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01. Respiration Basics

① Introduction

ⓐ definition

i. chemical process

→ breakdown of nutrient molecules (glucose)

→ to release energy stored within molecule bonds

ii. type of respiration

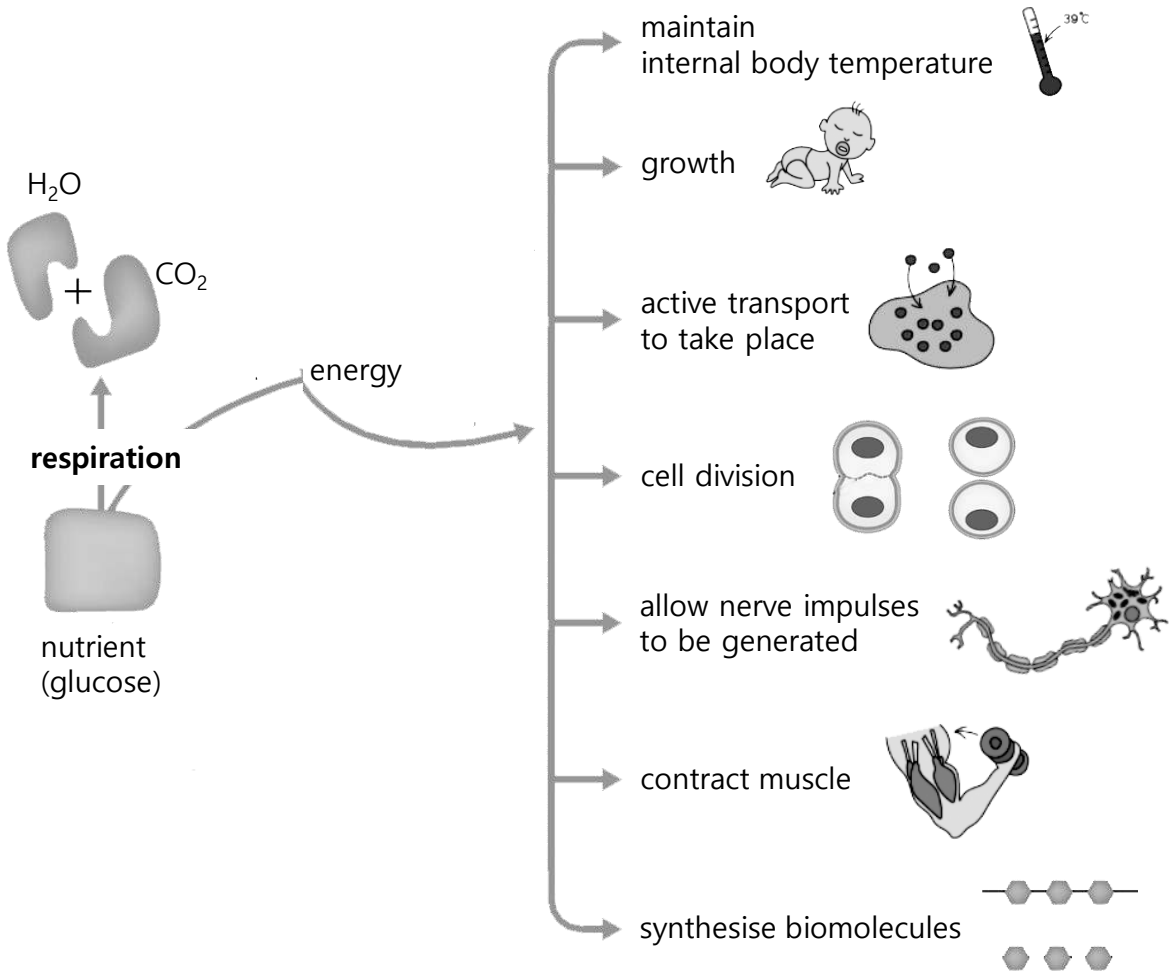
- aerobic respiration
  → take place with oxygen and in mitochondria
- anaerobic respiration
  → take place without oxygen
  → less energy is released compared to aerobic respiration

ⓑ control of respiration

→ respiration is a series of reactions

→ so, is controlled by enzymes

② Uses of Energy in Human Body



Fill in the Blanks

01. Respiration Basics

① Introduction

ⓐ definition

i . chemical process

→ _____ of nutrient molecules (glucose)

