JABATAN PELAJARAN NEGERI SELANGOR
PERSIDANGAN KEBANGSAAN PENGETUA SEKOLAH MENENGAH

PROGRAM PENINGKATAN PRESTASI AKADEMIK (2) **4551/1**

SIJIL PELAJARAN MALAYSIA 2010

BIOLOGY

Kertas 1
Sept./Okt.
1¼ jam

Satu jam lima belas minit

JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU

1. *Kertas soalan ini adalah dalam dwibahasa.*
2. *Soalan dalam bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.*
3. *Calon dikehendaki membaca maklumat di halaman belakang kertas soalan ini.*

Kertas soalan ini mengandungi 32 halaman bercetak

1 Diagram 1 shows structure of a chloroplast.
Rajah 1 *menunjukkan struktur kloroplas.*

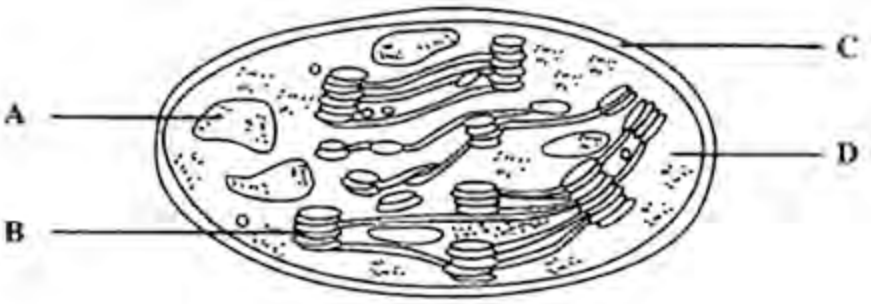


Diagram 1
Rajah 1

Which of the part **A**, **B**, **C** or **D**, contains chlorophyll?
Antara bahagian **A**, **B**, **C** *atau* **D**, *yang manakah mengandungi klorofil?*

2 Which structures contains cell sap?
Struktur manakah mengandungi sap sel?

A Lysosomes
Lisosom

B Chloroplast
Kloroplas

C Vacuole
Vakuol

D Secretory vesicles
Vesikel perembes

3 Diagram 2 shows the structure of plasma membrane of an animal cell.
Rajah 2 menunjukkan struktur membran plasma pada sel haiwan.

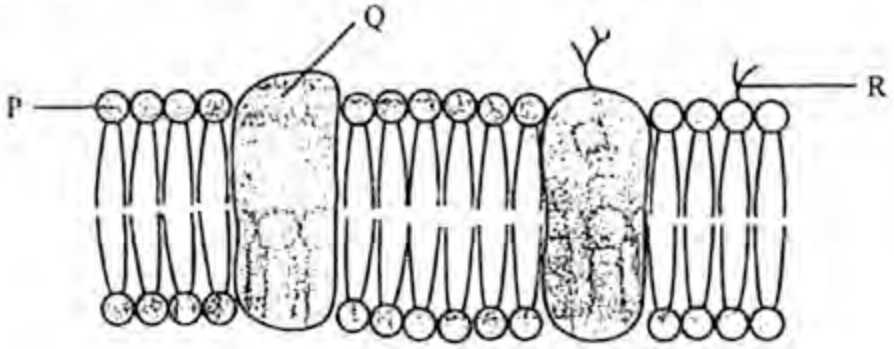


Diagram 2
Rajah 2

What are P, Q and R?
Apakah P, Q dan R?

	P	Q	R
A	Phospholipid *Fosfolipid*	Carbohydrate *Karbohidrat*	Protein *Protein*
B	Protein *Protein*	Cholesterol *Kolesterol*	Phospholipid *Fosfolipid*
C	Phospholipid *Fosfolipid*	Carbohydrate *Karbohidrat*	Cholesterol *Kolesterol*
D	Phospholipid *Fosfolipid*	Protein *Protein*	Carbohydrate *Karbohidrat*

4 Diagram 3 shows the movement of molecules P across the plasma membrane into a cell through process X.

Rajah 3 *menunjukkan pergerakan molekul* P *merentasi membran plasma melalui proses* X.

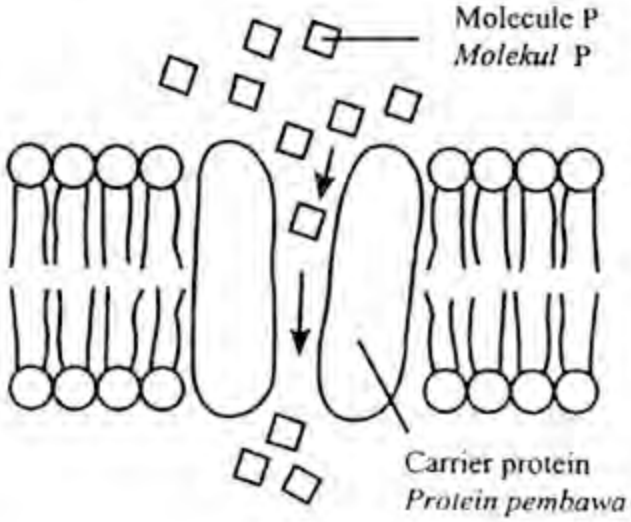


Diagram 3
Rajah 3

What is process X?
Apakah proses X?

A Osmosis
Osmosis

B Active transport
Pengangkutan aktif

C Simple diffusion
Resapan ringkas

D Facilitated diffusion
Resapan berbantu

5 Diagram 4 shows an experiment that is carried out to investigate osmosis process.
Rajah 4 menunjukkan satu eksperimen yang dijalankan untuk mengkaji proses osmosis.

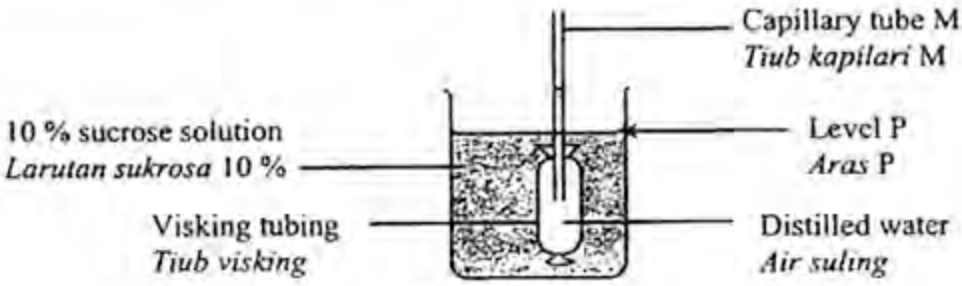


Diagram 4
Rajah 4

Which of the following describes the result of the experiment after one hour?
Antara berikut, yang manakah menerangkan keputusan eksperimen ini selepas satu jam?

