Time: 1 hour and 15 minutes

This question paper consists of **50** questions. Answer **all** questions.
Kertas soalan ini mengandungi **50** *soalan. Jawab* **semua** *soalan.*

1 Diagram 1 shows an animal cell.
Rajah 1 menunjukkan satu sel haiwan.

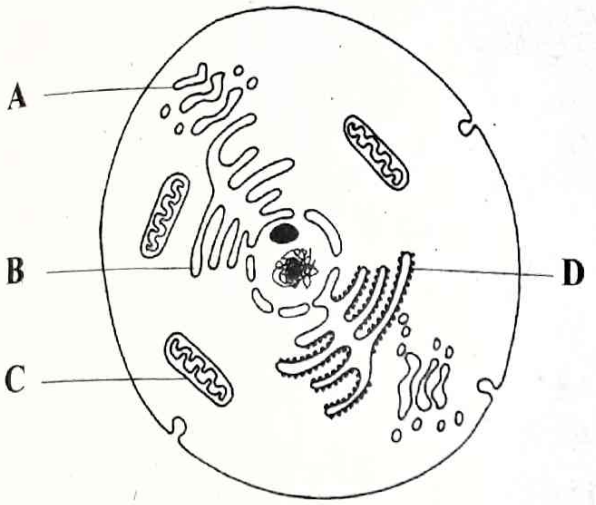


Diagram 1
Rajah 1

Which structure **A**, **B**, **C** or **D** is a smooth endoplasmic reticulum?
Antara struktur **A**, **B**, **C** *dan* **D** *yang manakah jalinan endoplasma licin?*

2 Diagram 2 shows a specialised cell in a digestive system.
Rajah 2 menunjukkan sel khusus dalam sistem pencernaan.

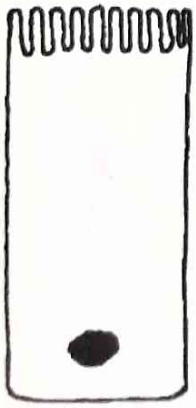


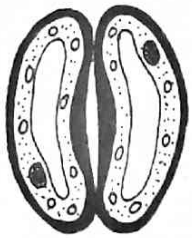
Diagram 2
Rajah 2

Which organ is abundant with the cell?
Organ manakah yang padat dengan sel itu?

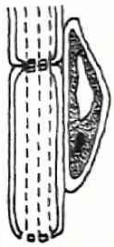
A Stomach *Perut*
B Oesophagus *Esofagus*
C Large intestine *Usus besar*
D Small intestine *Usus kecil*

3 Which tissue has the highest density of mitochondria?
Tisu manakah mempunyai kepadatan mitokondrion yang paling tinggi?

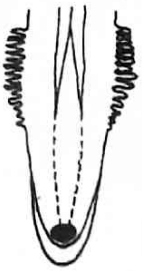
A



C

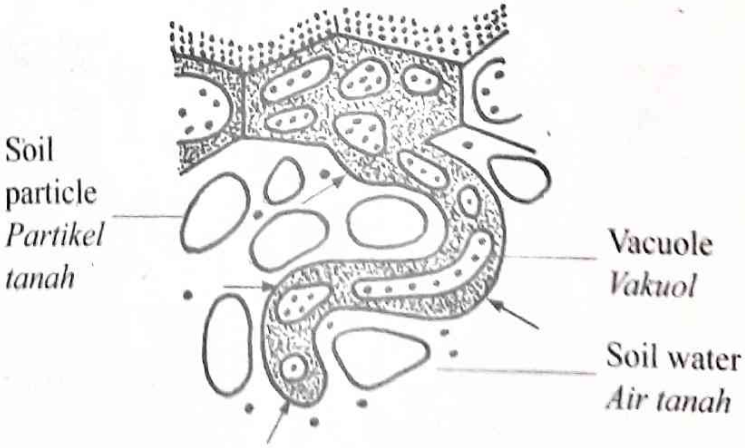


B



D

4 Diagram 3 shows the movement of mineral ions through process X in the root hair of a plant.
Rajah 3 menunjukkan pergerakan ion mineral melalui proses X dalam akar rambut tumbuhan.



Key / *Kekunci* : ⟶ Process X / *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 the condition of a cell before and after being immersed in solution Y.
Rajah 4 menunjukkan keadaan satu sel sebelum dan selepas direndam dalam larutan Y.

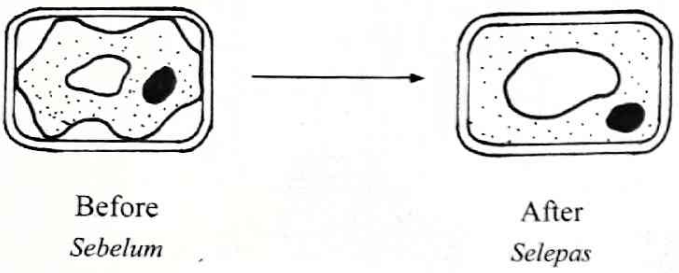


Diagram 4
Rajah 4

What is solution Y and the process involved?
Apakah larutan Y dan proses yang terlibat?

	Solution Y ***Larutan Y***	**Process** ***Proses***
A	Hypotonic *Hipotonik*	Plasmolysis *Plasmolisis*
B	Hypertonic *Hipertonik*	Plasmolysis *Plasmolisis*
C	Hypotonic *Hipotonik*	Deplasmolysis *Deplasmolisis*
D	Hypertonic *Hipertonik*	Deplasmolysis *Deplasmolisis*

6 What is the process that occurs when a red blood cell is immersed in a hypertonic solution?
Apakah proses yang berlaku apabila sel darah merah direndam dalam larutan hipertonik?

A Crenation
Krenasi

B Haemolysis
Hemolisis

C Plasmolysis
Plasmolisis

D Deplasmolysis
Deplasmolisis

7 Housewives usually marinate meat with slices of unripe papaya to tenderise the meat.
Which of the following can be used with the method above to minimise the time for tenderising the meat?
Suri rumah biasanya memerap daging dengan kepingan betik muda untuk melembutkan daging tersebut.
Antara yang berikut, yang manakah dapat digunakan dengan kaedah di atas untuk meminimumkan masa bagi melembutkan daging?

A Add some salt
Tambahkan sedikit garam

B Add some sugar
Tambahkan sedikit gula

C Keep at 40°C
Simpan pada suhu 40°C

D Keep in refrigerator for two hours
Simpan di dalam peti sejuk selama dua jam

8 Diagram 5 is a graph which shows the effect of substrate concentration on the rate of reaction.
Rajah 5 ialah graf yang menunjukkan kesan kepekatan substrat ke atas kadar tindak balas.