→ to release _____ stored within molecule bonds

ii . type of respiration

- _____ respiration

→ take place _____ oxygen and in _____

- _____ respiration

→ take place _____ oxygen

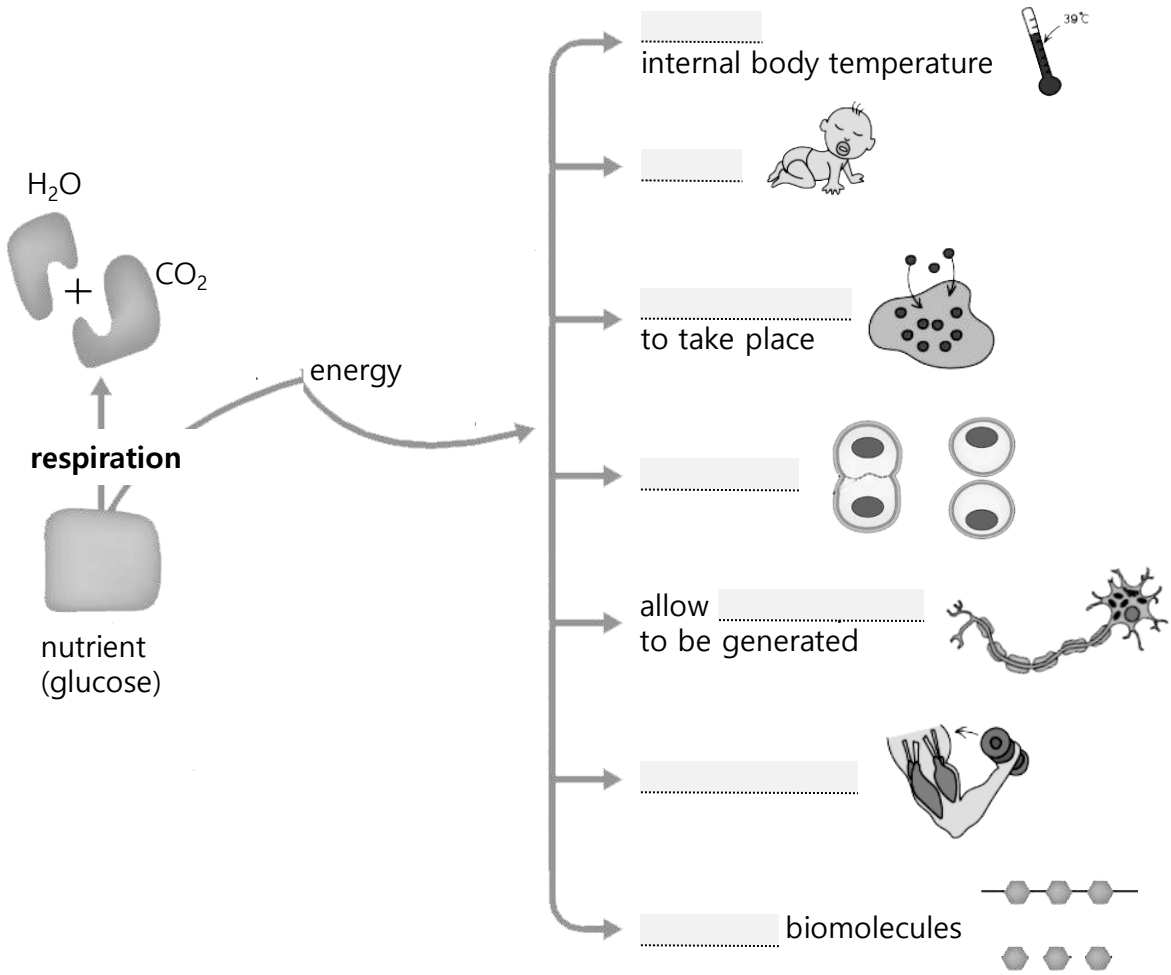
→ _____ is released compared to aerobic respiration

ⓑ control of respiration

→ respiration is a series of reactions

→ so, is controlled by _____

② Uses of Energy in Human Body



003.

MEMO

When does respiration take place in animals and plants?

	animals	plants
A	day time only	night time only
B	all the time	day time only
C	all the time	night time only
D	all the time	all the time

004.

Which process does ***not*** depend on respiratory energy?

A active transport

B osmosis

C peristalsis

D phagocytosis

005.

Which process, inside cells, releases energy useful to the body?

A absorption

B digestion

C respiration

D reproduction

MEMO

024.

The chemical formula C_2H_5OH represents a chemical produced during anaerobic respiration in yeast.

What is the name of this chemical?

A lactic acid

B ethanol

C glucose

D glycogen

025.

Which examples of respiration produce CO_2?

	aerobic respiration in human liver	anaerobic respiration in human muscles	anaerobic respiration in yeast
A	**O**	**X**	**O**
B	**X**	**O**	**O**
C	**X**	**X**	**O**
D	**O**	**O**	**O**

026.

The list below shows some metabolic processes.

X. glucose + oxygen → carbon dioxide + water
Y. glucose → alcohol + carbon dioxide
W. glucose → lactic acid
Z. carbon dioxide + water → glucose + oxygen

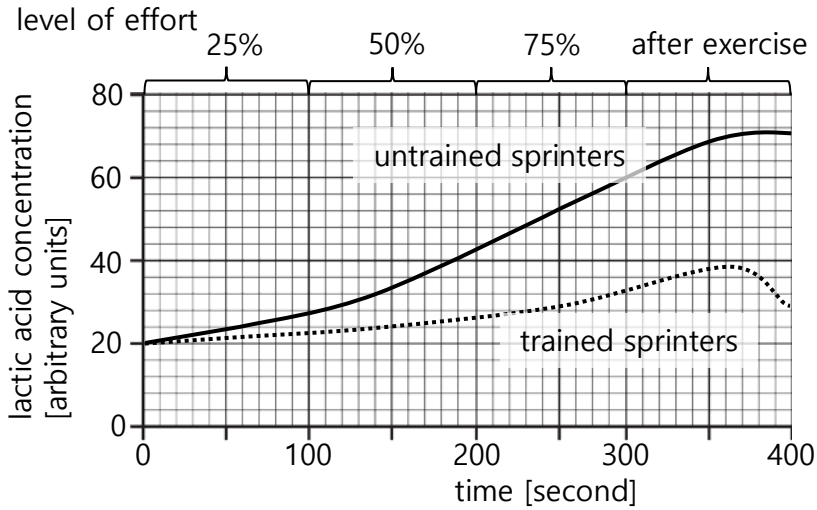
Which of these processes occur in human muscles?

A X only **B** X and Y **C** X and W **D** X, Y, W and Z

045.

MEMO

Scientists designed an investigation to find the effect of increasing levels of exercise on two groups of people. The first group of people were trained sprinters and the second group were untrained sprinters. The scientists asked all the people to run at three levels of effort: 25%, 50%, and 75% of their maximum running speed. They cycled for 100 seconds at each level of effort.
Figure below shows the average concentration of lactic acid in the blood of the trained sprinters and untrained sprinters in the investigation.



① Explain the effect of the increasing levels of effort on the average lactic acid concentration in the blood of the untrained sprinters.

……

……

……

② Describe why the lactic acid concentration in the blood in trained sprinters is different from the untrained sprinters 100 seconds after the exercise.

……

……

……

……

……

MEMO

062.

Which substances are excreted by lungs and kidneys?

	lungs	kidneys
A	carbon dioxide	carbon dioxide
B	urea	carbon dioxide
C	carbon dioxide	urea
D	urea	urea

063.

What materials are lost from the body by the lungs, kidneys, and skin?