	Volume of liquid in capillary tube M *Isi padu cecair di dalam tiub kapilari* **M**	**Level P of sucrose solution in the beaker** *Aras* **P** *larutan sukrosa di dalam bikar*
A	Increases *Meningkat*	Increases *Meningkat*
B	Increases *Meningkat*	Decreases *Menurun*
C	Decreases *Menurun*	Increases *Meningkat*
D	Decreases *Menurun*	Decreases *Menurun*

6 Diagram 5 shows a plant cell immersed in distilled water for 10 minutes.
Then the cell is removed and immersed in a 10 % sucrose solution for 5 minutes.

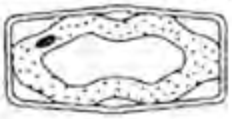
Rajah 5 menunjukkan satu sel tumbuhan yang direndam dalam air suling selama 10 minit.
Kemudian sel itu dipindahkan dan direndam di dalam 10 % larutan sukrosa selama 5 minit.

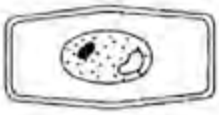
Plant cell in distilled water
Sel tumbuhan dalam air suling

Plant cell in 10 % sucrose solution
Sel tumbuhan dalam 10 % larutan sukrosa

Diagram 5
Rajah 5

If the plant cell is immersed in distilled water for another 10 minutes, what is the condition of the cell?
Jika sel tumbuhan direndam semula dalam air suling selama 10 minit, apakah keadaan sel tersebut?

A 

C 

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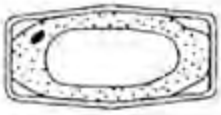
D 

7 Diagram 6 shows the hydrolysis process of a fat molecule.
Rajah 6 menunjukkan proses hidrolisis satu molekul lemak.

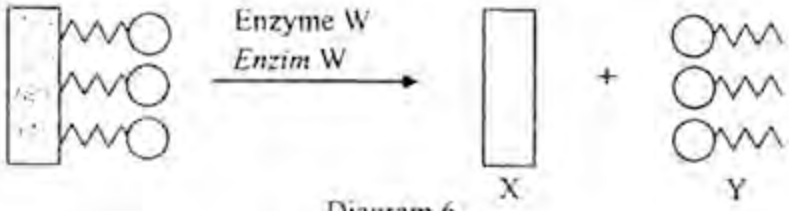


Diagram 6
Rajah 6

What are W, X and Y?
Apakah W, X dan Y?

	Enzyme W *Enzim W*	X	Y
A	Lipase *Lipase*	Glycerol *Gliserol*	Fatty Acids *Asid lemak*
B	Lipase *Lipase*	Fatty acids *Asid lemak*	Glycerol *Gliserol*
C	Lactase *Laktase*	Glucose *Glukosa*	Galactose *Galaktosa*
D	Lactase *Laktase*	Galactose *Galaktosa*	Glucose *Glukosa*

8 Diagram 7 shows a mechanism of enzyme reaction.
Rajah 7 menunjukkan satu mekanisme tindak balas enzim.

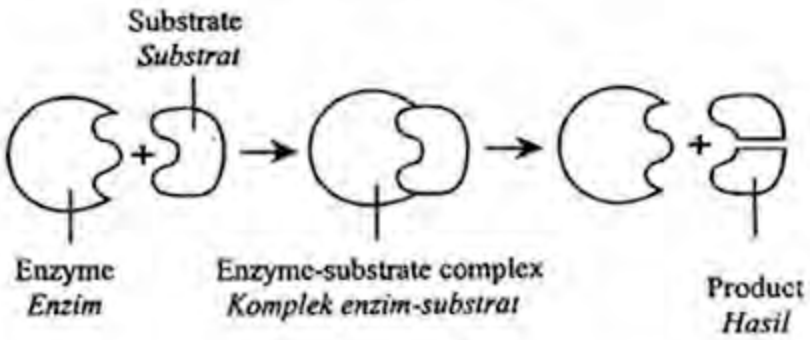


Diagram 7
Rajah 7

Which statement can be deduced from the diagram?
Pernyataan yang manakah boleh disimpulkan dari rajah itu?

A Enzyme action is specific
Tindakan enzim adalah spesifik

B Enzyme is denatured at 50 °C
Enzim dinyahasli pada suhu 50 °C

C Enzyme is destroyed at the end of the reaction
Enzim dimusnahkan pada akhir tindak balas

D Enzyme reaction can be inhibited by heavy metals
Tindak balas enzim boleh direncat oleh logam berat

9 Cell that synthesizes oestrogen hormone has abundance of organelles X.
What is X?
Sel yang mensintesis hormon estrogen mempunyai organel X dengan banyak.
Apakah X?

A Ribosome
Ribosom

B Golgi apparatus
Jasad Golgi

C Rough endoplasmic reticulum
Jalinan endoplasma kasar

D Smooth endoplasmic reticulum
Jalinan endoplasma licin

10 Which of the following is the process where the chromosome duplicates and forms two sister chromatids?
Antara yang berikut, yang manakah merupakan proses di mana kromosom mengganda dan membentuk dua kromatid kembar?

A Meiosis
Meiosis

B Mitosis
Mitosis

C Synapsis
Sinapsis

D Replication
Replikasi

11 Diagram 8 shows a process in a stage of cell division in a plant.
Rajah 8 menunjukkan satu proses dalam peringkat pembahagian sel pada tumbuhan.

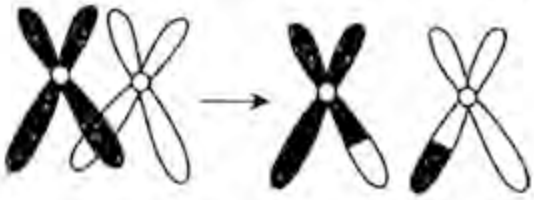


Diagram 8
Rajah 8

Which of the following part of the plant does this process occur?
Antara bahagian tumbuhan berikut, di manakah proses ini berlaku?

