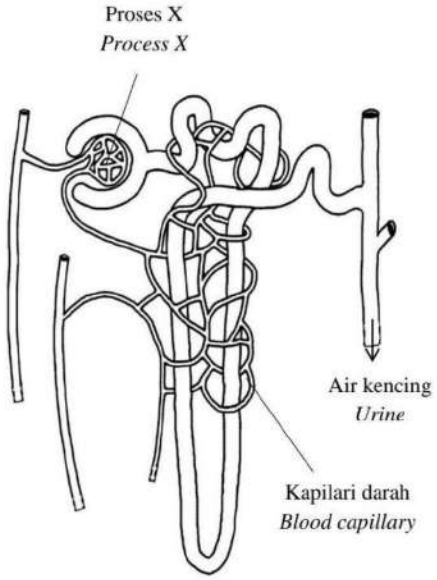
Bahagian B
[20 *markah*]
Bahagian ini mengandungi **dua** *soalan. Jawab* **satu** *soalan*

9. Rajah 9.1 menunjukkan struktur nefron dan salur darah di dalam ginjal manusia.
Diagram 9.1 *shows the nephron structure and the blood vessels in human kidney.*



(a) Berdasarkan Rajah 9.1, terangkan proses X yang berlaku di antara glomerulus dan kapsul Bowman.
Based on Diagram 9.1, *explain the process X that occurs between the glomerulus and Bowman's capsule Bowman.*

[5 markah]
[5 *marks*]

P1 Proses X ialah ultraturasan / *Process X is ultrafiltration.*

P2 Darah yang memasuki memasuki glomerulus bertekanan hidrostatik tinggi
Blood entering the glomerulus is under high hydrostatic pressure

P3 kerana diameter arteriol aferen lebih besar daripada diameter arteriol eferen.
because the diameter of the afferent arteriole is larger than the diameter of the efferent arteriole.

P4 Bendalir meresap melalui dinding kapilari glomerulus
The fluid seeps through the walls of the glomerulus capillaries

P5 ke (dalam rongga) kapsul Bowman
into (the cavity of) Bowman's capsule.

P6 Bendalir yang memasuki rongga kapsul Bowman dipanggil hasil turasan glomerulus.
The fluid that enters Bowman's capsule is known as the glomerular filtrate.

P7 Hasil turasan glomerulus mempunyai komposisi bahan yang sama seperti plasma darah tetapi tidak mengandungi sel darah merah, platlet dan protein plasma.
The glomerular filtrate has the same composition as blood plasma but does not contain red blood cells, platelets and plasma proteins.

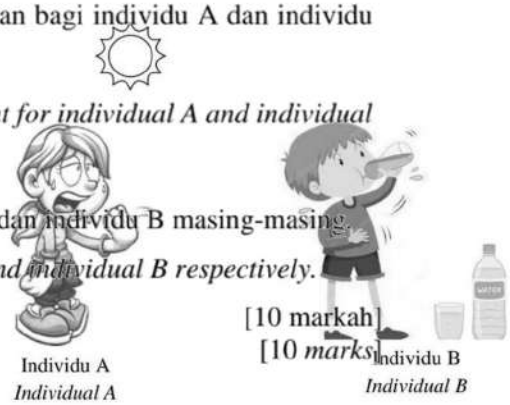
(b) Rajah 9.2 menunjukkan perbezaan kandungan air dalam badan bagi individu A dan individu B berdasarkan aktiviti yang dilakukan.

Diagram 9.2 shows the difference in the body's water content for individual A and individual B based on the activity that is being done.

Terangkan mekanisme pengawalaturan air dalam individu A dan individu B masing-masing.

Explain the mechanism of water regulation in individual A and individual B respectively.