A urea

B water

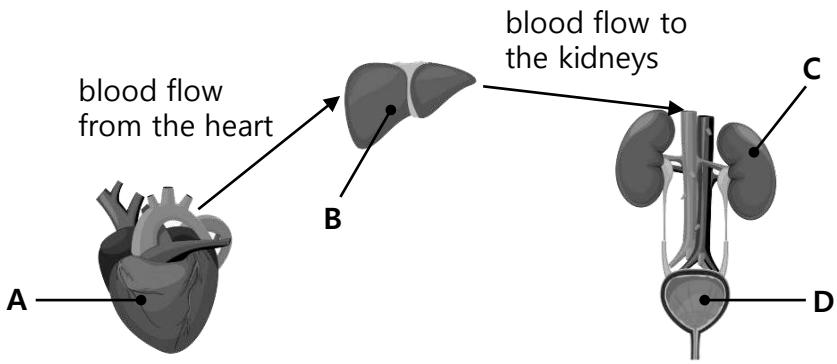
C excess salts

D carbon dioxide

064.

The figure shows the flow of blood from the heart, through the liver and towards the kidneys.

Where is urea made?



MEMO

100.

The table below shows the amount of salts and water lost from the kidneys and skin on a cold day and on a hot day. Food and drink intake are the same on both days.

	from kidneys		from skin	
	water loss	salt loss	water loss	salt loss
cold day	1.75dm^3	19.05g	0.00dm^3	0.00g
hot day	0.10dm^3	13.00g	2.55dm^3	6.05g

Which statement about the above result is correct?

A Salt is lost from the skin on cold days.

B The total amount of salt lost each day is the same.

C Less salt is lost from the kidneys on a cold day than on a hot day.

D More water is lost on a hot day from the kidneys than from the skin.

101.

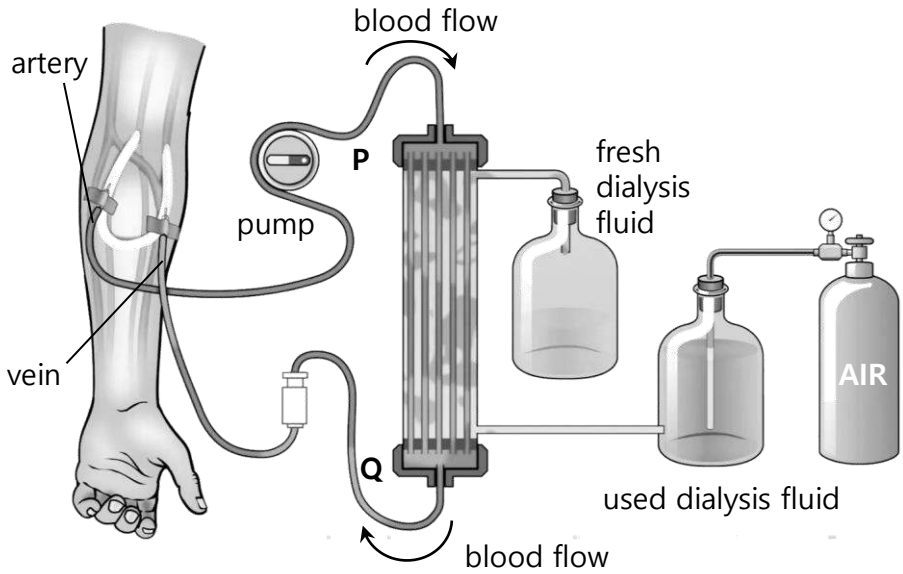
Blood is filtered by the kidneys. After this filtration, some substances are reabsorbed into the blood and others are excreted out of the body through urine.
Which line shows the correct movement of substances in a healthy person?

	reabsorbed into the blood	excreted through urine.
A	glucose, salt	water, urea
B	some glucose, some salt	some glucose, water, urea
C	glucose, water, urea	some glucose, some water, salt
D	glucose, some salts, some water	some salts, some water, urea

MEMO

118.

The figure below shows how blood and dialysis fluid move through a dialysis machine.



① Explain the changes that occur in blood as it flows through the dialysis machine from **P** to **Q**.

.....

.....

.....

② State the advantages of kidney transplants compared to artificial dialysis.

.....

.....

.....

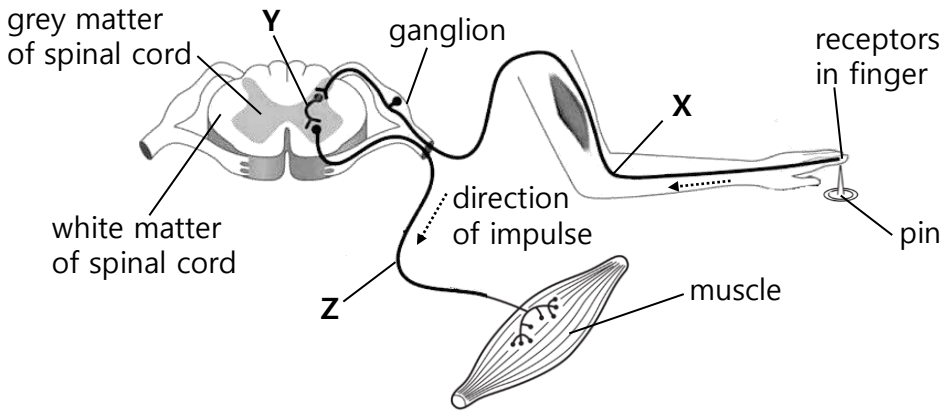
.....

.....

MEMO

149.

Figure below shows a reflex arc involving a finger and a muscle in the arm.



① State three stimuli that can be detected by receptors in the finger.

.....

.....

.....

② What are the names of neurons **X**, **Y**, and **Z** in the figure above?

X .....

Y .....

Z .....

③ It takes 0.02 seconds for the impulse to travel from the finger to the spinal cord at a distance of 1.5 metres.
What is the speed of the impulse?

.....metres per second

④ Although the total distance the impulse travels in the reflex arc is less than 3 metres, the time taken is more than 0.04 seconds.
Explain why the time taken is more than expected.