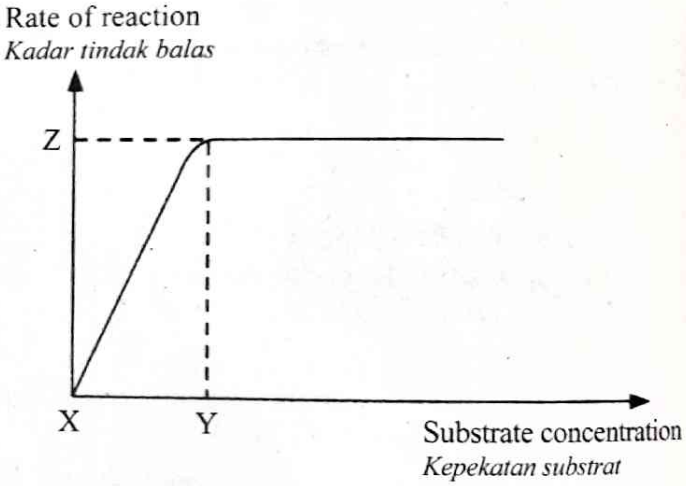


Diagram 5
Rajah 5

Which of the following conclusions can be deduced from the graph?
Antara berikut, kesimpulan manakah yang dapat dideduksikan daripada graf?

I Enzyme concentration is the limiting factor at level Z
Kepekatan enzim adalah faktor pengehad pada aras Z

II When the concentration of substrate is increased from X to Y, more substrate molecules are available to bind with the active site of the enzymes
Apabila kepekatan substrat bertambah dari X ke Y, lebih banyak molekul substrat mengikat kepada tapak aktif enzim

III At concentration Y, no more reaction takes place as all the active sites of enzymes are fully saturated
Pada kepekatan Y, tiada tindak balas yang berlaku kerana semua tapak aktif enzim telah tepu sepenuhnya

IV Rate of reaction at level Z can be increased if more substrate is added in the reaction
Kadar tindak balas pada aras Z boleh ditingkatkan jika lebih banyak substrat ditambah ke dalam tindak balas

A I and II
I *dan* II

B I and III
I *dan* III

C II and IV
II *dan* IV

D III and IV
III *dan* IV

9 The following are organelles in a pancreatic cell.
Berikut adalah organel-organel dalam sel pankreas.

- Ribosomes
  Ribosom
- Secretory vesicles
  Vesikel rembesan
- Transport vesicles
  Vesikel angkutan
- Golgi apparatus
  Jasad Golgi

Which of the following is the correct sequence of the organelles in the production of lipase enzyme?
Antara yang berikut, yang manakah menunjukkan urutan organel-organel yang betul dalam menghasilkan enzim lipase?

A Ribosomes (*Ribosom*) → Golgi apparatus (*Jasad Golgi*) → Transport vesicles (*Vesikel angkutan*) → Secretory vesicles (*Vesikel rembesan*)

B Ribosomes (*Ribosom*) → Transport vesicles (*Vesikel angkutan*) → Golgi apparatus (*Jasad Golgi*) → Secretory vesicles (*Vesikel rembesan*)

C Secretory vesicles (*Vesikel rembesan*) → Ribosomes (*Ribosom*) → Transport vesicles (*Vesikel angkutan*) → Golgi apparatus (*Jasad Golgi*)

D Secretory vesicles (*Vesikel rembesan*) → Transport vesicles (*Vesikel angkutan*) → Ribosomes (*Ribosom*) → Golgi apparatus (*Jasad Golgi*)

10 Enzyme activity in the alimentary canal is affected by temperature.
Which of the following will occur when someone has high fever?
Aktiviti enzim dalam salur alimentari dipengaruhi oleh suhu.
Antara yang berikut, apakah yang akan berlaku apabila seseorang mengalami demam panas?

A Diarrhoea
Cirit-birit

B Gastritis
Gastritis

C Indigestion
Ketidakhadaman

D Constipation
Sembelit

11 Diagram 6 shows a shirt which has a food stain on it. The shirt is washed using some biological washing powder.
Rajah 6 menunjukkan sehelai baju yang mempunyai kotoran makanan di atasnya. Baju tersebut dicuci menggunakan serbuk pencuci biologi.

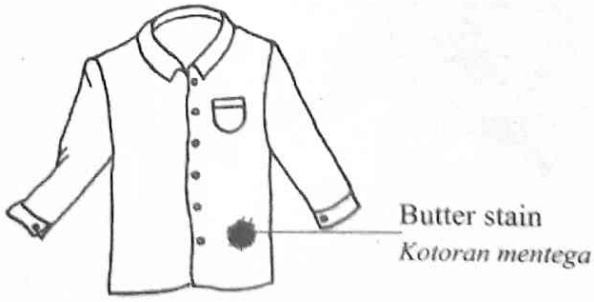


Diagram 6
Rajah 6

Which of the following enzymes helps in removing the stain?
Antara berikut, enzim manakah membantu menanggalkan kotoran tersebut?

A Lipase
Lipase

B Amylase
Amilase

C Protease
Protease

D Cellulase
Selulase

12 Diagram 7 shows the chromosomes in an abnormal human gamete.
Rajah 7 menunjukkan kromosom dalam gamet manusia yang abnormal.

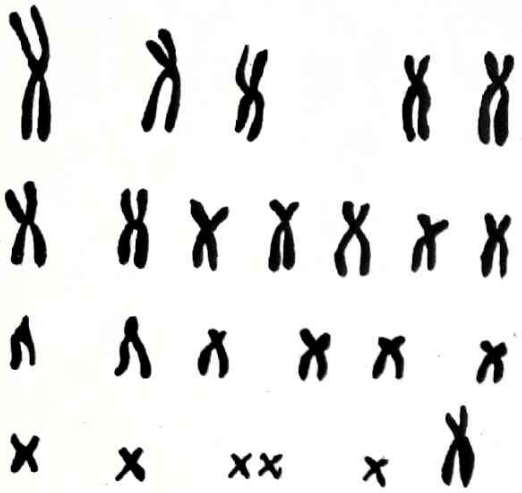


Diagram 7
Rajah 7

At which stage of the cell division did this mutation occur?
Pada peringkat pembahagian sel yang manakah mutasi ini berlaku?

A Prophase I
Profasa I

B Metaphase I
Metafasa I

C Anaphase I
Anafasa I

D Telophase I
Telofasa I

13 Diagram 8 shows a part of human life cycle.
Rajah 8 menunjukkan sebahagian kitar hidup manusia.

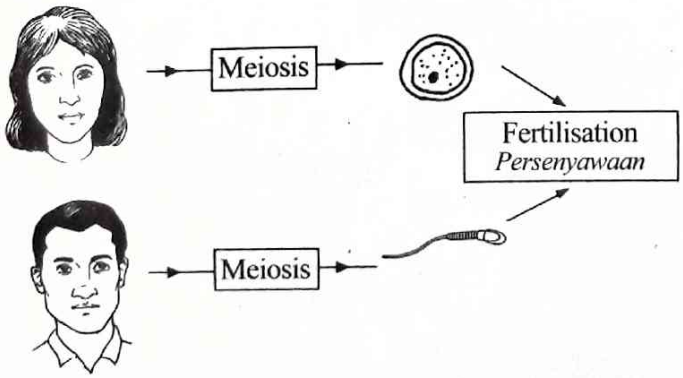


Diagram 8
Rajah 8

What is the importance of the process shown in the diagram?
Apakah kepentingan proses yang ditunjukkan dalam rajah tersebut?

