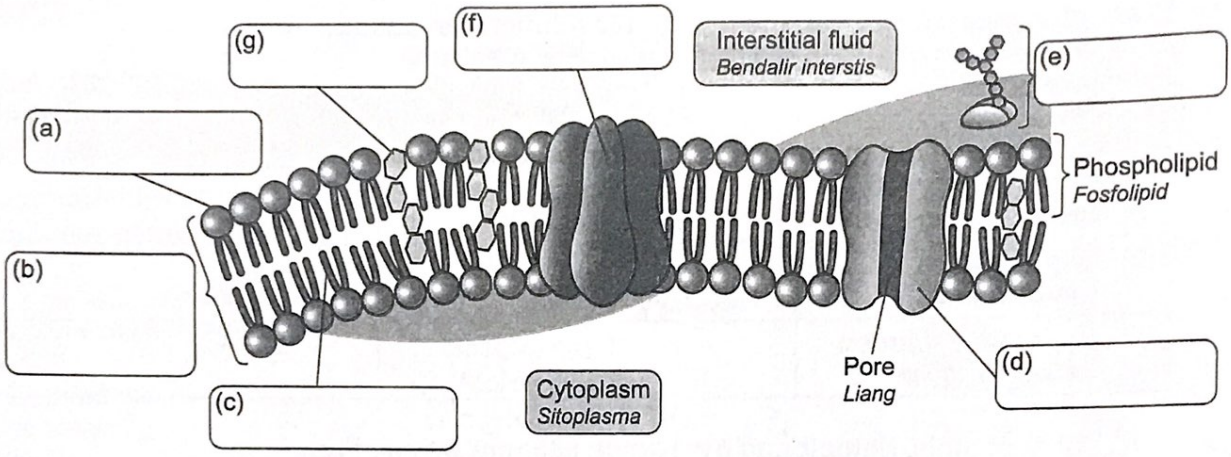
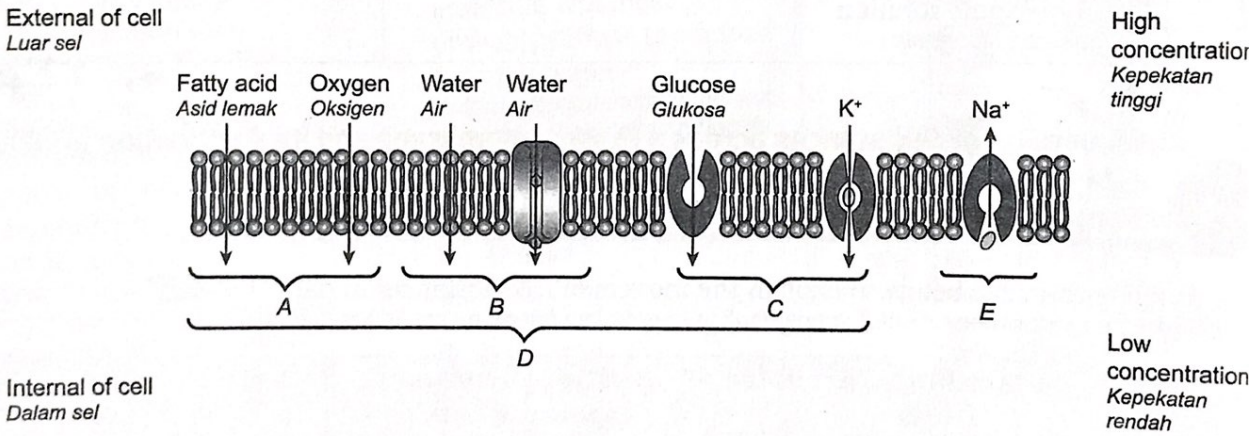
3.1 Structure of Plasma Membrane
Struktur Membran Plasma

1. The diagram below shows the structure of plasma membrane. Label the structures. TP1
Rajah di bawah menunjukkan struktur membran plasma. Labelkan struktur-struktur ini.



3.2 Concept of Movement of Substances across a Plasma Membrane
Konsep Pergerakan Bahan Merentasi Membran Plasma

2. Diagram below shows the movement of substances across plasma membrane. TP2
Rajah di bawah menunjukkan pergerakan bahan merentas membran plasma.



Name the following transport processes.
Namakan proses pengangkutan berikut.

A : _____ *D* : _____

B : _____ *E* : _____

C : _____

3.3 Movement of Substances across a Plasma Membrane in Living Organisms
Pergerakan Bahan Merentasi Membran Plasma dalam Organisma Hidup

3. Complete the table below. TP2
Lengkapkan jadual di bawah.

(a) Effect of hypotonic, isotonic and hypertonic solutions on animal cell.
Kesan larutan hipotonik, isotonik dan hipertonik ke atas sel haiwan.