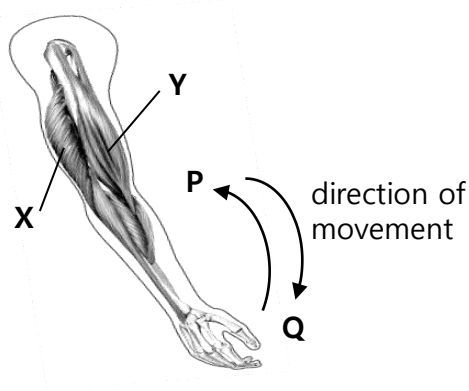
.....

.....

MEMO

166.

The diagram right shows two antagonistic muscles and the directions of movement that they produce.

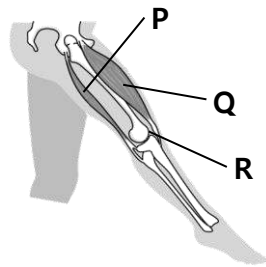


Which row correctly identifies these muscles and the directions of movement they produce on contraction?

	muscle **X**		muscle **Y**	
	name	movement	name	movement
A	biceps	Q	triceps	P
B	triceps	P	biceps	Q
C	biceps	P	triceps	Q
D	triceps	Q	biceps	P

167.

The diagram right shows some bones and muscles in a leg of a human.



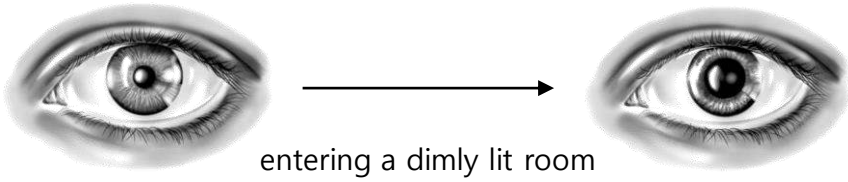
What happens to muscle **Q** and to the leg at joint **R**, when muscle **P** contracts?

	muscle **Q**	leg at joint **R**
A	relaxes	straightens
B	relaxes	bends
C	contracts	bends
D	contracts	straightens

183.

MEMO

The figure below shows a reflex action that involves the eye. **P** shows an eye in bright light and **Q** shows the same eyes when entering a dimly lit room.



P **Q**

① Complete the table below that summarizes the changes from **P** to **Q**.

stimulus	
receptor cells	
effector	
response	

② Explain how the nervous system coordinates the response shown in the figure above.

.....

.....

.....

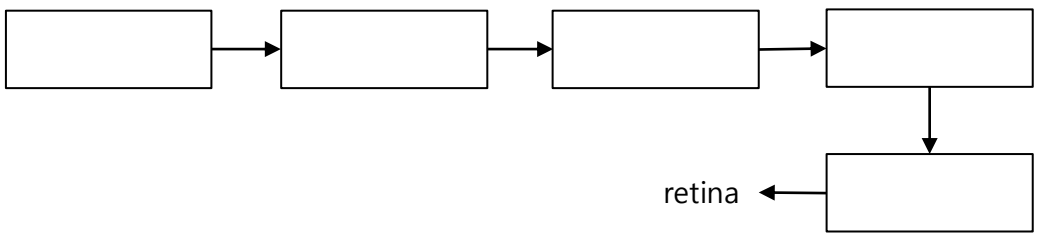
.....

184.

Light passes through part of the eye and reaches the retina.

Complete the flowchart by placing the following items in the box to show the correct order through which the light passes.

pupil **cornea** **aqueous humour** **lens** **vitreous humour**



224.

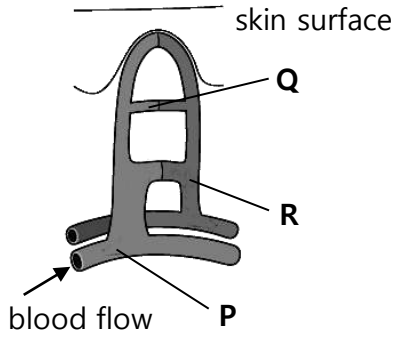
MEMO

Which responses occur when a health person is too cold?

	producing sweat	shivering	blood vessels supplying skin capillaries
A	no	yes	dilated
B	no	yes	constricted
C	no	no	constricted
D	yes	no	dilated

225.

The diagram right shows some blood vessels near the surface of the skin.



If vasodilation occurs at P,
what happens to the blood flow at Q and R?

	at Q	at R
A	increases	increases
B	increases	decreases
C	decreases	stays constant
D	stays constant	increases

226.

What is the reason sweat can cool the body?

A Sweating causes vasoconstriction.

B Urea and salt are lost from the body in sweat.

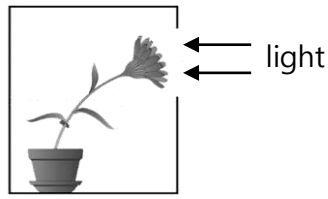
C Water in sweat evaporates from the skin.

D Sweating increases the water content of the blood.

MEMO

242.

The figure shows a plant shoot growing towards the light.



Which response is shown by the shoot of the plant?

A phototropism

B gravitropism

C respiration

D photosynthesis

243.

What is an example of gravitropism?

A antifungal chemicals produced by a plant

B the growth of a plant roots towards light

C a painful sensation in response to a stimulus

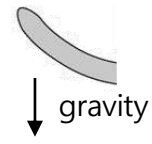
D the growth of plant stems away from the centre of the Earth

244.

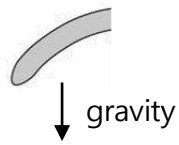
The diagram below shows the shoots of oat seedlings.

Which seedling exhibits negative geotropism?

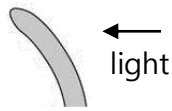
A



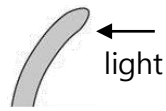
B



C



D

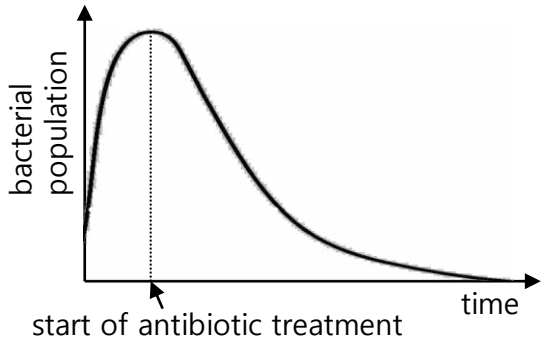


MEMO

263.