A Anther
Anter

B Lateral bud
Tunas sisi

C Cambium
Kambium

D Root tip
Hujung akar

12 Which statement is true about meiosis?
Pernyataan yang manakah benar tentang meiosis?

A DNA replication occurs twice in meiosis
Replikasi DNA *berlaku dua kali dalam meiosis*

B Uncontrolled meiosis can cause cancer
Meiosis yang tidak terkawal boleh menyebabkan kanser

C The chromosomes behaviour in meiosis I are the same as in mitosis
Perlakuan kromosom dalam meiosis I *adalah serupa seperti dalam mitosis*

D Synapsis and crossing over take place only during prophase I of meiosis
Sinapsis dan silangan kromosom hanya berlaku semasa profasa I *meiosis*

13 Diagram 9 shows a cross-section of a dicotyledonous leaf.
Rajah 9 menunjukkan satu keratan rentas sehelai daun dikotiledon.

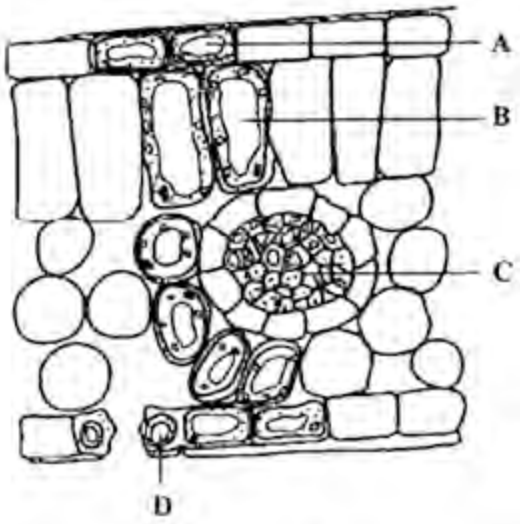


Diagram 9
Rajah 9

Which part **A**, **B**, **C** or **D**, transports glucose that is produced during photosynthesis?
Antara bahagian **A**, **B**, **C** *atau* **D**, *yang manakah mengangkut glukosa yang dihasilkan semasa fotosintesis?*

14 Which organism is a commensal?
Organisma manakah adalah komensal?

A

C

B

D

15 Diagram 10 shows the digestive system of a rabbit.
Rajah 10 *menunjukkan sistem pencernaan seekor arnab.*

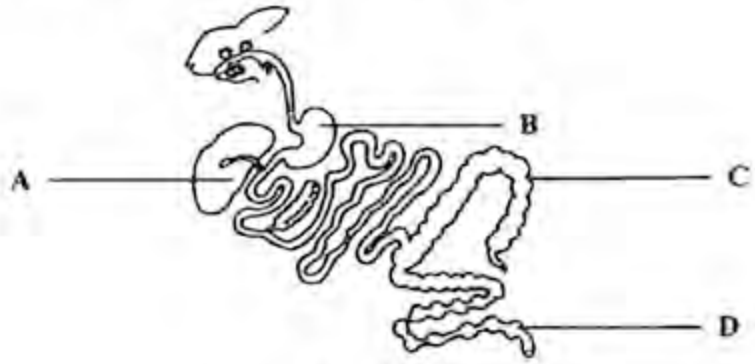


Diagram 10
Rajah 10

Which part contains symbiotic bacteria and protozoa?
Bahagian yang manakah mengandungi bakteria dan protozoa simbiotik?

16 Diagram 11 shows a longitudinal section of a villus.
Rajah 11 *menunjukkan keratan memanjang satu vilus.*

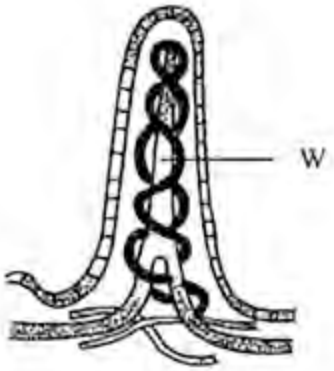


Diagram 11
Rajah 11

Which nutrients can be found in W?
Nutrien yang manakah terdapat dalam W?

A Vitamin C
Vitamin C

B Amino acids
Asid amino

C Vitamin E
Vitamin E

D Glucose
Glukosa

17 Which method can be used to increase crop's yield?
Kaedah manakah boleh digunakan untuk meningkatkan hasil pertanian?

I Tissue culture
Kultur tisu

II Genetic engineering
Kejuruteraan genetik

III Direct seedling of paddy
Taburan terus anak benih padi

IV Proper soil management
Pengurusan tanah yang cekap

A III and IV
III *dan* IV

B I, II and III
I, II *dan* III

C I, II and IV
I, II *dan* IV

D I, II, III and IV
I, II, III *dan* IV

18 Table 1 shows an experiment to determine the energy value of cashew nut.
Jadual 1 menunjukkan satu eksperimen untuk menentukan nilai tenaga kacang gajus.

Volume of water *Isi padu air*	20 cm^3
Initial water temperature *Suhu awal air*	26 °C
Final temperature water *Suhu akhir air*	78 °C
Mass of cashew nut *Jisim kacang gajus*	0·9 g
Specific heat capacity of water *Muatan haba tentu bagi air*	4·2 J g^{-1} $°C^{-1}$

Table 1
Jadual 1

What is the energy value of the cashew nut?
Apakah nilai tenaga kacang gajus?

A 1·45 kJ

B 4·85 kJ

C 2·23 kJ

D 9·83 kJ

19 Diagram 12 shows the equation of fermentation process in yeast.
Rajah 12 *menunjukkan persamaan proses penapaian dalam yis.*

Glucose / *Glukosa* ⟶ X + Y + Energy / *Tenaga*

Diagram 12
Rajah 12

What are X and Y?
Apakah X *dan* Y?

	X	Y
A	Lactic acid *Asid laktik*	Carbon dioxide *Karbon dioksida*
B	Ethanol *Etanol*	Carbon dioxide *Karbon dioksida*
C	Ethanol *Etanol*	Oxygen *Oksigen*
D	Lactic acid *Asid laktik*	Oxygen *Oksigen*

20 Diagram 13 shows a graph during a breathing mechanisme.
Rajah 13 *menunjukkan graf semasa mekanisma pernafasan.*

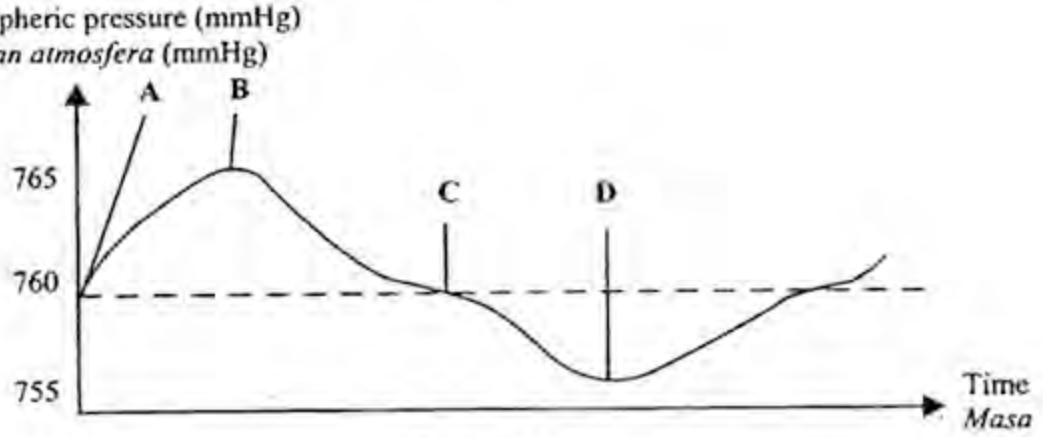


Diagram 13
Rajah 13

Which part shows the diaphragm when it is flattened?
Bahagian yang manakah menunjukkan diafragma dalam keadaan mendatar?