Type of solution *Jenis larutan*	Diffusion of water *Resapan air*	Effects / Phenomenon *Kesan / Fenomena*
(i) Hypotonic solution *Larutan hipotonik*		
(ii) Isotonic solution *Larutan isotonik*		
(iii) Hypertonic solution *Larutan hipertonik*		

(b) Effect of hypotonic, isotonic and hypertonic solutions on plant cell.
Kesan larutan hipotonik, isotonik dan hipertonik ke atas sel tumbuhan.

Type of solution *Jenis larutan*	Diffusion of water *Resapan air*	Effects / Phenomenon *Kesan / Fenomena*
(i) Hypotonic solution *Larutan hipotonik*		
(ii) Isotonic solution *Larutan isotonik*		
(iii) Hypertonic solution *Larutan hipertonik*		

3.4 Movement of Substances across a Plasma Membrane and its Application in Daily Life
Pergerakan Bahan Merentasi Membran Plasma dalam Kehidupan Harian

4. Complete the table below to explain the movement of substances in daily life. TP2
Lengkapkan jadual berikut untuk menerangkan pergerakan bahan dalam kehidupan harian.

	(a) Isotonic drink for athlete *Minuman isotonik bagi atlet*	(b) Oral rehydration solutions for patient with diarrhea *Minuman penghidratan semula bagi pesakit cirit-birit*	(c) Saline solution for medical use *Larutan saline untuk penggunaan perubatan*
Function *Fungsi*			
Impact *Kesan*			

SPM Practice 3

Paper 1

3.1 Structure of Plasma Membrane
Struktur Membran Plasma

1. SPM 2010 Which molecules can pass through phospholipid bilayer?
Apakah molekul yang boleh bergerak melalui dwilapisan fosfolipid?

A Charged ion
Ion bercas

B Water
Air

C Amino acids
Asid amino

D Glycogen
Glikogen

3.2 Concept of Movement of Substances across a Plasma Membrane
Konsep Pergerakan Bahan Merentasi Membran Plasma

2. SPM 2009 Diagram 1 shows the movement of substance *P* across the plasma membrane of a cell by a certain process.
Rajah 1 menunjukkan pergerakan bahan P merentasi membran plasma sel melalui satu proses tertentu.

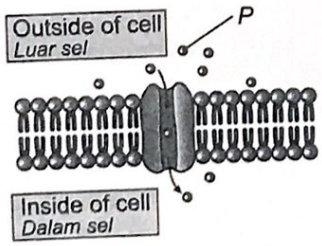


Diagram 1 / *Rajah 1*

Which of the following statements about this process is correct?
Antara pernyataan berikut, yang manakah benar mengenai proses ini?

A Molecule *P* is soluble in lipid.
Molekul P larut dalam lipid.

B It is known as facilitated diffusion.
Proses ini dikenal sebagai resapan berbantu.

C Molecule *P* moves against its concentration gradient.
Molekul P bergerak menentang kecerunan kepekatan.

D It requires energy.
Proses ini memerlukan tenaga.

3. Which of the following molecule will most probably diffuse the fastest through water?
Antara molekul-molekul berikut, yang manakah paling mungkin meresap dengan paling cepat melalui air?

A Methanol
Metanol

B Ethanol
Etanol

C Propanol
Propanol

D Butanol
Butanol

4. Which of the following statements outlines the difference between active transport and facilitated diffusion?
Antara pernyataan berikut, yang manakah menunjukkan perbezaan antara pengangkutan aktif dan resapan berbantu?

	Active transport *Pengangkutan aktif*	Facilitated diffusion *Resapan berbantu*
A	Occurs through transport protein *Berlaku melalui protein pengangkutan*	Occurs through phospholipid bilayer *Berlaku melalui dwilapisan fosfolipid*
B	Does not require energy *Tidak memerlukan tenaga*	Require energy *Memerlukan tenaga*
C	Movement of substances against concentration gradient *Pergerakan bahan menentang kecerunan kepekatan*	Movement of substances follows concentration gradient *Pergerakan bahan menurun kecerunan kepekatan*
D	Involves non-polar molecules *Melibatkan molekul-molekul tidak berkutub*	Involves polar molecules *Melibatkan molekul-molekul berkutub*

3.3 Movement of Substances across a Plasma Membrane in Living Organisms
Pergerakan Bahan Merentasi Membran Plasma dalam Organisma Hidup

5. The table below shows the concentration of four substances inside and outside of a cell in arbitrary units. Which

substances can only be transported out of the cell by active transport?
Jadual di bawah menunjukkan kepekatan empat bahan di dalam dan di luar sel dalam unit arbitrari. Antara bahan berikut, yang manakah hanya boleh diangkut ke luar sel secara pengangkutan aktif?

