LIT

	Name:	
	Class :	
	JABATAN PELAJARAN NEGERI JOHOR	_
ججر		
	4	551/2
PEPERIKSAA	N PERCUBAAN SPM 2008	
TINGKATAN	5	
BIOLOGY		
Kertas 2		
September		
$2\frac{1}{2}$ hours	Dua jam tiga puluh	ı minit.

## JANGAN BUKA KERTAS SOALAN INI SEHINGGA DIBERITAHU.

- 1. Sila tuliskan nama dan kelas anda di ruang yang disediakan di bahagian atas sebelah kanan kertas ini.
- 2. Kertas soalan ini disediakan dalam dwibahasa. Soalan bahasa Inggeris mendahului soalan yang sepadan dalam bahasa Melayu.
- 3. Calon perlu menjawab semua soalan dalam bahasa Inggeris.
- 4. Calon dikehendaki membaca maklumat di halaman belakang kertas soalan.

K	od Pemerik:	sa	
Bahagian	Soalan	Markah Penuh	Markah
	1	12	
	2	13	
	3	14	
A	4	10	
	5	11	
	6	20	
D	7	20	
в	8	20	
	9	20	
Jum	lah	100	

Kertas ini mengandungi 23 halaman bercetak.

Section A [60 marks] Answer all questions in this section Jawab semua soalan dalam bahagian ini

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Diagram 1.1 shows a cross section of a leaf.
 Rajah 1.1 menunjukkan keratan rentas sehelai daun.



(a)	Label the structures P,Q,R and S Labelkan struktur P,Q,R dan S		1 (:
	P :		
	Q :		
	R :		
	S :		
		[4 marks]	

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	1 <u>3</u>		4551/
(b)	) Explain the stage of cell organization in the leaf. Teranekan peringkat organisasi sel dalam daun		1(b)
	······	• • • • • • • • • • • • • • • • • • • •	
		•••••	
. •••			
		•••••	
		[2 marks]	
(c) Ex	plain the role of structure R.		
Te	erangkan peranan struktur R		
			1 (c)
		[2 marks]	}
(d) Ta	able 1 shows some organelles in cells.	[2 marks]	}
(d) Ta <i>Ja</i>	able 1 shows some organelles in cells. dual Imenunjukkan beberapa organel di dalam sel	[2 marks]	
(d) Ta <i>Ja</i>	able 1 shows some organelles in cells. dual Imenunjukkan beberapa organel di dalam sel Lysosomes	[2 marks]	l (d)
 (d) Ta <i>Ja</i>	able 1 shows some organelles in cells. dual Imenunjukkan beberapa organel di dalam sel Lysosomes Smooth Endoplasmic reticulum	[2 marks]	l (d)
(d) Ta <i>Ja</i>	able 1 shows some organelles in cells. dual Imenunjukkan beberapa organel di dalam sel Lysosomes Smooth Endoplasmic reticulum Mitochondria	[2 marks]	I (d)
(d) Ta <i>Ja</i>	able 1 shows some organelles in cells. dual Imenunjukkan beberapa organel di dalam sel Lysosomes Smooth Endoplasmic reticulum Mitochondria Centrioles	[2 marks]	I (d)
(d) Ta	able 1 shows some organelles in cells. <i>dual 1menunjukkan beberapa organel di dalam sel</i> Lysosomes Smooth Endoplasmic reticulum Mitochondria Centrioles Chloroplast	[2 marks]	I (d)
 (d) Ta Ja	able 1 shows some organelles in cells. <i>dual Imenunjukkan beberapa organel di dalam sel</i> Lysosomes Smooth Endoplasmic reticulum Mitochondria Centrioles Chloroplast Golgi apparatus	[2 marks]	1 (d)
 (d) Τε <i>Ja</i>	able 1 shows some organelles in cells. dual Imenunjukkan beberapa organel di dalam sel Lysosomes Smooth Endoplasmic reticulum Mitochondria Centrioles Chloroplast Golgi apparatus Vacuoles	[2 marks]	(b) I
(d) Τε <i>Ja</i>	able 1 shows some organelles in cells. dual Imenunjukkan beberapa organel di dalam sel Lysosomes Smooth Endoplasmic reticulum Mitochondria Centrioles Chloroplast Golgi apparatus Vacuoles Table 1	[2 marks]	I (d)

By referring to Diagram 1.1, Tick ( < ) the organelles that are not found

in the cells in the boxes provided in Table 1.

Dengan merujuk kepada rajah 1.1, tandakan beberapa organel yang tidak terdapat di dalam sel-sel. di dalam Jadual 1





Diagram 2 shows how Adenosine triphosphate molecules (ATP molecules) are 2 produced and utilized during cell metabolism.