A To double up the chromosomal number of offspring
Untuk menggandakan bilangan kromosom anak

B To halve the chromosomal number of offspring
Untuk menjadikan bilangan kromosom anak menjadi separuh

C To maintain the chromosomal number of offspring
Untuk mengekalkan bilangan kromosom anak

D To reduce the chromosomal number of offspring
Untuk mengurangkan bilangan kromosom anak

14 Diagram 9 shows phases of a cell cycle.
Rajah 9 menunjukkan fasa dalam kitar sel.

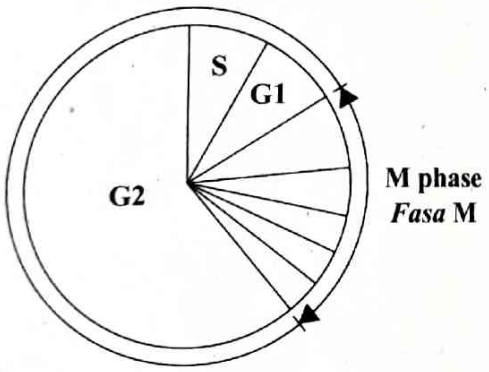


Diagram 9
Rajah 9

Which of the following is correct about the phases in the cell cycle?
Antara yang berikut, yang manakah betul tentang fasa dalam kitar sel?

	G1	S	G2	M Phase *Fasa* M
A	ATP production *Penghasilan* ATP	Nuclear division *Pembahagian nukleus*	Synthesis of organelle *Sintesis organel*	DNA replication *Replikasi* DNA
B	Synthesis of organelle *Sintesis organel*	DNA replication *Replikasi* DNA	ATP production *Penghasilan* ATP	Nuclear division *Pembahagian nukleus*
C	ATP production *Penghasilan* ATP	Synthesis of organelle *Sintesis organel*	Nuclear division *Pembahagian nukleus*	DNA replication *Replikasi* DNA
D	Synthesis of organelle *Sintesis organel*	ATP production *Penghasilan* ATP	DNA replication *Replikasi* DNA	Nuclear division *Pembahagian nukleus*

15 Diagram 10 shows homologous chromosomes in a stage of meiosis.
Rajah 10 menunjukkan kromosom homolog dalam satu peringkat meiosis.

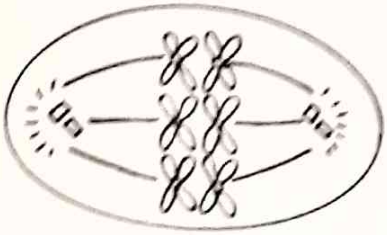


Diagram 10
Rajah 10

What is the number of chromosomes found in a daughter cell after completing meiosis?
Berapakah bilangan kromosom dalam sel anak selepas meiosis lengkap?

A 24
B 12
C 6
D 3

16 Diagram 11 shows a cross section of a leaf.
Rajah 11 menunjukkan keratan rentas daun.

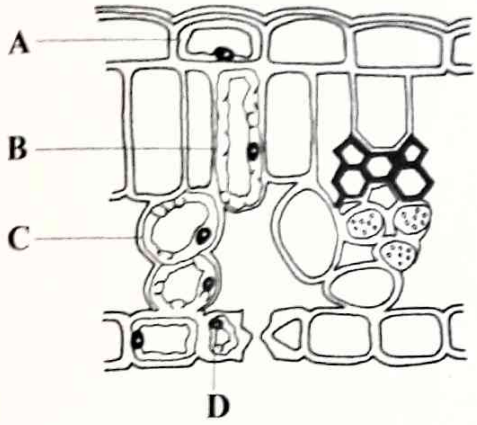


Diagram 11
Rajah 11

Which structure **A**, **B**, **C** or **D** has a large number of chloroplasts?
Antara struktur **A**, **B**, **C** *dan* **D**, *yang manakah mempunyai bilangan kloroplas yang paling banyak?*

17 The following statements are the effects of excessive consumptions of a vitamin for a long period.
Pernyataan berikut adalah kesan-kesan pengambilan sejenis vitamin bagi suatu jangka masa yang panjang.

- Interferes with the functions of muscles
  Gangguan fungsi otot
- Calcification of muscles
  Enapan kalsium pada otot

What is the vitamin?
Apakah vitamin tersebut?

A Vitamin A
Vitamin A
B Vitamin B
Vitamin B
C Vitamin C
Vitamin C
D Vitamin D
Vitamin D

18 The following information shows a biochemical reaction.
Maklumat berikut menunjukkan suatu tindak balas biokimia.

Caseinogen	Q	Casein
Kaseinogen	$\rightleftharpoons$	*Kasein*

What is Q?
Apakah Q?

A Rennin
Rennin
B Pepsin
Pepsin
C Trypsin
Tripsin
D Erepsin
Erepsin

19 Diagram 12 shows a human digestive system.
Rajah 12 menunjukkan suatu sistem pencernaan manusia.

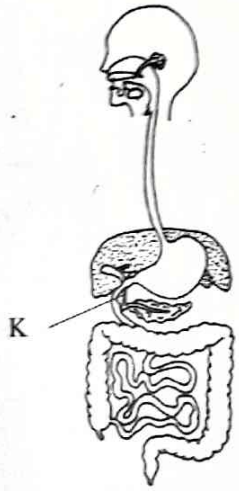


Diagram 12
Rajah 12

What is the effect towards the individual if a part of K is removed because of a disease?
Apakah kesan terhadap individu jika sebahagian **K** *dibuang kerana suatu penyakit?*

A More bile is secreted
Lebih banyak hempedu dirembeskan
B Less pepsin is secreted
Kurang pepsin dirembeskan
C Less lipid is digested
Kurang lipid dicernakan
D More protein is digested
Lebih protein dicernakan

20 Diagram 13 shows the stages of food digestion along the human alimentary canal.
Rajah 13 menunjukkan peringkat pencernaan makanan di sepanjang salur alimentari manusia.