[10 markah]
[10 *marks*]



Individu A
Individual A

Individu B
Individual B

Individu A

P1 Kehilangan air akibat cuaca panas melampau // *Water loss due to extreme hot weather*

P2 Tekanan osmosis darah meningkat melebihi julat normal
Blood osmotic pressure increases above the normal range

P3 Osmoreseptor dalam hipotalamus dirangsang
Osmoreceptors in the hypothalamus are stimulated

P4 Kelenjar pituitari dirangsang // *Pituitary gland is stimulated*

P5 Lebih hormon antidiuresis (ADH) dirembes daripada kelenjar pituitari
More antidiuretic hormone (ADH) is secreted from pituitary gland

P6 Kepekatan ADH yang tinggi menyebabkan dinding tubul berlingkar distal / tubul pengumpul lebih telap terhadap air
High ADH concentrations cause the wall of the distal convoluted tubule / collecting duct become more permeable to water

P7 Lebih banyak air diserap semula (daripada bendalir renal) ke dalam kapilari darah
More water is absorbed (from the renal fluid) into blood capillary

P8 Air kencing lebih pekat/sedikit dihasilkan // *Very concentrated/Low in volume of urine is produced*

P9 Tekanan osmosis darah kembali ke julat normal // *Blood osmotic pressure returns to normal*

Individu B

P10 Minum terlalu banyak air // *Drink too much water*

P11 Tekanan osmosis darah menurun ke bawah julat normal
Blood osmotic pressure drops below the normal range

P12 Osmoreseptor dalam hipotalamus kurang dirangsang
Osmoreceptors in the hypothalamus are less stimulated

P13 Kelenjar pituitari kurang dirangsang // *Pituitary gland is less stimulated*

P14 Kurang ADH dirembes daripada kelenjar pituitari
Less *ADH is secreted from pituitary gland*

P15 Kepekatan ADH yang rendah menyebabkan dinding tubul berlingkar distal / tubul pengumpul kurang telap terhadap air
Low ADH concentrations cause the wall of the distal convoluted tubule / collecting duct become less permeable to water

P16 Kurang air diserap semula (daripada bendalir renal) ke dalam kapilari darah
Less water is absorbed (from the renal fluid) into blood capillary

P17 Air kencing lebih cair/banyak dihasilkan // *Less concentrated/High in volume of urine is produced*

P18 Tekanan osmosis darah kembali ke julat normal // *Blood osmotic pressure returns to normal*

(c) Diagnosis untuk diabetes melitus boleh dilakukan melalui ujian air kencing untuk menguji kehadiran glukosa dalam air kencing. Terangkan mengapa air kencing pesakit diabetes mengandungi glukosa.

Diagnosis for diabetes mellitus can be carried out through urine test to identify the presence of glucose in urine. Explain why the urine of a diabetic patient contains glucose.

[5 markah]
[5 *marks*]

P1 Kelenjar pankreas gagal merembeskan insulin
Pancreatic gland fails to secrete insulin

P2 Glukosa berlebihan tidak dapat ditukarkan kepada glikogen
Excess glucose cannot be converted into glycogen

P3 Kepekatan glukosa dalam darah tinggi
The concentration of glucose in blood is high

P4 Ginjal gagal menyerap semula semua glukosa dalam tubul berlingkar proksimal
The kidneys are unable to reabsorb all glucose in the proximal convoluted tubule

P5 Glukosa dirembeskan ke dalam air kencing
Glucose is secreted into the urine

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9. Rajah 9.1 menunjukkan struktur yang terlibat dalam proses penghasilan air kencing.
Diagram 9.1 shows a structure involve in the formation of urine.

Rajah 9.1/*Diagram* 9.1

(a) Nyatakan **tiga** proses utama yang terlibat dalam penghasilan air kencing.
*State **three** main processes involved in the formation of urine.*

Ultraturasan, penyerapan semula, rembesan [3 markah/*marks*]
Ultrafiltration, reabsorption, secretion

(b) Terangkan bagaimana proses di T berlaku.
Explain how the process in T occur.