Rajah 2 menunjukkan bagaimana molekul ATP dibentukkan dan digunakan semasa metabolisme sel.

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(b)	Based on Diagram 2, explain how ATP molecules are produced in the cells. Berdasarkan rajah 2, terangkan bagaimana molekul ATP di bentukkan.	
	······	
		2(b)
	······	
	. [3 marks]	
(c)	State the uses of ATP molecules in the following cells :	
(i)	Root hair cells of plants	
(ii)	Neurones in the brain	
		.
		2(c)
	[2 marks]	
		1

(d)(i) Explain why aerobic respiration in the muscle cells generates 38

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Confidential 7 4551/2 molecules of ATP for every glucose molecule but anaerobic respiration only generates 2 molecules of ATP for every glucose molecule. Terangkan mengapa semasa respirasi aerob sel otot menghasilkan 38 ATP daripada satu molekul glukose tetapi hanya menghasilkan 2 ATP semasa respirasi anaerob. 2(d)(i)[4 marks] (ii) Heavy-metal ions such as mercury, silver, arsenic and lead are toxic substances which are harmful to the cells and at high concentrations can lead to the death of an organism. Explain the above statement based on your biological knowledge on enzyme action . Ion logam berat seperti merkuri, perak, arsenik dan plumbum adalah 2(d)(ii) sebatian toksik kepada sel dan pada kepekatan tinggi boleh menyebabakan kematian kepada organisma. Terangakan pernyataan diatas berdasarkan pengetahuan Biologi anda tentang tindakan enzim. TOTAL [2 marks] Diagram 3 shows the structure of a nephron in the kidneys of humans.

Rajah 3 menunjukkan struktur satu unit nefron dalam ginjal manusia.



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······	
	3(b)
[ 3 marks ]	
<ul> <li>(c) Explain the effects of drinking a large amount of water on the quality and quantity of the urine of a healthy person.</li> <li>Terangkan kesan meminum jumlah air yang banyak ke atas kualiti dan kuantiti air kencing dari seorang yang sihat.</li> </ul>	
	2(a)
	5(0)
[4 marks]	

Table 3 shows the concentration of some substances in the blood plasma, glomerular filtrate and urine of an adult.

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Jadual 3 menunjukkan kepekatan bahan- bahan dalam plasma darah, turasan glomerulus dan air kencing seorang dewasa.

Substances in	Concentration of substance in fluid (g/dm <sup>3</sup> ) Kepekatan bahan dalam cecair (g/dm <sup>3</sup> )				
Substances in fluid Bahan dalam cecair	Blood plasma entering the glomerulus Plasma darah yang memasuki glomerulus	Glomerular filtrate Filtrat glomerulus	Urine produced by kidney Urine yang dihasilkan oleh ginjal		
Glucose Glukosa	1.0	1.0	0.0		
Amino acid Asid amino	1.5	1.5	0.0		
Protein Protein	80.0	0.0	0.0		
Urea Urea	0.3	0.3	20.0		
Sodium ion Ion Natrium	3.2	3.2	3.5		

Table 3 Jadual 3

(d) Based on Table 3, explain the difference in the concentration of urea in the blood plasma, glomerular filtrate and urine.



Diagram 4 shows the relationship between the hormonal levels and changes in the ovary during the menstrual cycle.

Rajah 4 menunjukkan perubahan aras hormon dan peribahan pada ovari semasa

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(a)(ii) Explain why an imbalance of hormones P and Y causes the disruption of the ovulation process.
 Ketidak seimbangan hormon P dan Y menyebabkan gangguan proses ovulasi. Terangkan

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4(a)(i)

Confidential 13 4551/24(a)(ii) [2 marks] (b) Draw in Diagram 4, structure T on the 26<sup>th</sup> day if fertilization did not occur. Lukiskan dalam Rajah 4, struktur T pada hari ke 26 jika persenyawaan tidak berlaku. [1 mark] (c) Explain the relationship between the structure T and the level of hormone Q 4(b) from the  $16^{th}$  to  $28^{th}$  day. Berikan perhubungan diantara struktur T dan aras hormone O dari hari ke 16 hingga hari ke 28. 4(c) [2 marks] (d) If a mother is a drug addict, there is a tendency for the baby to be addicted to the drug as well. Explain. Jika ibu adalah seorang penagih dadah, bayi yang dilahirkan juga berkecenderungan menjadi penagih dadah. Terangkan. 4(d) [3 marks] TOTAL The students of Form 5 Anggun carried out an experiment to investigate the variation amongst themselves. The height and the type of ear lobe of each student