21 The following statement is related to the breathing mechanism in a fish.
Pernyataan berikut berkaitan dengan mekanisma pernafasan ikan.

• The operculum is closed *Operkulum tertutup*

Which statement is true?
Pernyataan yang manakah adalah benar?

A The pressure in its buccal cavity decreases
Tekanan di dalam rongga mulut berkurang

B The pressure in its buccal cavity increases
Tekanan di dalam rongga mulut bertambah

C There is no change in pressure in its buccal cavity
Tiada perubahan tekanan di dalam rongga mulut

D The operculum closes due to the pressure in the buccal cavity
Operkulum tertutup akibat tekanan dalam rongga mulut

22 Diagram 14 shows the set-up of apparatus to measure the percentage of certain gas in the air.
Rajah 14 menunjukkan persediaan radas untuk mengukur peratus gas tertentu di dalam udara.

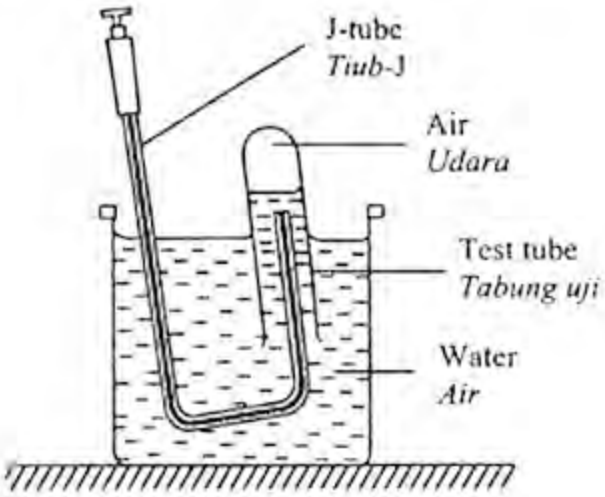


Diagram 14
Rajah 14

Initial length of the air column *Panjang awal kolum udara*	10·00 cm
Length of air column after using potassium hydroxide solution *Panjang kolum udara setelah larutan kalium hidroksida digunakan*	9·8 cm
Length of air column after using alkaline potassium pyrogallate *Panjang kolum udara setelah alkali kalium pirogalol digunakan*	7·8 cm

Calculate the percentage of oxygen content in the air.
Kirakan peratus oksigen di dalam udara.

A 12 %

B 16 %

C 18 %

D 20 %

23 Diagram 15 shows the interaction between two organisms.
Rajah 15 menunjukkan interaksi antara dua organisma.

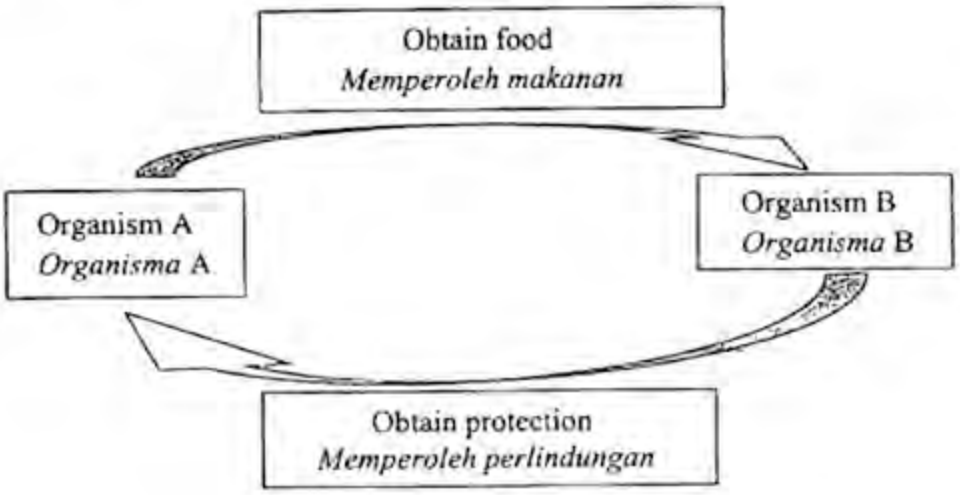


Diagram 15
Rajah 15

What is the type of interaction between organisms A and B?
Apakah jenis interaksi antara organisma A dan B?

A Commensalism
Komensalisme

B Saprophytism
Saprofitisme

C Parasitism
Parasitisme

D Mutualism
Mutualisme

24 Diagram 16 shows a food chain.
Rajah 16 menunjukkan satu rantai makanan.

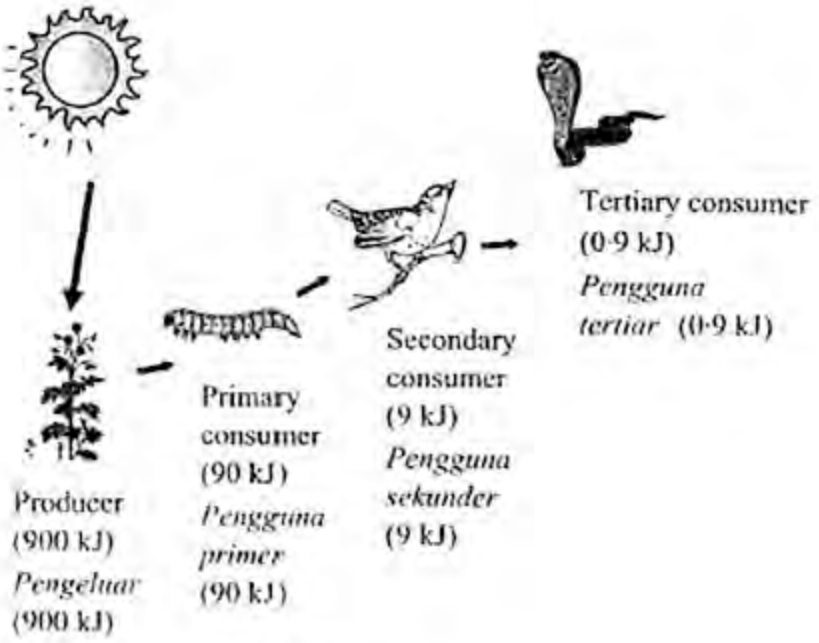


Diagram 16
Rajah 16

Which of the following statement is **not** true?
Antara pernyataan berikut, yang manakah adalah **tidak** *benar*?