P1 Proses X ialah ultraturasan / *Process X is ultrafiltration.* [4 markah/*marks*]

P2 Darah yang memasuki memasuki glomerulus bertekanan hidrostatik tinggi
Blood entering the glomerulus is under high hydrostatic pressure

P3 Diameter arteriol aferen lebih besar daripada diameter arteriol eferen.
The diameter of the afferent arteriole is larger than the diameter of the efferent arteriole.

P4 Bendalir meresap melalui dinding kapilari glomerulus
The fluid seeps through the walls of the glomerulus capillaries

P5 ke (dalam rongga) kapsul Bowman
into (the cavity of) Bowman's capsule.

P6 Bendalir yang memasuki rongga kapsul Bowman dipanggil hasil turasan glomerulus.
The fluid that enters Bowman's capsule is known as the glomerular filtrate.

P7 Hasil turasan glomerulus mempunyai komposisi bahan yang sama seperti plasma darah tetapi tidak mengandungi sel darah merah, platlet dan protein plasma.
The glomerular filtrate has the same composition as blood plasma but does not contain red blood cells, platelets and plasma proteins.

(c) Dalam sekatan jalan raya, sekumpulan remaja lelaki telah ditahan dan air kencing mereka diuji dengan Kit Ujian Dadah Air Kencing . Air kencing salah seorang daripada mereka didapati positif dadah jenis ganja.

Berdasarkan pengetahuan biologi anda terangkan bagaimana ganja boleh dikesan di dalam air kencingnya?

In a roadblock, a group of teenage boys were detained, and their urine was tested with a Drug Urine Test Kit. The urine of one of them was found to be positive for cannabis.

Based on your biological knowledge explain how cannabis can be detected in his urine?

[5 markah/*marks*]

P1 Rembesan ialah proses pembentukan air kencing
Secretion is the process of urine production

P2 iaitu rembesan bahan buangan darah yang tidak dituras pada awalnya
which secretes waste materials that do not filtered earlier

P3 Ganja dirembeskan di sepanjang tubul renal
The cannabis is secreted along the renal tubule

P4 Rembesan paling aktif berlaku di tubul berlingkar distal
Secretion is most active at the distal convoluted tubule

P5 Rembesan berlaku secara resapan ringkas / pengangkutan aktif
Secretion occurs through simple diffusion / active transport

P6 Rembesan menyingkirkan bahan toksik seperti ganja
Secretion gets rid of waste toxic such as cannabis

(d) Rajah 9.2 menunjukkan En. Z pada situasi A dan situasi B.

Diagram 9.2 shows Mr Z in situation A and situation B.

Situasi A/ *Situation B* | Situasi B/ *Situation B*

Berdasarkan pengetahuan biologi anda, huraikan perbezaan mekanisme pembetulan untuk mengembalikan tekanan osmosis darah En Z kembali kepada julat normal.

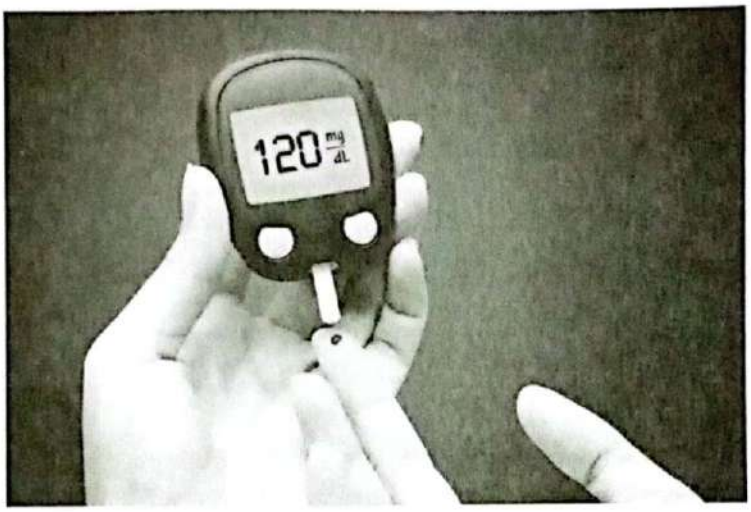
Based on your biological knowledge, describe the difference in the corrective mechanism to return the blood osmotic pressure of Mr. Z back to the normal range.