	Concentration inside cell *Kepekatan di dalam sel*	Concentration outside cell *Kepekatan di luar sel*
A	8	8
B	7	10
C	8	4
D	7	6

6. SPM 2009 Which of the following diagrams shows the appearance of a plant cell which is immersed in distilled water?
Antara rajah berikut, yang manakah menunjukkan keadaan satu sel tumbuhan yang direndam dalam air suling?

A

C

B

D

7. SPM 2017 The cytoplasm of onion cells shrink after it is placed in solution *X*. Which of the following is solution *X* and what is the process that has occurred to the cell in the solution *X*?
Sitoplasma sel-sel bawang mengecut selepas diletakkan dalam larutan X. Antara yang berikut, yang manakah merupakan larutan X dan apakah proses yang berlaku ke atas cell tersebut dalam larutan X.

	Solution *X* *Larutan X*	Process *Proses*
A	Distilled water *Air suling*	Plasmolysis *Plamolisis*
B	20% sucrose solution *Larutan sukrosa 20%*	Plasmolysis *Plamolisis*
C	20% sucrose solution *Larutan sukrosa 20%*	Haemolysis *Hemolisis*
D	Distilled water *Air suling*	Crenation *Krenasi*

8. An animal cell is placed in a dish of distilled water. Which of the following will occur after some time?
Satu sel haiwan diletakkan dalam satu pinggan air suling. Antara yang berikut, yang manakah akan berlaku selepas beberapa ketika?

A The cell will become plasmolysed.
Sel tersebut mengalami plasmolisis.

B Water will be transported into the cell via active transport.
Air akan diangkut ke dalam sel secara pengangkutan aktif.

C The plasma membranes become wrinkled.
Membran plasma menjadi berkedut.

D The cytoplasm of the cell will become more dilute.
Sitoplasma sel menjadi lebih cair.

9. SPM 2013 Four potato strips are placed in distilled water and three salt solutions of different concentration. The percentage changes in mass of the potato strips after four hours are shown below. Which potato strip was most likely to be placed in distilled water?
Empat jalur ubi kentang diletakkan dalam air suling dan tiga larutan garam dengan kepekatan yang berlainan. Peratus perubahan jisim jalur ubi kentang selepas empat jam ditunjukkan di bawah. Antara jalur ubi kentang berikut, yang manakah paling mungkin diletakkan dalam air suling?

	Potato strip *Jalur ubi kentang*	Percentage change in mass *Peratus perubahan jisim*
A	*P*	+5%
B	*Q*	+10%
C	*R*	0%
D	*S*	–15%

10. Which of the following processes causes microorganisms in food to lose water by osmosis?
Antara proses berikut, yang manakah menyebabkan mikroorganisma dalam makanan kehilangan air melalui osmosis?

A Pickling
Penjerukan

B Fermentation
Penapaian

C Dehydration
Pendehidratan

D Pasteurisation
Pempasteuran

11. Diagram 2 shows a graph of percentage difference in length of strips of potato against concentration of sucrose solution.
Rajah 2 menunjukkan graf peratus perbezaan panjang jalur ubi kentang melawan kepekatan larutan sukrosa.

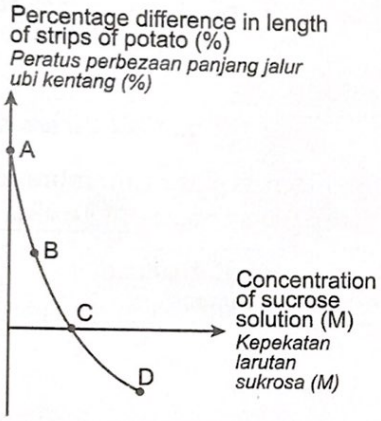


Diagram 2 / *Rajah 2*

At which point, **A**, **B**, **C** or **D**, is the concentration of the sucrose solution is hypertonic to the cell sap of the potato cells?
*Pada titik manakah, **A**, **B**, **C**, atau **D**, kepekatan larutan sukrosa adalah hipertonik kepada sap sel ubi kentang?*

3.4 Movement of Substances across a Plasma Membrane and its Application in Daily Life
Pergerakan Bahan Merentasi Membran Plasma dalam Kehidupan Harian

12. SPM 2011 A gardener planted an herbaceous plant in a pot with soil taken from the mangrove swamp. After a few days he found that the plant wilted. What is the cause of the wilting of plant?
Seorang tukang kebun menanam tumbuhan herba di dalam pasu dengan menggunakan tanah dari kawasan paya bakau. Selepas beberapa hari, dia mendapati tumbuhan itu layu. Apakah yang menyebabkan kelayuan tumbuhan?