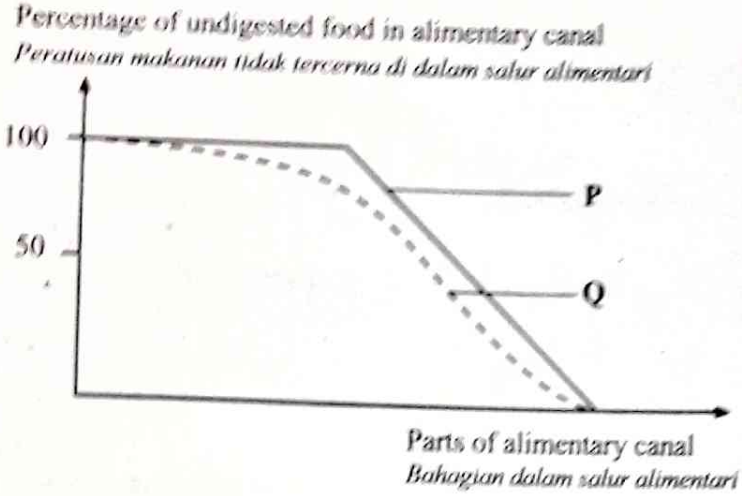


Diagram 13
Rajah 13

What are **P** and **Q**?
*Apakah **P** dan **Q**?*

	P	Q
A	Protein *Protein*	Starch *Kanji*
B	Fat *Lemak*	Protein *Protein*
C	Starch *Kanji*	Fat *Lemak*
D	Starch *Kanji*	Protein *Protein*

21 Which is the correct sequence of cellulose digestion in the stomach of a ruminant?
Manakah urutan yang betul tentang pencernaan selulosa di dalam perut haiwan ruminan?

A Abomasum → Omasum → Reticulum → Rumen
Abomasum *Omasum* *Retikulum* *Rumen*

B Omasum → Abomasum → Rumen → Reticulum
Omasum *Abomasum* *Rumen* *Retikulum*

C Reticulum → Rumen → Abomasum → Omasum
Retikulum *Rumen* *Abomasum* *Omasum*

D Rumen → Reticulum → Omasum → Abomasum
Rumen *Retikulum* *Omasum* *Abomasum*

22 Which process involves aerobic respiration?
Proses manakah yang melibatkan respirasi aerob?

A Fermentation by yeast
Penapaian oleh yis

B Initial stage of seed germination
Peringkat awal percambahan biji benih

C Contraction of heart muscles when a person is at rest
Pengecutan otot jantung semasa seseorang sedang berehat

D Growth of paddy plants under waterlogged condition
Pertumbuhan pokok padi dalam keadaan air bertakung

23 Diagram 14 shows gaseous exchange between body cells and blood capillaries.
Rajah 14 menunjukkan pertukaran gas antara sel badan dengan kapilari darah.

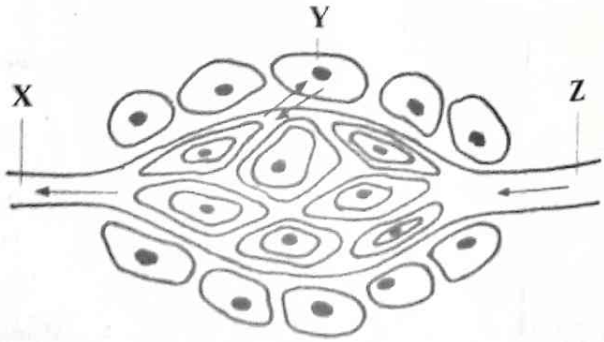


Diagram 14
Rajah 14

What is the partial pressure of carbon dioxide at **X**, **Y** and **Z**?
*Apakah tekanan separa karbon dioksida di **X**, **Y** dan **Z**?*

	X	Y	Z
A	Low *Rendah*	High *Tinggi*	Low *Rendah*
B	High *Tinggi*	High *Tinggi*	Low *Rendah*
C	Low *Rendah*	High *Tinggi*	High *Tinggi*
D	High *Tinggi*	Low *Rendah*	High *Tinggi*

24 Which structure in the respiratory system of a fish increases the surface area for gaseous exchange?
Struktur manakah dalam sistem respirasi ikan meningkatkan luas permukaan untuk pertukaran gas?

A Filament *Filamen*
B Gill arch *Lengkung insang*
C Operculum *Operkulum*
D Buccal cavity *Lantai mulut*

25 Diagram 15 shows the breathing mechanism in humans.
Rajah 15 menunjukkan mekanisme pernafasan manusia.

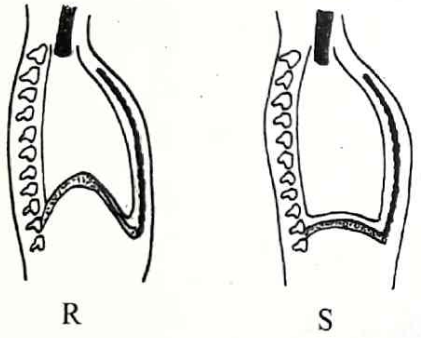


Diagram 15
Rajah 15

Which statements explain the diagram correctly?
Pernyataan yang manakah menerangkan gambar rajah dengan betul?

	R	S
A	Diaphragm flattened *Diafragma mendatar*	Diaphragm in dome shape *Diafragma berbentuk kubah*
B	External intercostals muscles contract *Otot interkostal luar mengecut*	External intercostals muscles relax *Otot interkostal luar mengendur*
C	Lung volume decreases *Isi padu peparu berkurang*	Lung volume increases *Isi padu peparu bertambah*
D	Low air pressure in the alveoli *Tekanan udara dalam alveolus rendah*	High air pressure in the alveoli *Tekanan udara dalam alveolus tinggi*

26 Diagram 16 shows the tracheal system of an insect.
Rajah 16 menunjukkan sistem trakea bagi seekor serangga.

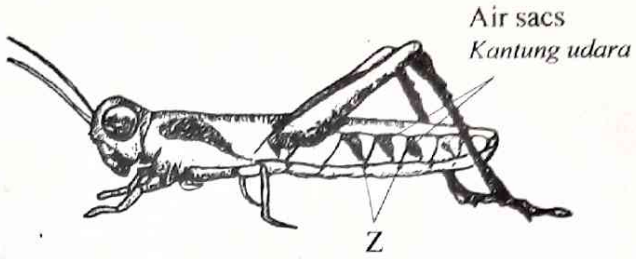


Diagram 16
Rajah 16

What is Z?
Apakah Z?

A Trachea *Trakea*
B Spiracle *Spirakel*
C Muscle *Otot*
D Tracheole *Trakeol*

27 Diagram 17 shows the distribution of white mould, yellow mould and black mould on a moist bread which was kept in a dark condition at room temperature after 12 days.
Rajah 17 menunjukkan taburan kulapuk putih, kulapuk kuning dan kulapuk hitam di atas roti lembap yang disimpan dalam keadaan gelap pada suhu bilik selepas 12 hari.

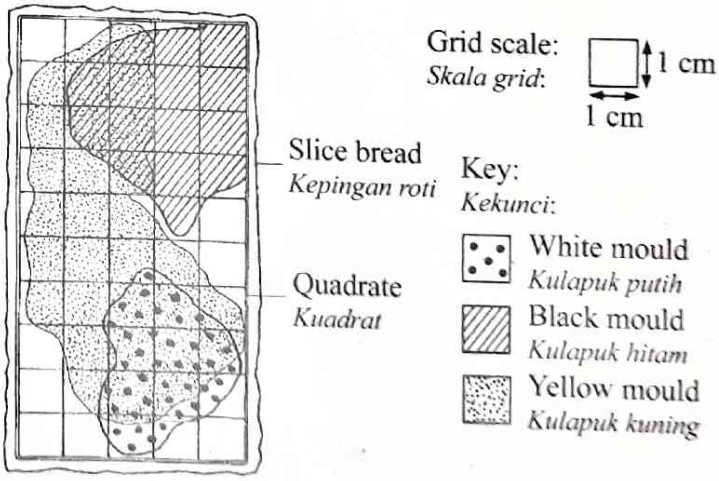


Diagram 17
Rajah 17

What is the percentage of coverage of yellow mould on the bread?
Apakah peratusan litupan kulapuk kuning di atas roti itu?