The graph right shows the effect of antibiotic treatment on the bacterial population in the blood.

What conclusion can be drawn from the graph right?



A Antibiotics take a few days to kill all bacteria.

B Antibiotics cause reduction cell-division in bacteria.

C Antibiotics are effective against bacterial as well as viral infections.

D After the start of antibiotic treatment the bacterial population was decreasing.

264.

In which organ of the body do drugs break down?

A liver

B brain

C heart

D kidneys

265.

The statements are about the use of antibiotics.

P. using an antibiotic to prevent infection **Q**. using an antibiotic known to kill all bacteria **R**. using an antibiotic known to kill only bacteria causing an infection **S**. using an antibiotic to treat a viral infection

Which practices will increase the chance of the development of antibiotic resistance in bacteria?

A **P** and **Q** **B** **P** and **R** **C** **P**, **Q** and **S** **D** **P**, **Q**, **R** and **S**

MEMO

281.

What are the two explanations for the effects of smoking cigarettes?

P. Cilia beat more slowly.
Q. Cilia beat more quickly.
R. Goblet cells produce more mucus.
S. Goblet cells stop producing mucus.

A P and R **B** P and S **C** Q and R **D** Q and S

282.

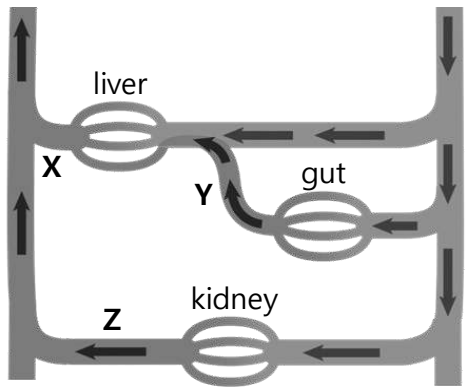
What are the effects of cigarette smoke on the gas exchange system?

	chance of lung infection	mucus in the airway
A	decreased	decreased
B	increased	increased
C	increased	decreased
D	decreased	increased

283.

The diagram right shows some human organs and blood vessels.

What happens to the alcohol levels in blood vessels X, Y and Z immediately after taking an alcoholic drink?



	X	**Y**	**Z**
A	high	low	medium
B	low	low	high
C	medium	high	low
D	high	high	medium

03. Sexual Reproduction in Plants

① Structure of Flower

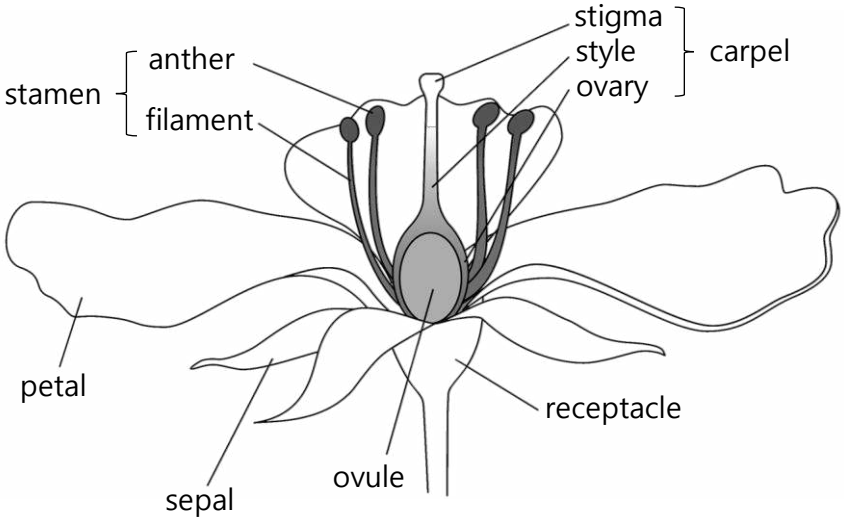
ⓐ flower

ⅰ. definition

flower is reproductive organ of plant

ⅱ. contain both male and female reproductive parts

ⓑ parts of flower



part	description
sepal	protect flower when it is in bud (unopened flower) often green and much smaller than the petals
petals	brightly coloured in insect-pollinated flowers to attract insects in wind pollinated flowers are tiny, and used for pushing bracts
anther	has pollen sacs with pollen grains which contain the male nucleus (male gamete).
stigma	top of female part of flower which collect pollen grains
ovary	produces female sex cell (ovum)
ovule	contain female sex cell

② Adaptations for Pollination

ⓐ pollination

ⅰ. definition

pollination is transfer of pollen grains from anther (male part) to stigma (female part)

ⅱ. pollen

→ male gamete that contains a nucleus inside

→ pollen is not capable of locomotion (moving from one place to another)