A Snake is the fourth trophic level of the food chain
Ular adalah di aras trofik keempat dalam rantai makanan

B Green plants are at the base of the pyramid number of the food chain
Tumbuhan hijau adalah dasar kepada piramid nombor dalam rantai makanan

C The higher the trophic level, the smaller the size of the organism
Semakin tinggi aras trofik, saiz organisma akan menjadi semakin kecil

D Most of the energy is lost as heat, undigested matter and metabolic activities
Kebanyakan tenaga hilang sebagai haba, bahan tidak tercerna dan aktiviti metabolisme

25 Diagram 17 shows parts of nitrogen cycle in the atmosphere.
Rajah 17 menunjukkan sebahagian kitar nitrogen di atmosfera.

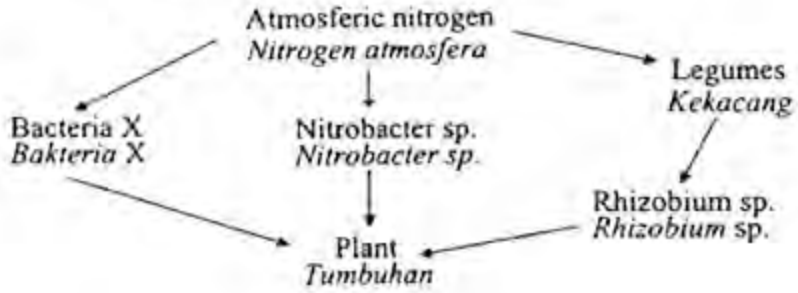


Diagram 17
Rajah 17

What is bacteria X?
Apakah bakteria X?

A Nitrogen-fixing bacteria
Bakteria pengikat nitrogen

B Denitrifying bacteria
Bakteria pendenitratan

C Purifying bacteria
Bakteria pengurai

D Nitrifying bacteria
Bakteria penitritan

26 Diagram 18 shows eight similar quadrates that are used to estimate the population of Mimosa pudica in a school field. The coverage of each quadrate is recorded.
Rajah 18 menunjukkan lapan kuadrat yang digunakan untuk menganggar populasi Mimosa pudica di padang sekolah. Litupan setiap kuadrat direkodkan.

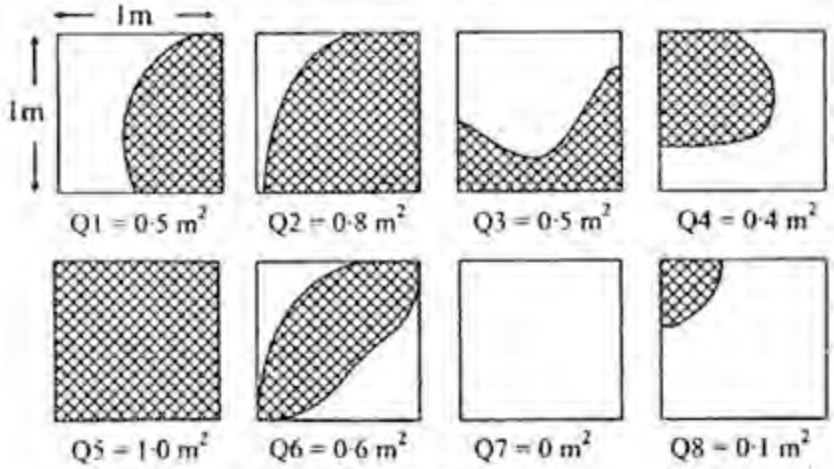


Diagram 18
Rajah 18

What is the percentage coverage of Mimosa pudica in this school field?
Apakah peratus litupan Mimosa pudica di padang sekolah ini?

A 39 %

B 49 %

C 67 %

D 77 %

27 What are the effects of sulphur dioxide on human health?
Apakah kesan sulfur dioksida kepada kesihatan manusia?

I Irritates the eyes
Memedihkan mata

II Binds with haemoglobin in the blood
Bergabung dengan hemoglobin dalam darah

III Causes shortness of breath and coughing
Menyebabkan kesesakan nafas dan batuk

IV Retards mental development
Merencat perkembangan mental

A I and III only
I dan III sahaja

B II and IV only
II dan IV sahaja

C I, II and III only
I, II dan III sahaja

D II, III and IV only
II, III dan IV sahaja

28 Which of the following gases destroys the ozone layer?
Antara gas berikut, yang manakah memusnahkan lapisan ozon?

A Carbon dioxide
Karbon dioksida

B Chlorofluorocarbon
Klorofluorokarbon

C Methane
Metana

D Nitrous oxide
Nitrus oksida

29 What is the effect when the oxygen content in a river decrease?
Apakah kesan apabila kandungan oksigen dalam sungai berkurang?

A The river is not polluted
Sungai tidak tercemar

B BOD value in the river decreases
Nilai BOD *dalam sungai berkurang*

C Number of aquatic organism in the river increases
Bilangan organisma akuatik dalam sungai meningkat

D The number of microorganism in the river increases
Bilangan mikroorganisma dalam sungai meningkat

30 Diagram 19 shows a human activity.
Rajah 19 *menunjukkan suatu aktiviti manusia.*

Diagram 19
Rajah 19

Which of the following is the effect of the activity?
Antara yang berikut, yang manakah merupakan kesan daripada aktiviti tersebut?

A Reduce BOD value of water
Menurunkan nilai BOD *air*

B Increase acidic value of the soil
Meningkatkan nilai asid tanah

C Increase the vision distance
Meningkatkan jarak penglihatan

D Decrease the carbon particle in the atmosphere
Mengurangkan partikel karbon di atmosfera

31 Which organism has open blood circulatory system?
Organisma yang manakah mempunyai sistem peredaran terbuka?

A Fish
Ikan

B Frog
Katak

C Grasshopper
Belalang

D Elephant
Gajah

32 Diagram 20 shows a cross-section of a dicotyledonous root.
Rajah 20 menunjukkan keratan rentas akar dikotiledon.

Diagram 20
Rajah 20

Which of the part transports water and mineral ions?
Bahagian yang manakah mengangkut air dan ion mineral?