A 18%
B 30%
C 54%
D 60%

28 Diagram 18 shows the distribution of mangrove tree in a swamp area.

Rajah 18 menunjukkan taburan pokok paya bakau di suatu kawasan berpaya.

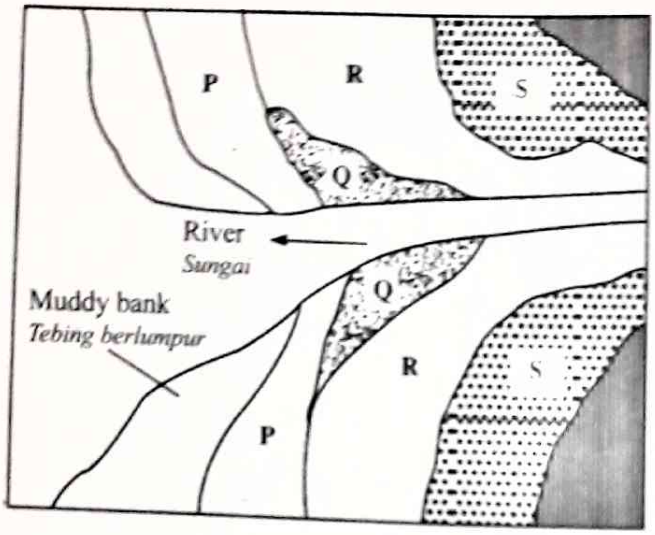


Diagram 18
Rajah 18

Which of the following is *Rhizophora* sp.?

Antara yang berikut, yang manakah Rhizophora sp.?

A P
B Q
C R
D S

29 Diagram 19 shows a graph of the population of *Paramecium aurelia* and *Paramecium caudatum* when cultured together.

Rajah 19 menunjukkan graf bagi populasi Paramecium aurelia dan Paramecium caudatum apabila dikultur bersama.

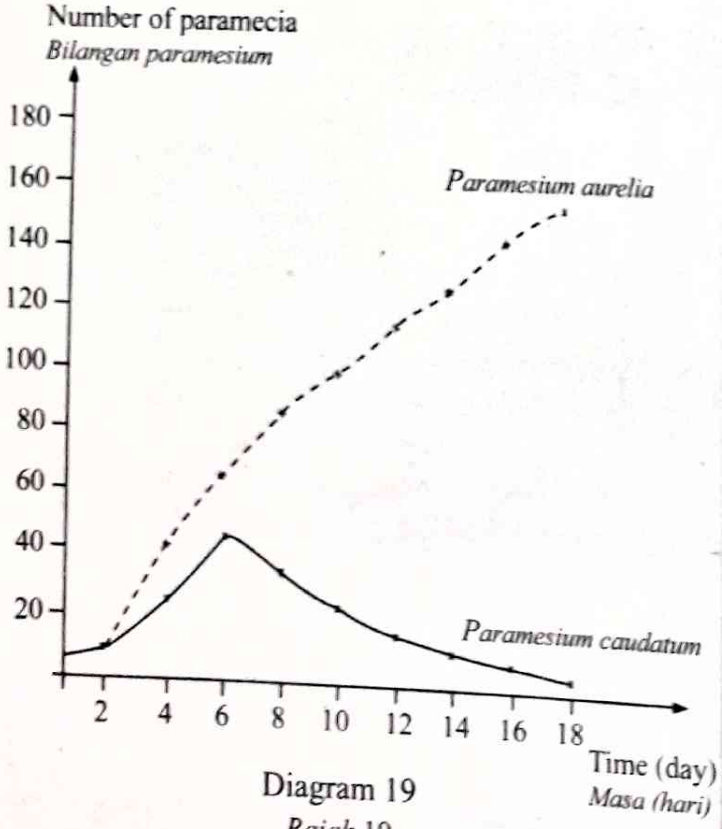


Diagram 19
Rajah 19

Which of the following statements is correct about the diagram?

Antara berikut, pernyataan manakah yang betul mengenai rajah itu?

A *Paramecium aurelia* will migrate
Paramecium aurelia akan berpindah

B *Paramecium caudatum* is a weak species
Paramecium caudatum adalah spesies yang lemah

C *Paramecium caudatum* is a successful species
Paramecium caudatum adalah spesies yang berjaya

D Both species compete for different resources
Kedua-dua spesies bersaing untuk sumber yang berbeza

30 Diagram 20 shows an ecosystem in a pond.

Rajah 20 menunjukkan ekosistem dalam sebuah kolam.

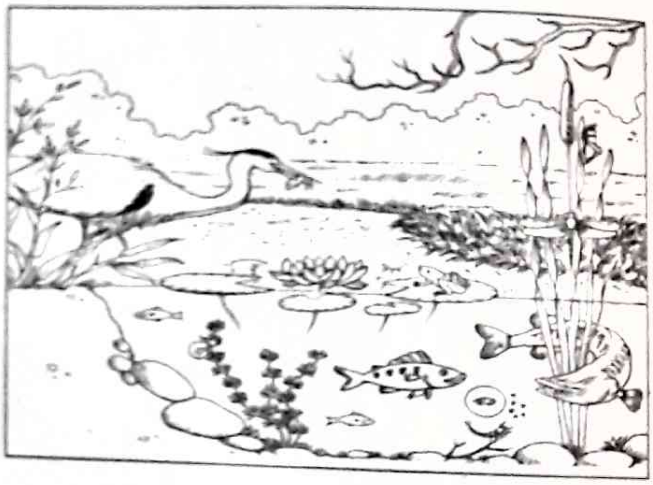


Diagram 20
Rajah 20

Which organism represents the correct trophic level?

Organisma manakah yang mewakili aras trofik yang betul?

	Organism *Organisma*	Trophic level *Aras trofik*
A	Frog *Katak*	Primary consumer *Pengguna pertama*
B	Algae *Alga*	Decomposer *Pengurai*
C	Flamingo *Burung bangau*	Tertiary consumer *Pengguna tertier*
D	Grasshopper *Belalang*	Secondary consumer *Pengguna sekunder*

31 Which of the following is the effect of an increase in biochemical oxygen demand (BOD)?
Antara yang berikut, yang manakah kesan daripada peningkatan keperluan oksigen biokimia (BOD)?