[8 markah/*marks*]

Situasi A / *Situation A*	Situasi B / *Situation B*
Pada hari hujan, Encik Z **kurang berpeluh** *During raining , Mr Z excretes less sweats*	Pada hari panas, Encik Z **banyak berpeluh** *During hot weather, Mr Z excretes more sweats*
Tekanan osmosis darah menurun ke bawah julat normal *Blood osmotic pressure drops below the normal range*	**Tekanan osmosis darah meningkat** melebihi julat normal *Blood osmotic pressure increases above the normal range*
Osmoreseptor dalam hipotalamus **kurang dirangsang** *Osmoreceptors in the hypothalamus are less stimulated*	**Osmoreseptor** dalam hipotalamus **dirangsang** *Osmoreceptors in the hypothalamus are stimulated*
Kelenjar pituitari kurang dirangsang *Pituitary gland is less stimulated*	**Kelenjar pituitari dirangsang** *Pituitary gland is stimulated*
Kurang hormon antidiuresis (ADH) dirembes daripada kelenjar pituitari Less *antidiuretic hormone ADH is secreted from pituitary gland*	**Lebih ADH dirembes** daripada kelenjar pituitari *More ADH is secreted from pituitary gland*
Kepekatan ADH dalam darah rendah *ADH concentration in blood is low*	**Kepekatan ADH dalam darah tinggi** *ADH concentration in blood is high*
Dinding tubul berlingkar distal / tubul pengumpul kurang telap terhadap **air** *Wall of the distal convoluted tubule / collecting duct less permeable to water*	**Dinding tubul berlingkar distal / tubul pengumpul lebih telap** terhadap **air** *The wall of the distal convoluted tubule / collecting duct more permeable to water*
Kurang air diserap semula (daripada bendalir renal) ke dalam kapilari darah *Less water is absorbed (from the renal fluid) into blood capillary*	**Lebih banyak air diserap semula** (drpd bendalir renal) ke dlm kapilari darah *More water is absorbed (from the renal fluid) into blood capillary*
Air kencing lebih cair / banyak dihasilkan *Less concentrated / High in volume of urine is produced*	**Air kencing lebih pekat / sedikit dihasilkan** *Very concentrated / Low in volume urine is produced*

(c) Seorang murid telah bersarapan dengan sepinggan nasi goreng dan secawan kopi. Rajah 10.3 menunjukkan aras gula di dalam darahnya. Bacaan normal aras gula darah ialah antara 75 - 100 mg/dL.

A student had a plate of fried rice and a cup of coffee for breakfast. Diagram 10.3 *shows the level of sugar in her blood. A normal blood sugar level reading is between* 75 - 100 mg/dL.



Rajah 10.3
Diagram 10.3

Huraikan bagaimana proses homeostasis berlaku untuk mengawal atur aras gula dalam darah murid tersebut kembali ke aras yang normal.

Describe how the homeostasis process occurs to regulate the blood sugar level of the student back to the normal level.

[6 *markah*]
[6 *marks*]

P1 Aras gula dalam darah meningkat / tinggi
Blood sugar level increases / high

P2 Sel (beta) pankreas dirangsang
(Beta) cells in pancreas are stimulated

P3 Pankreas merembeskan insulin (ke dalam darah)
Pancreas secretes insulin (into the blood)

P4 Insulin menukarkan glukosa berlebihan ditukar kepada glikogen
Insulin converts excess glucose in converted into glycogen

P5 dalam proses respirasi sel / *in the process of cellular respiration*

P6 Glikogen disimpan di dalam hati
Glycogen is stored in liver

P7 DI dalam sel adipos, glukosa berlebihan ditukarkan kepada lemak
In adipose cells, insulin convert excess glucose to fats