→ so, plants have mechanisms in place to transfer pollen from anther to stigma

→ this process is called pollination

ⅲ. agents of pollination

→ insects, birds, mammals, water, wind

Fill in the Blanks

03. Sexual Reproduction in Plants

① Structure of Flower

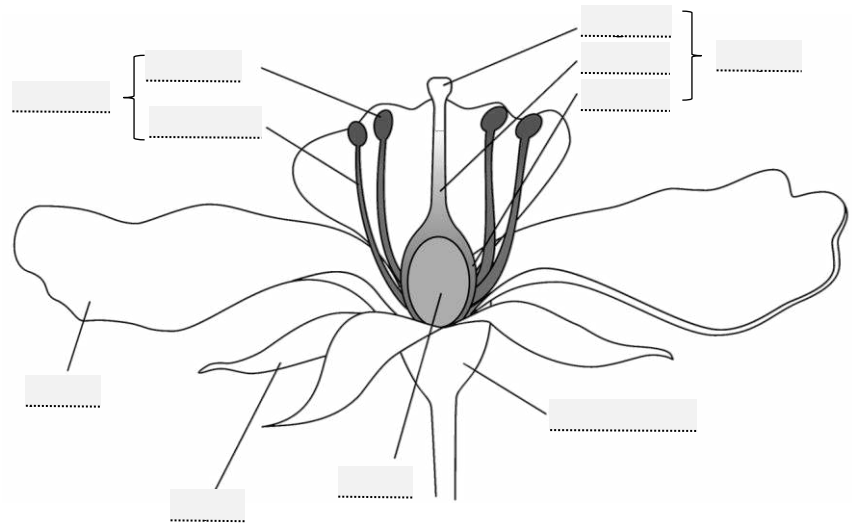
ⓐ flower

i . definition

flower is _____ of plant

ii . contain both male and female reproductive parts

ⓑ parts of flower



part	description
_____	protect flower when it is in _____ (unopened flower) often green and much_____ than the petals
_____	_____ coloured in insect-pollinated flowers to attract insects in wind pollinated flowers are tiny, and used for _____
_____	has _____ with pollen grains which contain the male nucleus (male gamete).
_____	top of female part of flower which collect _____
_____	_____ female sex cell (ovum)
_____	_____ female sex cell

② Adaptations for Pollination

ⓐ pollination

i . definition

pollination is _____ from anther (male part) to stigma (female part)

ii . pollen

→ _____ that contains a nucleus inside

→ pollen is not capable of _____ (moving from one place to another)

→ so, plants have mechanisms in place to _____ from anther to stigma

→ this process is called _____

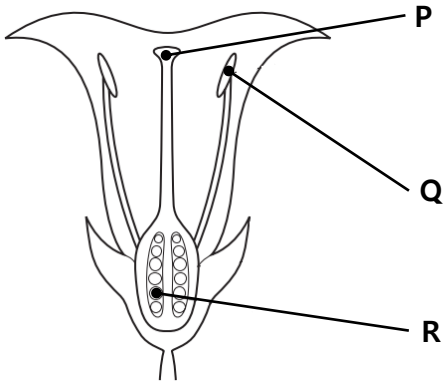
iii . agents of pollination

→ _____

311.

MEMO

The diagram shows half a flower. There is a statement of each labeled part.



P. stigma which receives pollen from insects
Q. anther which produces smooth and light pollen grains
R. ovule where fertilisation occurs when the male and female nuclei fuse

Which statements are correct for an insect-pollinated flower?

A P only **B** Q only **C** P and R **D** Q and R

312.

The figure right shows the flowers of easter lily (*Lilium longiflorum*).

What are the names of the parts labelled **P** to **S**?

P .....

Q .....

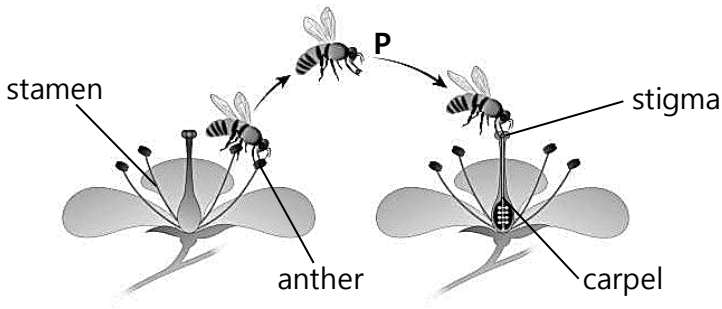
R .....

S .....

MEMO

322.

The diagram below shows a process in plant reproduction.



Which process is represented by arrow **P**?

A pollination

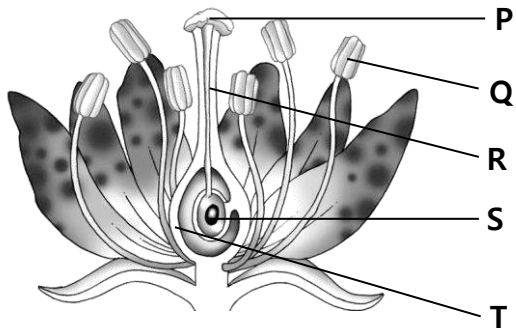
B fertilisation

C seed dispersal

D pollen tube growth

323.

The diagram right shows the cross-section of a flower.



Which labeled parts of the flower continue to develop after fertilisation?

A P and R

B Q and T

C S and T

D R and S

MEMO

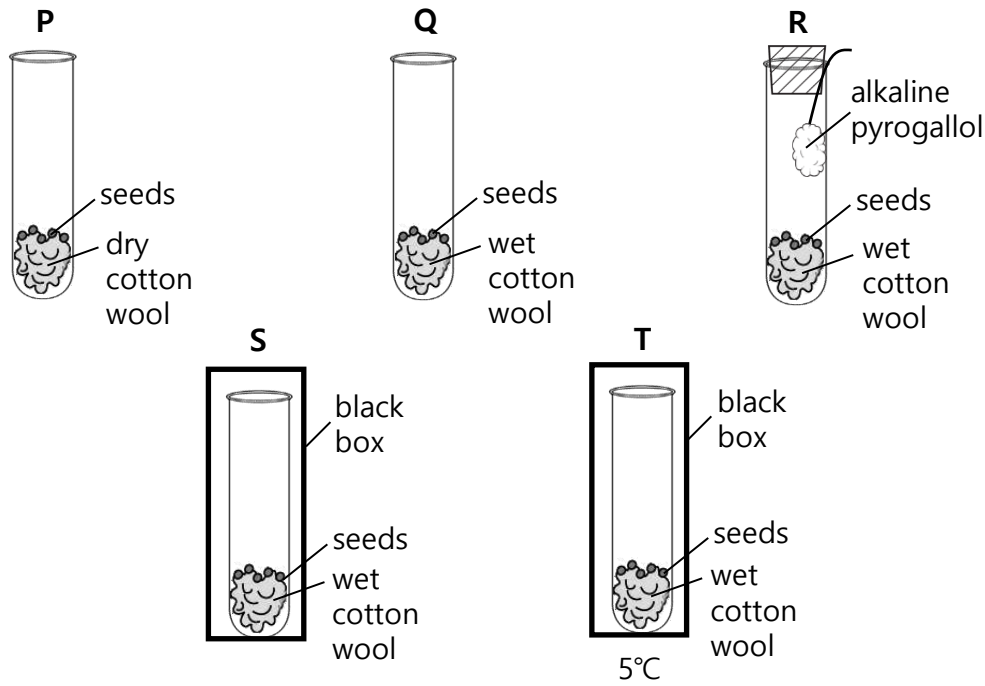
356.