A Algal bloom occurs
Berlaku pertumbuhan alga yang pesat

B Decomposition by bacteria
Penguraian oleh bakteria

C Death of aquatic organisms
Kematian organism akuatik

D Rapid growth of microorganisms
Pertumbuhan pesat mikroorganisma

32 Diagram 21 shows a human activity.
Rajah 21 menunjukkan suatu aktiviti manusia.

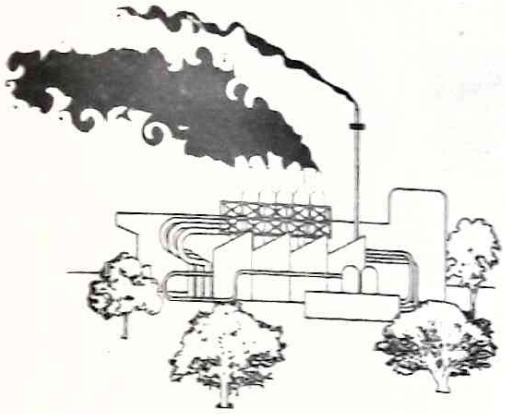


Diagram 21
Rajah 21

Which of the following are the long-term effects on human health?
Antara yang berikut, yang manakah kesan jangka panjang kepada kesihatan manusia?

I Bronchitis
Bronkitis

II Skin itchiness
Kegatalan pada kulit

III Infertility
Kemandulan

IV Skin cancer
Kanser kulit

A I and II
I *dan* II

B I and III
I *dan* III

C II and IV
II *dan* IV

D III and IV
III *dan* IV

33 Diagram 22 shows a human heart.
Rajah 22 menunjukkan jantung manusia.

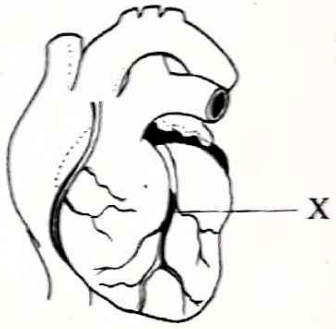


Diagram 22
Rajah 22

What will happen if there is a blockage of blood flow in X?
Apakah yang akan berlaku jika aliran darah tersumbat dalam X?

A Stroke
Angin ahmar

B Hypertension
Hipertensi

C Low blood pressure
Tekanan darah rendah

D Myocardial infarction
Penginfarkan miokardium

34 Which of the following shows the correct sequence of blood flow in a systemic blood circulation of a human being?
Antara berikut, urutan manakah yang betul tentang aliran darah dalam peredaran darah sistemik dalam manusia?

A Left ventricle (*Ventrikel kiri*) → Vena cava (*Vena kava*) → Body tissues (*Tisu badan*) → Aorta (*Aorta*) → Left atrium (*Atrium kiri*)

B Right ventricle (*Ventrikel kanan*) → Vena cava (*Vena kava*) → Left atrium (*Atrium kiri*) → Aorta (*Aorta*) → Body tissues (*Tisu badan*)

C Left ventricle (*Ventrikel kiri*) → Aorta (*Aorta*) → Body tissues (*Tisu badan*) → Vena cava (*Vena kava*) → Right atrium (*Atrium kanan*)

D Right ventricle (*Ventrikel kanan*) → Aorta (*Aorta*) → Body tissues (*Tisu badan*) → Vena cava (*Vena kava*) → Left ventricle (*Ventrikel kiri*)

35 Diagram 23 shows an aphid feeding from tissue **X** of a plant.
Rajah 23 menunjukkan seekor afid mendapatkan makanan daripada tisu **X** *suatu tumbuhan.*

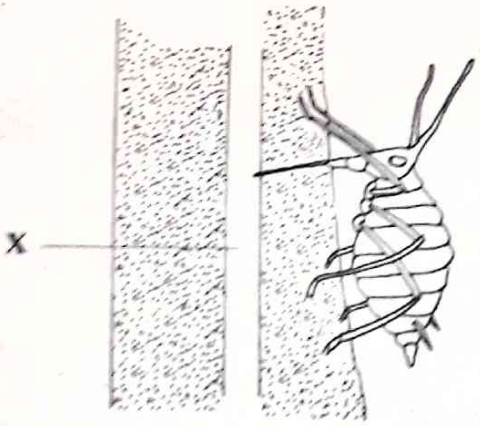


Diagram 23
Rajah 23

What is tissue **X**?
Apakah tisu **X**?

A Xylem
Xilem

B Cortex
Korteks

C Phloem
Floem

D Epidermis
Epidermis

36 Diagram 24 shows the locomotion of a fish.
Rajah 24 menunjukkan pergerakan seekor ikan.

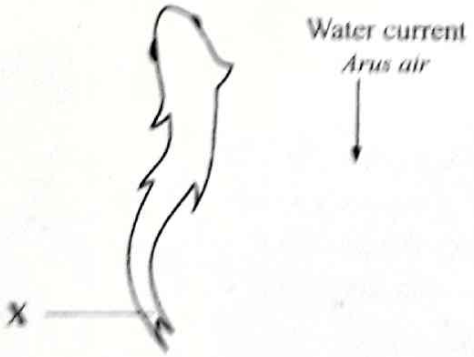


Diagram 24
Rajah 24

What will happen to the locomotion of the fish if structure **X** is injured?
Apakah yang akan berlaku kepada pergerakan ikan itu jika struktur **X** *tercedera?*

A The fish cannot float
Ikan itu tidak boleh terapung

B The fish cannot overcome resistance
Ikan itu tidak boleh mengatasi rintangan

C The fish cannot move up and down
Ikan itu tidak boleh bergerak ke atas dan ke bawah

D The fish cannot produce forward thrust
Ikan itu tidak boleh menghasilkan tujahan ke hadapan

37 Diagram 25 shows the vertebral column of a human.
Rajah 25 menunjukkan turus vertebra manusia.

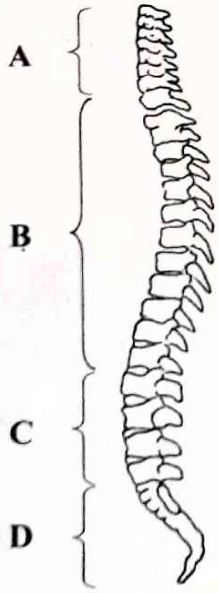
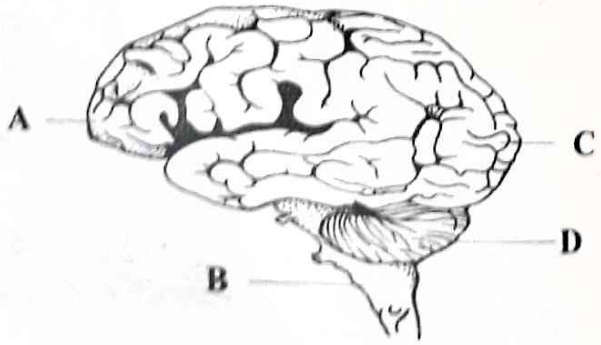


Diagram 25
Rajah 25

Which of the parts labeled **A**, **B**, **C** or **D** is a sacrum?
Bahagian manakah yang berlabel **A**, **B**, **C** *dan* **D** *ialah sakrum?*

38 An accident victim injured his head and had difficulties in breathing.
Seorang mangsa kemalangan mengalami kecederaan kepala dan kesukaran bernafas.