Pelajar-pelajar tingkatan 5 Anggun telah menjalankan satu eksperimen untuk menyiasat variasi dalam kalangan mereka. Baka ketinggian dan jenis cuping telinga

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were observed and recorded. The data was compiled in Table 5.1 and Table 5.2

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setiap pelajar telah diperhatikan. Data-data telah dimasukkan dalam jadual 5.1 dan 5.2

# Height

Ketinggian							_
Range of height/cm Julat ketinggian/cm	< 150	150-154	155 - 159	160 - 164	165 - 169	170 - 174	175 - 179
Number of students <i>Bilangan</i> <i>pelajar</i>	2	3	6	8	5	4	2

Table 5.1 Jadual 5.1

### Type of ear lobe Jenis cuping telinga

Type of ear lobe Jenis cuping telinga	Attached ear lobe Cuping telinga melekap	Unattached ear lobe Cuping telinga tak melekap
Number of students Bilangan pelajar	24	6

Table 5.2 Jadual 5.2

- a) Based on Table 5.1 and 5.2, draw a frequency distribution histogram to show : Berdasarkan jadual 5.1 dan 5.2, lukiskan histogram taburan kekerapan untuk menunjukkan :
  - i) The number of students against their height



[4 marks]

## 5(a)(i)(i

(b) List two differences between the variation shown by the height characteristic and the type of ear lobe of the students.

Senaraikan dua perbezaan diantara variasi yang ditunjukkan oleh cirri ketinggian dan jenis cuping telinga pelajar-pelajar

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Explain how that variation occurs amongst the cloned banana plants Terangkan bagaimana variasi itu boleh berlaku di kalangan klon pokok pisang tersebut.

[3 marks]

TOTAL

### Section B Bahagian B [40 marks] Answer any two questions Jawab mana-mana dua soalan.

6(a).

Many women assume that as long as they are still getting their menstruations, they have plenty of healthy eggs left. But this is not quite true.

Ramai wanita anggap mereka masih subur dan boleh menghasilkan banyak 'telur' yang sihat lagi selagi mereka masih ada haid. Tetapi perkara tersebut tidak berapa benar.

Explain the contribution of science and technology to human reproduction. Terangkan sumbangan Sains dan Teknologi kepada pembiakan manusia.

[ 10 marks ]

(b)

Growth and development does not cease once birth has occurred, instead it continues throughout the stages of life from infancy to adulthood. Proses pertumbuhan dan perkembangan tidak berhenti selepas kelahiran, bahkan ia adalah satu proses yang berterusan mulai peringkat bayi sehingga dewasa.

Do you agree with the above statement ? Justify your answer. Adakah anda bersetuju dengan pernyataan di atas? Justifikasikan jawapan anda.

[ 10 marks ]

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(a) Compare joint S and joint T in Diagram 7.1 Bandingkan sendi S dan sendi T di dalam Rajah 7.1

(5 marks) ;

(b) Describe the straightening and bending of the forearm brought about by the antagonistic action of the muscles labelled as M and N. *Huraikan pergerakan melurus dan membengkok yang ditunjukkan oleh tindakan antagonis otot M and N.* 

(5 marks)

(c) Diagram 7.2 shows one of the adaptive characteristics found in birds which help them in their locomotion.

Rajah 7.2 menunjukkan salah satu ciri penyesuaian yang ditunjukkan oleh burung yang membantu mereka di dalam pergerakan.



Diagram 7.2 Rajah 7.2

Based on Diagram 7.2, and on your biological knowledge explain how birds are adapted to fly.

Berdasarkan Rajah 7.2 dan pengetahuan biologi anda terangkan bagaimana burung disesuaikan untuk terbang.

(10 marks)

[See Overleaf Confidential 8. Table 8 shows the daily energy requirement for different groups of people. Jadual 8 menunjukkan keperluan tenaga harian untuk kumpulan individu yang berlainan.