Fruits can be spread by animals or the wind. The table below contains descriptions of the four fruits.
Which fruit is spread by wind?

fruit	description
A	fleshy and scented
B	sticky and has hooks
C	has a wing and light weight
D	brightly coloured and sweet tasting

357.

The experiment shown in the diagram below was set up to determine the conditions required for seeds to germinate. All tubes except tube labeled **T** are kept at 25℃.



In which tube will the seeds germinate most likely?

A P and R

B Q and S

C Q and T

D Q only

389.

MEMO

What always increases during the development of a fetus?

A volume

B dry mass

C cell number

D complexity

390.

The table below lists some of the processes that occur during reproduction in flowering plants and humans.

Which row is correct?

	fertilisation needed	pollination need	implantation needed
A	humans only	flowering plants only	humans only
B	flowering plants and humans	flowering plants only	humans only
C	humans only	flowering plants and humans	flowering plants only
D	humans only	humans only	flowering plants and humans

391.

Where does material diffusion between mother and fetus occur?

A ovary

B placenta

C amniotic sac

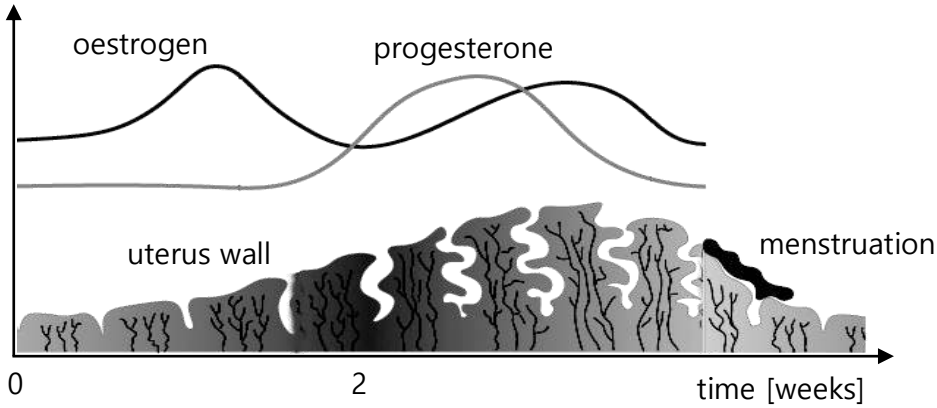
D umbilical cord

MEMO

425.

The diagram below shows the changes of some hormones and uterus wall which take place during a woman's menstrual cycle.

What is occurring at the time of ovulation?



A a fall in the levels of oestrogen and progesterone

B a rise in the levels of oestrogen and progesterone

C a rise in the levels of oestrogen and a fall in the level of progesterone

D a fall in the levels of oestrogen and a rise in the level of progesterone

426.

How does the rhythmic method of birth control work?

A Preventing of implantation

B Preventing of ovulation

C Avoiding sexual intercourse during ovulation.

D A physical barrier prevents sperms reaching the egg.

427.

What takes place to the uterus lining during menstruation?

A breaks down

B more hardening

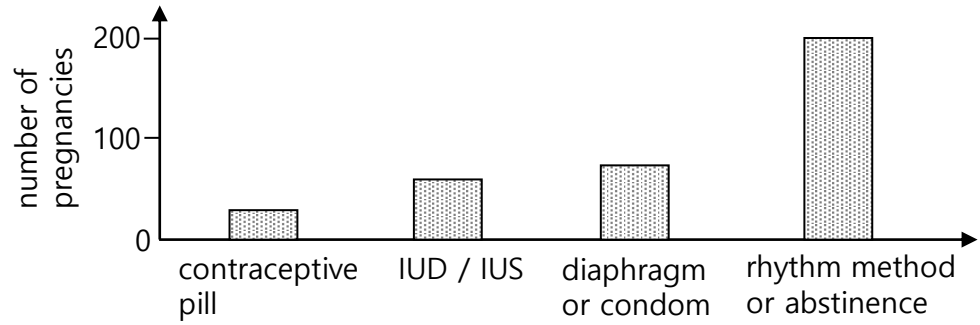
C repair and thickening

D implantation of embryo

MEMO

450.

The graph shows the number of pregnancies in 4 groups of 1,000 women. Each group used a different method of contraception.



The method of contraception which is the most effective is;

A chemical

B physical barrier

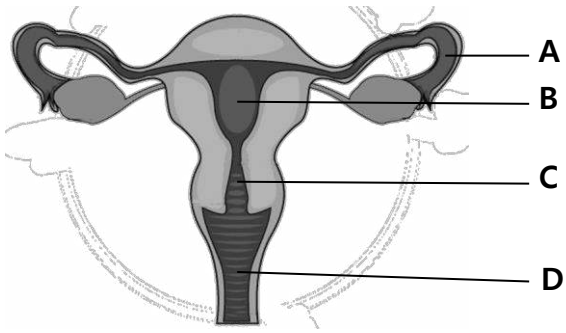
C surgical

D natural

451.

The diagram right shows the reproductive system of a human female.