33 Diagram 21 shows a graph of a type of immunity.
Rajah 21 menunjukkan graf bagi sejenis keimunan.

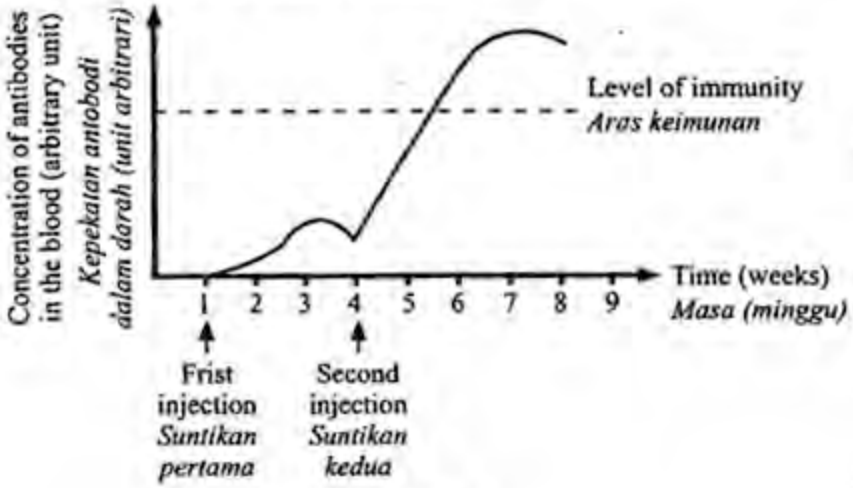


Diagram 21
Rajah 21

Which statement is true about the graph?
Pernyataan yang manakah benar tentang graf tersebut?

A Second injection contains higher level of antibody
Suntikan kedua mengandungi aras antibodi yang lebih tinggi

B Second injection is required to boost the production of antibody
Suntikan kedua diperlukan untuk merangsang penghasilan antibodi

C Both injections contain pathogen which control production of antibody
Kedua-dua suntikan mengandungi patogen yang mengawal penghasilan antibodi

D Both injections contain serum that can increase antibody level
Kedua-dua suntikan mengandungi serum yang meningkatkan aras antibodi

34 Diagram 22 shows structure Z in human lymphatic system.
Rajah 22 menunjukkan struktur Z dalam sistem limfa manusia.

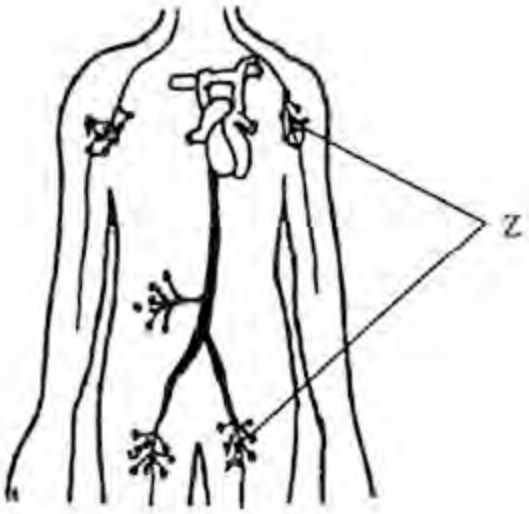


Diagram 22
Rajah 22

What happen to the human body if Z is malfunction?
Apakah yang akan berlaku kepada tubuh manusia jika Z gagal berfungsi?

A Fats from small intestine will be accumulated in Z
Lemak dari usus kecil akan terkumpul dalam Z

B The concentration of antibody in the body decrease
Kepekatan antibodi dalam tubuh berkurang

C The immunity level increases
Aras keimunan meningkat

D The flow of lymph is obstructed
Aliran limfa akan tersekat

35 Diagram 23 shows a human lumbar vertebra.
Rajah 23 menunjukkan vertebra lumbar pada manusia.

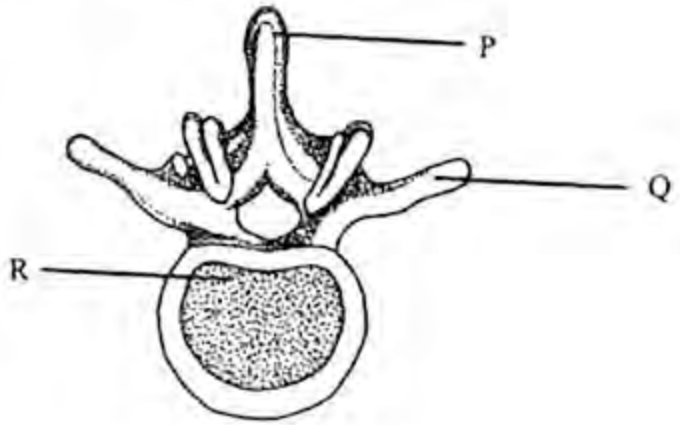


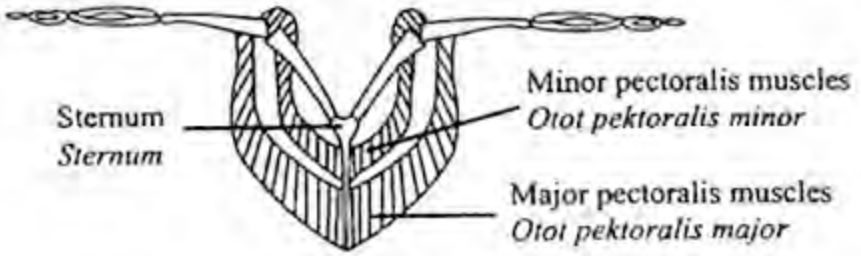
Diagram 23
Rajah 23

What are P, Q and R?
Apakah P, Q dan R?