Which part **A**, **B**, **C** or **D** was injured?
Antara bahagian **A**, **B**, **C** *dan* **D** *yang manakah mengalami kecederaan?*

39 A rubber tapper encounters a large cobra in his plantation.
What is the response of his body to this fearful situation?
Seorang penoreh getah berhadapan dengan seekor ular tedung yang besar di ladangnya.
Apakah tindak balas yang berlaku dalam badannya untuk menghadapi situasi yang menakutkan ini?

I Adrenaline secretion increases
Rembesan adrenalina bertambah

II Thyroxine secretion decreases
Rembesan tiroksina menurun

III Rate of respiration increases
Kadar respirasi bertambah

IV Rate of heartbeat decreases
Kadar denyutan jantung menurun

A I and II
I *dan* II

B I and III
I *dan* III

C II and IV
II *dan* IV

D III and IV
III *dan* IV

40 Diagram 26 is a graph which shows the relationship between blood glucose level and time.
Rajah 26 ialah graf yang menunjukkan hubungan antara aras glukosa darah dengan masa.

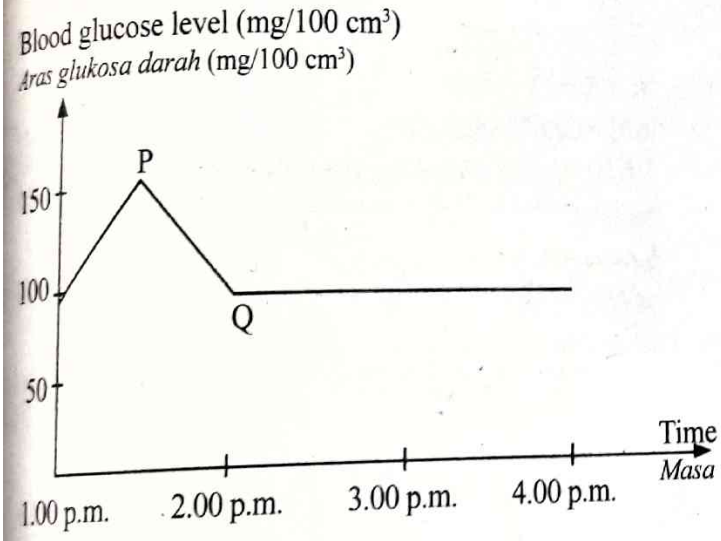


Diagram 26
Rajah 26

A meal containing sugar is consumed at 1.00 p.m. Which statement explains the graph from P to Q?
Makanan yang mengandungi gula diambil pada pukul 1.00 tengah hari.
Pernyataan yang manakah menerangkan graf dari P ke Q?

A ADH was secreted
ADH *dirembeskan*

B Insulin was secreted
Insulin dirembeskan

C Orange juice was drank
Jus oren diminum

D Glucose was absorbed
Glukosa diserap

41 Diagram 27 shows a nephron.
Rajah 27 menunjukkan satu nefron.

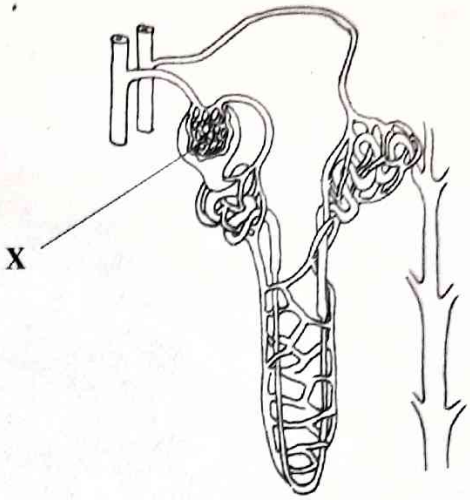


Diagram 27
Rajah 27

What process occurs at **X**?
Apakah proses yang berlaku di **X**?

A Osmosis
Osmosis

B Secretion
Rembesan

C Reabsorption
Penyerapan semula

D Ultrafiltration
Ultraturasan

42 A woman has a weak uterus during her pregnancy.
Which treatment can overcome the problem?
Seorang wanita mempunyai uterus yang lemah semasa kehamilannya.
Rawatan manakah yang dapat mengatasi masalah itu?

A Oxytocin injection
Suntikan oksitosin

B Prolactin injection
Suntikan prolaktin

C Progesterone injection
Suntikan progesteron

D Follicle stimulating hormone (FSH) injection
Suntikan hormon perangsang folikel (FSH)

43 Which of the following is the correct sequence for the stages in the development of pollen grains?
Antara yang berikut, urutan yang manakah betul bagi peringkat-peringkat perkembangan butir debunga?

A	Pollen mother cell *Sel induk debunga*	→	Tetrad *Tetrad*	→	Pollen grains *Butir debunga*	→ Mature pollen grain *Butir debunga matang*
B	Tetrad *Tetrad*	→	Pollen mother cell *Sel induk debunga*	→	Pollen grains *Butir debunga*	→ Mature pollen grain *Butir debunga mtang*
C	Pollen mother cell *Sel induk debunga*	→	Pollen grains *Butir debunga*	→	Mature pollen grain *Butir debunga matang*	→ Tetrad *Tetrad*
D	Tetrad *Tetrad*	→	Pollen grains *Butir debunga*	→	Pollen mother cell *Sel induk debunga*	→ Mature pollen grain *Butir debunga matang*

44 Diagram 28 shows the formation of sperm in the seminiferous tubule.
Rajah 28 menunjukkan pembentukan sperma dalam tubul seminiferus.

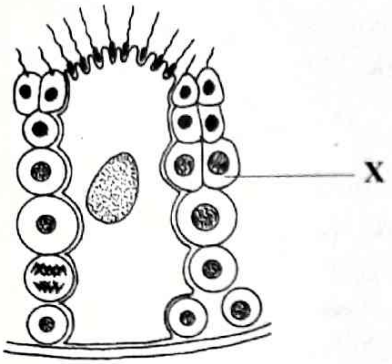


Diagram 28
Rajah 28

What is cell **X**?
Apakah sel **X**?

A Spermatid
Spermatid

B Spermatogonium
Spermatogonium

C Primary spermatocyte
Spermatosit primer

D Secondary spermatocyte
Spermatosit sekunder

45 Diagram 29 shows the double fertilisation process in flowering plants.
Rajah 29 menunjukkan proses persenyawaan ganda dua dalam tumbuhan berbunga.

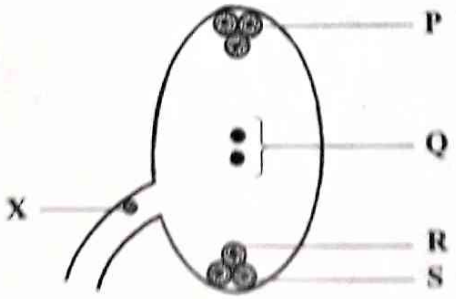


Diagram 29
Rajah 29

Which structure are fertilised by nucleus **X**?
Struktur yang manakah akan disenyawakan oleh nukleus **X**?