A Less aeration in the soil.
Kurang pengudaraan dalam tanah.

B Too much fertiliser in the soil.
Terlalu banyak baja di dalam tanah.

C The soil water is hypertonic to the root cells.
Air tanah adalah hipertonik terhadap sel-sel akar.

D Too little soil in the pot.
Terlalu sedikit tanah di dalam pasu.

Paper 2

Section A / *Bahagian A*

1. SPM 2016 Diagram 1.1 shows the structure of plasma membrane based on the fluid mosaic model.
Rajah 1.1 menunjukkan struktur membran plasma berdasarkan model mozek bendalir. HOTS Analysing

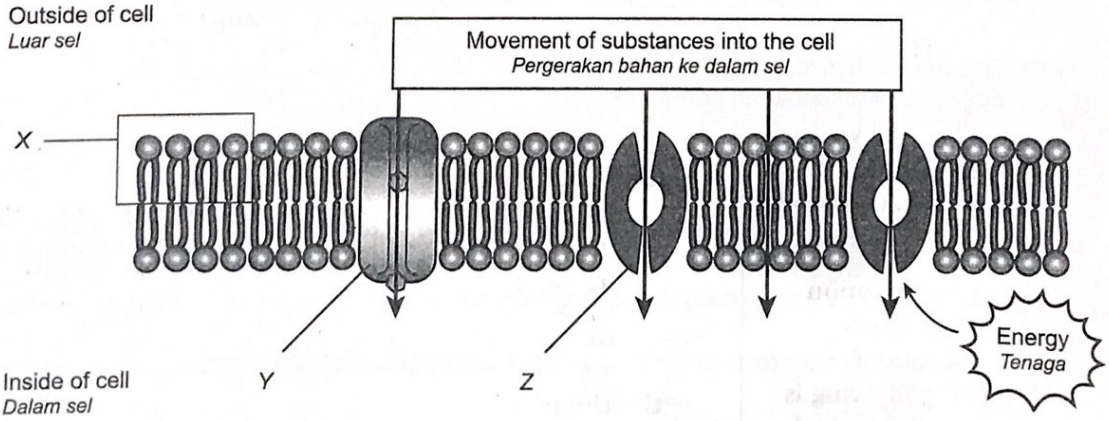


Diagram 1.1 / *Rajah 1.1*

(a) Name the parts labelled as *X*, *Y*, and *Z*.
Namakan bahagian berlabel X, Y dan Z.

X : _____ *Y* : _____

Z : _____

[3 marks / *3 markah*]

(b) Give **one** example of substance that is able to move across part X. Explain the characteristic of the substance related to this ability.
*Berikan **satu** contoh bahan yang boleh bergerak melalui bahagian X. Terangkan ciri-ciri bahan tersebut berkaitan dengan keupayaan ini.*

_____

[2 marks / *2 markah*]

(c) State **two** differences between the movement of oxygen and glucose across plasma membrane.
*Nyatakan **dua** perbezaan antara pergerakan oksigen dan glukosa merentasi membran plasma.* HOTS Analysing

The movement of oxygen *Pergerakan oksigen*	**The movement of glucose** *Pergerakan glukosa*

[2 marks / *2 markah*]

(d) Diagram 1.2 shows root hair cell of plant *R* and the surrounding soil particles.
Rajah 1.2 menunjukkan sel rambut tumbuhan R dan zarah-zarah tanah di sekelilingnya.

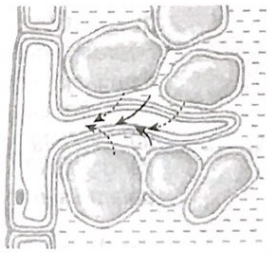


Diagram 1.2 / *Rajah 1.2*

(i) Name the transport process by which root hair cells absorb water.
Namakan proses pengangkutan di mana sel rambut akar menyerap air.

_____

[1 mark / *1 markah*]

(ii) Define the process in (d)(i).
Berikan definisi proses di (d)(i).

_____

_____

[2 marks / *2 markah*]

(e) A plant is given excessive fertiliser. Explain the effect of excessive fertiliser on the process mentioned in (d)(i).
Suatu tumbuhan diberi baja berlebihan. Terangkan kesan baja berlebihan ke atas proses yang dinyatakan pada (d)(i). HOTS Analysing

_____

_____

[2 marks / *2 markah*]