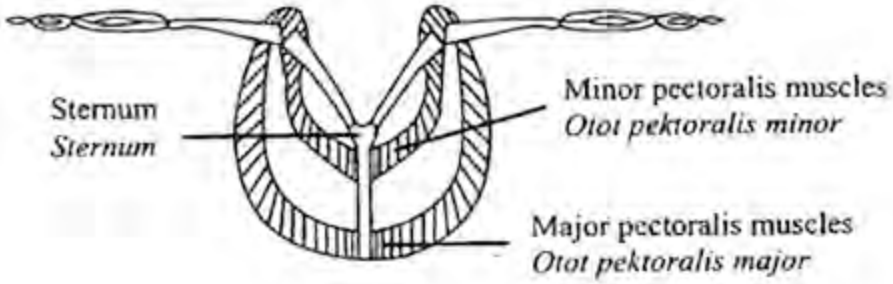
	P	Q	R
A	Transverse process *Cuaran lintang*	Spinous process *Cuaran spinal*	Sternum *Sternum*
B	Transverse process *Cuaran lintang*	Spinous process *Cuaran spinal*	Centrum *Sentrum*
C	Spinous process *Cuaran spinal*	Transverse process *Cuaran lintang*	Sternum *Sternum*
D	Spinous process *Cuaran spinal*	Transverse process *Cuaran lintang*	Centrum *Sentrum*

36 Diagram 24 shows a pair of pectoralis muscles of two birds. The major pectoralis muscle of bird P is normal while the major pectoralis muscle of bird Q is abnormal.

Rajah 24 menunjukkan sepasang otot pektoralis pada dua ekor burung. Otot pektoralis major pada burung P adalah normal manakala otot pektoralis major pada burung Q adalah abnormal.



Bird P



Bird Q

Diagram 24
Rajah 24

What is the effect of the abnormality on bird Q?
Apakah kesan daripada keabnormalan itu pada burung Q?

A It can fly higher
Ia boleh terbang tinggi

B The upward movement of the wings is weaker
Pergerakan sayap ke atas menjadi lemah

C The downward movement of the wing is weaker
Pergerakan sayap ke bawah menjadi lemah

D The upward and downward movements of the wings are more rapid while flying
Pergerakan ke atas dan ke bawah sayap menjadi lebih cepat ketika terbang

37 Diagram 25 shows structure of a knee joint.
Rajah 25 menunjukkan struktur sendi lutut.

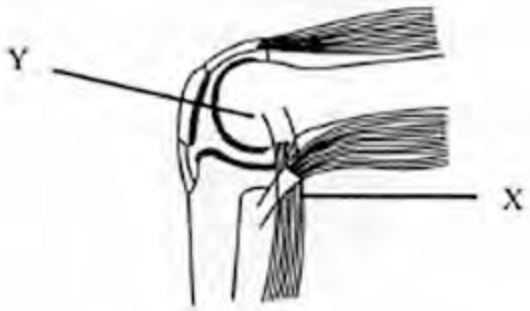


Diagram 25
Rajah 25

Which tissues joint X to Y?
Tisu yang manakah menyambungkan X ke Y?

A Tendon
Tendon

B Ligament
Ligamen

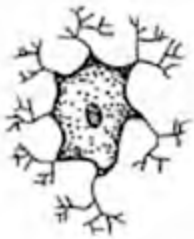
C Cartilage
Rawan

D Skeletal muscle
Otot rangka

38 Which of the following structure is an efferent neurone?
Antara struktur berikut, yang manakah neuron eferen?

A 

C 

B 

D 

39 Diagram 26 shows the human endocrine system.
Rajah 26 menunjukkan sistem endokrin manusia.

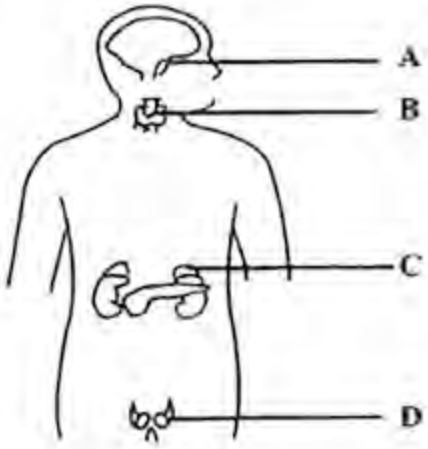


Diagram 26
Rajah 26

Which glands secretes growth hormone?
Kelenjar manakah merembeskan hormon pertumbuhan?

40 Diagram 27 shows a cross-section of the human brain.
Rajah 27 menunjukkan keratan rentas otak manusia.

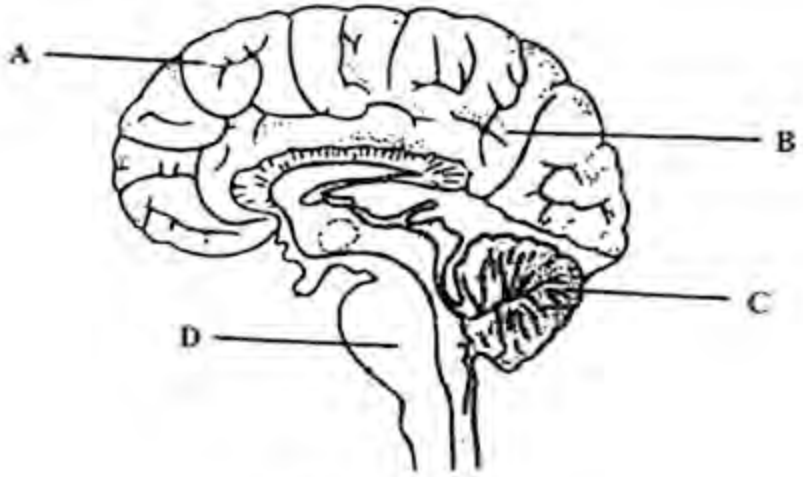


Diagram 27
Rajah 27

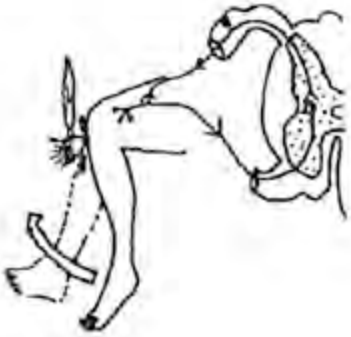
Which part controls the rate of heartbeat?
Bahagian manakah mengawal kadar denyutan jantung?

41 Diagram 28 shows the knee jerk test on a student.
Rajah 28 menunjukkan ujian sentakan lutut ke atas seorang murid.

Diagram 28
Rajah 28

Which diagram shows the student reflex arc?
Rajah manakah yang menunjukkan arka refleks murid tersebut?

A



C

B

D

42 Diagram 29 shows a female reproductive system.
Rajah 29 menunjukkan sistem pembiakan perempuan.

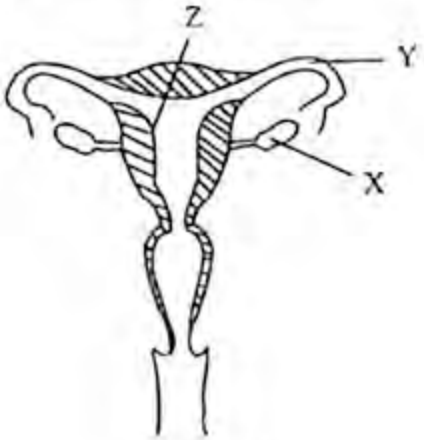


Diagram 29
Rajah 29

What processes occur at X, Y and Z?
Apakah proses yang berlaku di X, Y dan Z?