A P and Q
P *dan* Q

B P and S
P *dan* S

C Q and R
Q *dan* R

D R and S
R *dan* S

46 A student with a blood type which contains antibodies A and antibodies B met with an accident. Which blood group is suitable to be donated to the student?
Seorang pelajar yang mempunyai jenis darah yang mengandungi antibodi A dan antibodi B telah mengalami kemalangan.
Kumpulan darah manakah yang sesuai untuk didermakan kepada pelajar tersebut?

A I^OI^O

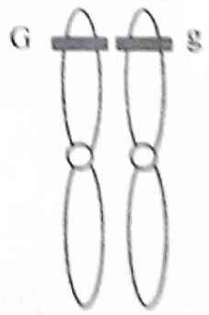
B I^AI^O

C I^AI^B

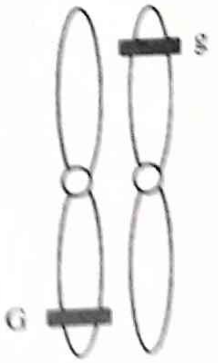
D I^BI^O

47 Which diagram shows the correct allele on homologous chromosomes?
Rajah manakah menunjukkan alel yang betul pada kromosom homolog?

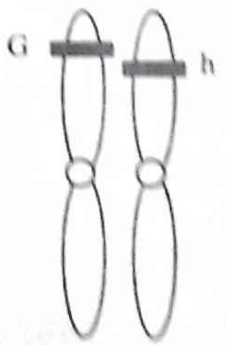
A



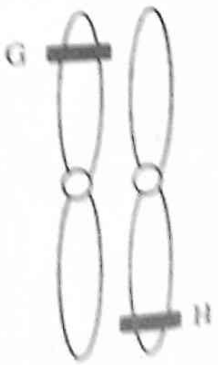
C



B



D



48 Diagram 30 shows a graph of blood groups for a few students.
Rajah 30 menunjukkan graf bagi kumpulan-kumpulan darah bagi beberapa orang pelajar.

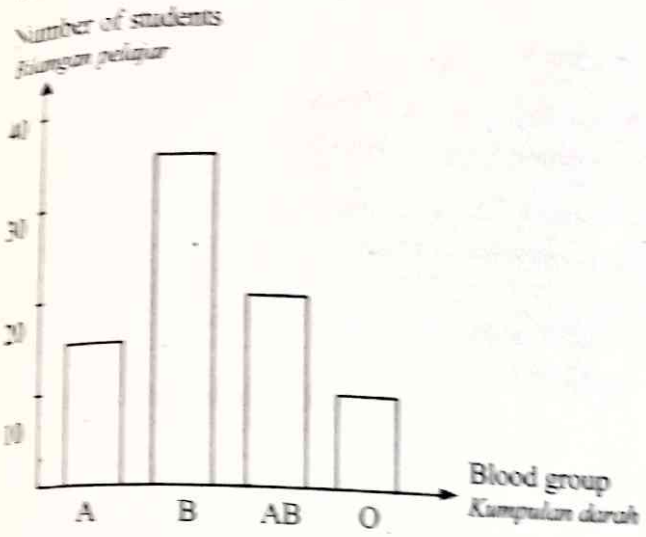


Diagram 30
Rajah 30

Which of the following characteristics refers to that type of variation?
Antara berikut ciri manakah yang merujuk kepada jenis variasi itu?

A Quantitative
Kuantitatif

B Shows intermediates
Menunjukkan perantaraan

C Shows distinct categories
Menunjukkan kategori yang ketara

D Influenced by environment
Dipengaruhi oleh persekitaran

49 Diagram 31 shows combinations of chromosomes produced in gametes after meiosis II. This results in a variety of gametes that leads to genetic variation.
Rajah 31 menunjukkan gabungan kromosom yang dihasilkan di dalam gamet selepas meiosis II. Ini mengakibatkan pelbagai gamet yang menyebabkan variasi genetik.

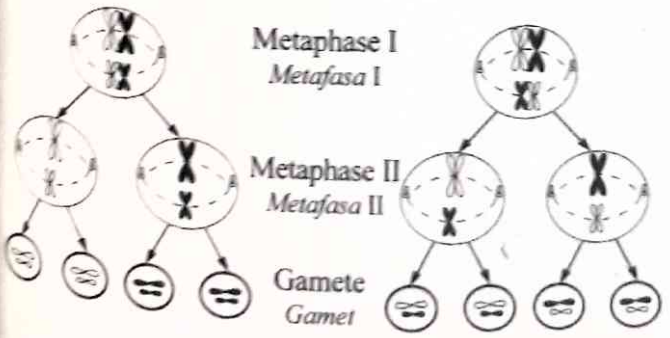


Diagram 31
Rajah 31

Which of the following conditions causes the production of gametes with different combinations?
Antara berikut, keadaan manakah yang menyebabkan penghasilan gamet dengan kombinasi yang berbeza?

A Mutation
Mutasi

B Crossing over
Pindah silang

C Random fertilisation
Persenyawaan rawak

D Independent assortment of chromosomes
Penyusunan rawak kromosom

50 Diagram 32 shows a karyotype of a genetic disease in humans.
Rajah 32 menunjukkan kariotip penyakit genetik pada manusia.

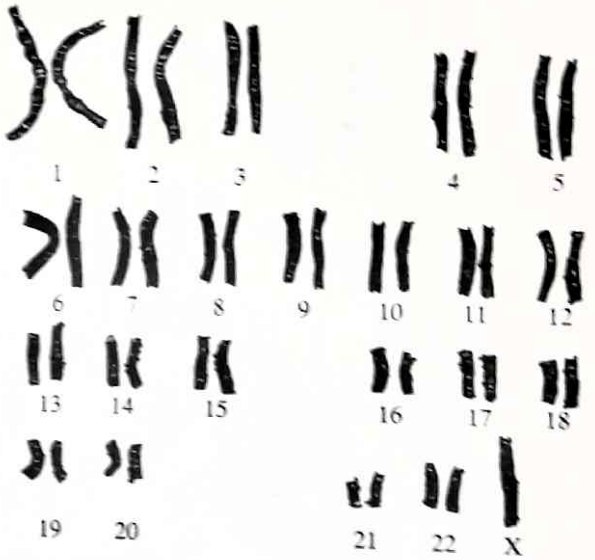


Diagram 32
Rajah 32

What is the genetic disease?
Apakah penyakit genetik tersebut?

A Albinism
Albinisme

B Turner's syndrome
Sindrom Turner

C Sickle-cell anaemia
Anemia sel sabit

D Klinefelter's syndrome
Sindrom Klinefelter

END OF QUESTION PAPER
KERTAS PEPERIKSAAN TAMAT