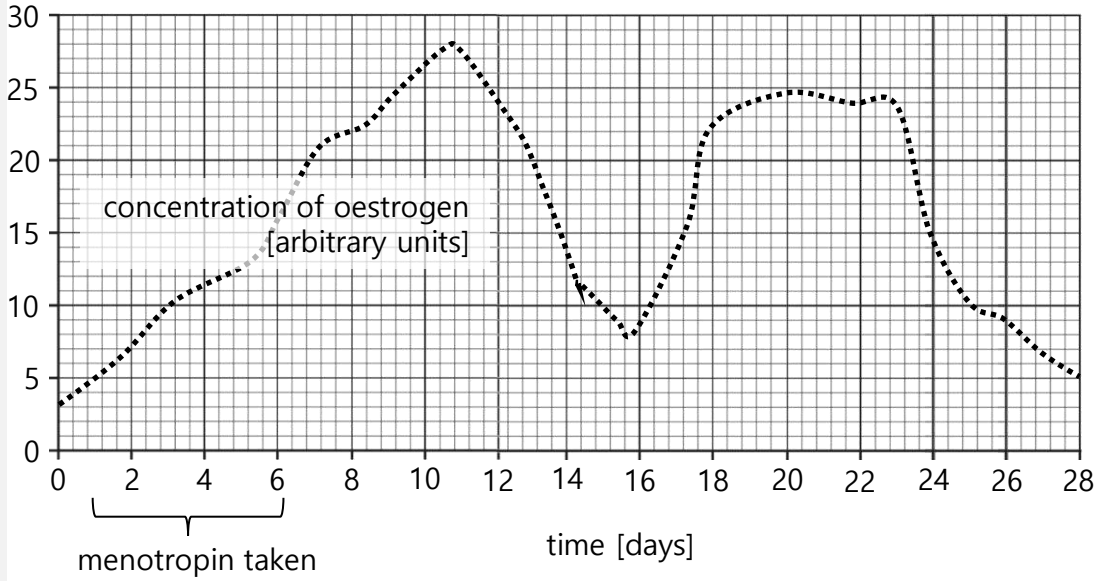
If a woman uses Femidom as a contraceptive, where does she put it?



MEMO

468.

The drug menotropin is given to women who have difficulty having children. This drug increases the secretion of FSH.
As part of infertility treatment, a woman was given menotropin for 5 days. Her blood oestrogen concentrations were measured daily for 27 days.
Results are shown in the graph below.



① Using the results above, describe the changes in oestrogen in the blood over 27 days.

.....

.....

.....

.....

② Doctors thought ovulation occurred around the 15th day.
State the meaning of the term ovulation.

.....

.....

.....

01. Asexual Reproduction

				293.	A	294.	A	295.	C
296.	A								

297. **Answer**

The correct answer should include the following words and phrases:
- genetic material (DNA) replicates
- cell membrane and cell wall develops in the middle of the cell
- binary fission
- bacterial cytoplasm divides into two

298. **Answer**

The correct answer should include the following words and phrases:
- favourable characteristics of parent passed on
- dense colonies outcompete other species ;
- rapid
- less energy and resources used
- no gametes (only one parent required)

02. Sexual Reproduction

						299.	A		

300. **Answer**

The correct answer should include the following words and phrases:

type of reproduction	advantage	disadvantage
asexual reproduction	- no gametes needed - fast and rapid spread - less energy required - if parent well adapted offspring will be adapted to surroundings	- no variation - less evolution - less able to adapt to change - may all be killed by same disease
sexual reproduction	- variation - evolution and formation of new species -able to adapt to change	- may need two plants - slow - many seeds wasted - fertilization may not happen loss of lots of energy

301. **Answer**

The correct answer should include the following words and phrases:
- gives genetic variation (or diversity)
- allows mutations to be
- allows adaptation to new conditions (or environment)
- new species can evolve
- allows natural selection to occur
- pollen exchanged between individuals (cross pollination) → seeds are dispersed → can colonise new areas
- survival through harsh or adverse conditions

302. **Answer**

① - meiosis

②
- allows variation
- adaptation to new (or changed) environment
  → natural selection
  → evolution
  → formation of new species

03. Sexual Reproduction in Plants

				303.	D	304.	D	305.	D
306.	D	307.	A	308.	A	309.	D	310.	C
311.	C								

312. **Answer**

The correct answer should include the following words and phrases:
- P: petal
- Q: anther
- R: stigma
- S: style

313. **Answer**

①

function	name of structure	letter
provides support to the stem	**xylem**	**J**
protects flower bud	**sepal**	**G**
produces glucose	**leaf**	**H**
produces pollen	**anther**	**B**
delivers male nuclei to the site of fertilisation	**pollen tube**	**D**

② - B, D, F
③ - translocation
④ - H

314. **Answer**

① Oryza
②
- feathery stigma
- stigma with large surface area
- stigma and anthers hang outside the flower

315. **Answer**

The correct answer should include the following words and phrases:
①
(1) stigma
(2) anther
(3) petal
(4) ovary
(5) sepal
②
- (large) petals
- stigma inside petals
- anther inside petals
- large stigma

04. Pollination and Reproduction

316.	B	317.	D	318.	C	319.	B	320.	C
321.	A	322.	A	323.	C	324.	D	325.	D

326. **Answer**

The correct answer should include the following words and phrases:
- pollen from anther to stigma
- between different plants of same species

327. **Answer**

The correct answer should include the following words and phrases:
- wastage of pollen
- wastage of energy
- depends on presence of pollinator
- need a pollinating other plant nearby
- long time for next generation to develop
- seeds scattered to places where they cannot grow
- variation leads to plants that are not adapted to place

328. **Answer**

The correct answer should include the following words and phrases:
- pollination
  pollen transferred from anther to stigma
- fertilisation
  gametes (ova and pollen nuclei or sperm and egg) fuse together

329. **Answer**

The correct answer should include the following words and phrases:
- less variation and reduced gene pool
  → uniform crop
- less chance for evolution to occur
  → less adaption to new environment
  → more chance to pass on genetic disease
- no external agent of pollination required
  → more chance of fertilisation
  → single plant can reproduce
- whole crop would be susceptible to adverse factors (drought or disease)

330. **Answer**

The correct answer should include the following words and phrases:
①
A- style/ B- ovule/ C- ovary (wall)
②
ⓐ meiosis
ⓑ haploid
ⓒ fuses (or joins, combines)
ⓓ diploid
ⓔ fertilisation
ⓕ zygote
ⓖ mitosis