	X	Y	Z
A	Fertilization *Persenyawaan*	Ovulation *Ovulasi*	Implantation *Penempelan*
B	Fertilization *Persenyawaan*	Implantation *Penempelan*	Ovulation *Ovulasi*
C	Ovulation *Ovulasi*	Fertilization *Persenyawaan*	Implantation *Penempelan*
D	Ovulation *Ovulasi*	Implantation *Penempelan*	Fertilization *Persenyawaan*

43 Diagram 30 shows the development of follicle in an ovary.
Rajah 30 menunjukkan perkembangan folikel dalam ovari.

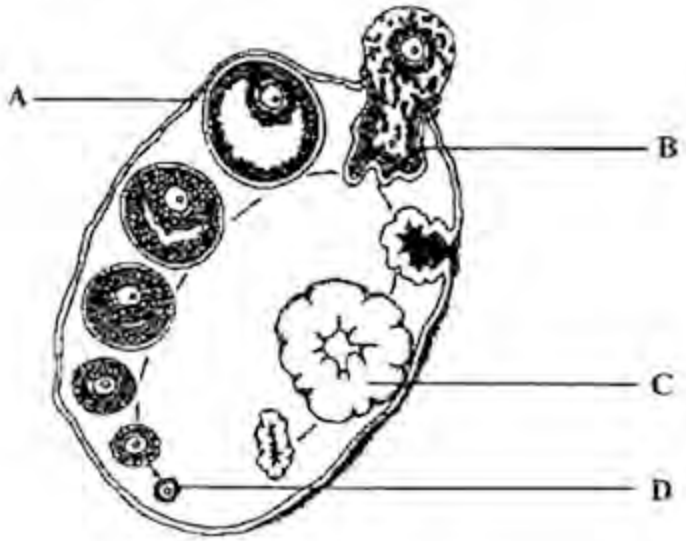


Diagram 30
Rajah 30

Which structure is involved in secreting progesterone?
Struktur yang manakah terlibat dalam perembesan progesteron?

44 Which of the following structures will be developed from the integument of a flowering plant after fertilization?
Antara berikut, yang manakah struktur yang akan berkembang daripada integumen suatu tumbuhan berbunga selepas persenyawaan?

A Testa
Testa

B Seed
Biji

C Fruit
Buah

D Ovule
Ovul

45 Which of the following is a characteristic of plant that undergoes primary growth only?
Antara yang berikut, yang manakah ciri tumbuhan yang mengalami pertumbuhan primer sahaja?

A The woody stem
Batang pokok berkayu

B The non-woody stem
Batang pokok tidak berkayu

C The stem with growth rings
Batang yang mempunyai gelang pertumbuhan

D Cork is present in the stem
Terdapat gabus dalam batang pokok

46 Diagram 31 shows the sequence of allele on a pair of homologous chromosomes.
Rajah 31 *menunjukkan urutan alel pada sepasang kromosom homolog.*

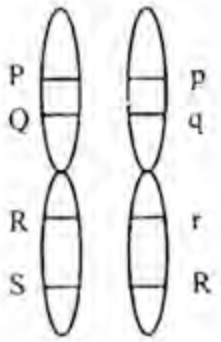


Diagram 31
Rajah 31

Which of the pair of allele is **not** correct?
Pasangan alel yang manakah **tidak** *benar?*

A P and P
P *dan* P

B S and R
S *dan* R

C R and r
R *dan* r

D Q and q
Q *dan* q

47 A girl has blood group A and her brother has blood group B.
Which is the correct combination of genotypes belonging to their parents?
Seorang kanak-kanak perempuan mempunyai kumpulan darah A *dan abangnya mempunyai kumpulan darah* B.
Manakah berikut merupakan kombinasi genotip yang betul bagi ibu bapa mereka?

	Father's genotype *Genotip bapa*	**Mother's genotype** *Genotip ibu*
A	AB	AB
B	AA	BB
C	AO	AO
D	BO	BO

48 Allele R is dominant to allele r for a characteristic. Allele Y is dominant to allele y for another characteristic.
A male heterozygous of both characteristic (RrYy) is crossed with a female homozygous recessive for both characteristic (rryy).
Alel R *adalah dominan terhadap alel* r. *Alel* Y *adalah dominan terhadap alel* y *untuk ciri yang lain.*
Seorang lelaki heterozigot untuk kedua-dua ciri (RrYy) *dikacukkan dengan seorang perempuan homozigot resesif untuk kedua-dua ciri* (rryy).

Which of the following are the probable alleles of the offspring?
Antara yang berikut, yang manakah kemungkinan alel bagi anak-anak pasangan tersebut?

	Alleles of the offspring *Alel anak*			
A	RRYY	RRyy	rrYY	RrYY
B	RrYy	Rryy	rrYy	rryy
C	rRyy	rryy	RRYy	RrYY
D	RRYY	rryy	rRyY	Rryy

49 Which occurrence does **not** cause variation?
Kejadian yang manakah **tidak** *menyebabkan variasi?*

A Crossing over
Pindah silang

B Random fertilization
Persenyawaan rawak

C Separation of sister chromatids
Pemisahan kromatid beradik

D Independent assortment of chromosomes
Penyusunan kromosom secara bebas

50 A normal person has 46 chromosome. A person with Down's syndrome has 47 chromosomes in his cells.
Individu normal mempunyai 46 *kromosom. Individu yang menghidap sindrom Down mempunyai* 47 *kromosom dalam selnya.*

Which of the following occurrence cause this abnormality?
Antara kejadian berikut, yang manakah menyebabkan keabnormalan ini?

A Chromosomal mutation happened during the production of the egg cell or sperm
Mutasi kromosom berlaku semasa penghasilan sel telur atau sperma

B More than one sperm fused with one egg during fertilization
Lebih daripada satu sperma telah mensenyawakan satu telur semasa persenyawaan

C Radiation caused a change in the structure of the sperm
Radiasi telah menyebabkan perubahan struktur sperma

D The mother was exposed to harmful chemicals during pregnancy
Ibu telah terdedah kepada bahan kimia berbahaya semasa mengandung

END OF QUESTION PAPER
KERTAS SOALAN TAMAT