Individuals groups	Daily Energy	Carbohydrates	Proteins	Fats
Kumpulan individu	Requirement / kJ	/ g	/ g	/ g
-	Keperluan tenaga	Karbohidrat / g	Protein / g	Lemak / g
	harian / kJ			
Man				
Lelaki dev	vasa			
Sedentary work	10080	390	90	53
Kerja pejabat				
Moderate work	11760	455	105	62
Kerja sederhana				
Heavy work	16380	635	146	87
Kerja berat		ļ	-	
Wome	n.			
Wanit	7080			
Sedentary work	/980	310	70	42
Kerja pejabat	0.420			
Moderate work	9420	360	85	49
Kerja sedernana	12(00			
Heavy work	12600	490	115	67
<u>Nerja berat</u>	10500			
Fregnancy	10200	410	95	56
Childre		<u>+</u>		+
Kanak-ka	nn an ak			
Lin to 2 year				
Sehingga 2 tehun	5040	195	45	27
3 to 6 years			-	
3 hingga 6 tahun	6300	245	56	33
7 to 9 years				
7 hingga 9 tahun	7560	295	70	40
10 to 12 years				
10 hingga 12 tahun	8820	340	80	47
Adolesco	ents	-		1
Remaj	a			
13 to 15 yrs boys	40500	440	07	
13 ningga 15 tanun -	10500	410	32	dC
ΙθΙαΚΙ				
13 to 15 yrs airls				
13 hingga 15 tahun -	9420	360	82	49
perempuan			-	
16 to 18 yrs boys				-
16 hingga 18 tahun -	12600	490	115	67
lelaki				
16 to 18 yrs. – girls				
16 hingga 18 tahun -	9420	360	82	49
perempuan				

(a) (i) What is a balanced diet? Apakah maksud makanan seimbang?

[ 2 *marks* ]

[8 marks]

(ii) Based on Table 8.1, explain why different groups of people have different daily energy requirement?

Berdasarkan Jadual 8.1, terangkan mengapa kumpulan individu yang berlainan mempunyai keperluan tenaga harian yang berbeza?

(b) Besides the basic nutrients shown in Table 8.1, what other nutrients are also essential to be included in our daily diet.

Selain daripada nutrient asas yang ditunjukkani dijadual 8.1 apakah nutrient lain yang perlu di masukkan ke dalam makanan harian kita?

State your answer by giving suitable examples. Nyata jawapan anda dengan memberikan contoh yang sesuai.

[ 4 *marks* ]

(c) (i) What is malnutrition? Apakah maksud malnutrisi?

[2 marks]

 (ii) State two effects of malnutrition by giving suitable examples. Nyatakan dua kesan malnutrisi dengan memberikan contoh yang sesuai.

[ 4 *marks* ]

9 Diagram 9 shows a newspaper cutting on one of the effects of environmental pollution. Rajah 9 menunjukkan keratan akhbar yang memaparkan salah satu daripada

kesan pencemaran alam sekitar.

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Worsening air pollution via factory and motor vehicle emissions the culprit Acid rain on the rise



(a) Explain the causes of the phenomenon shown in Diagram 9 and the effects on the environment and organisms.

Suggest ways to minimize the effects of this phenomenon. Terangkan punca-punca fenomena tersebut dan kesannya ke atas persekitaran sebagaimana yang ditunjukkan di dalam Rajah 9 dan cadangkan cara-cara untuk mengurangkan kesannya terhadap alam sekitor

(10 marks)

(b) As an environmental activist, explain the greenhouse effect and discuss some human activities that can lead to the greenhouse effect. Give suggestions to the public on measures to be taken to reduce the greenhouse effect.

Sebagai pencinta alam sekitar, bincangkan aktiviti manusia yang boleh menyebabkan kesan Rumah Hijau kepada masyarakat dan cadangkan langkah-langkah yang harus diambil untuk mengatasi akibat buruk dari kesan rumah hijau.

(10 marks)

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# Paper 2 Marking scheme Section A

QUES	STION 1		
No	Marking criteria	Ma	rks
(a)	Able to name the structures P,Q,R and S		
· ·	P- xylem / xylem vessels Q- phloem / sieve tube R- spongy mesophyli cell / mesophyll cell S- guard cell	1 1 1 1	4
(b)	Able to explain the stage of organization with reason		
	<ul> <li>Sample Answer</li> <li>The leaf is an organ</li> <li>Consists of epidermal tissues, ground tissues and vascular tissues/ Various tissues</li> <li>Combined together to perform photosynthesis/ a specific function</li> </ul>	1 1 1 Any 2	2
(c)	Able to explain the role of R Sample answer F : R is a spongy mesophyll cell Can absorb light for photosynthesis E: contains chlorophyll /chloroplasts	1	2
(d)	Able to indicate the correct organelles		
	Lysosomes		
	Smoothendoplasmic reticulum		
	Mitochondria	2	2
	Centrioles 🗸		{ }
	Chloroplast		
	Golgi apparatus		
	Vacuoles		
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Able to name the cell structure and the organelle		
F : Sample Answer Cell structure : Chromosome Organelle: Nucleus	- The second sec	2
	Total	=12

## **QUESTION 2**

No	Marking criteria	Mar	ks
(a)(i)	X : Respiration / aerobic respiration / cellular respiration	1	
(ii)	Mitochondria	1	2
<b>(b)</b>	<ul> <li>Able to explain how ATP are formed based on diagram.</li> <li>Sample answer <ul> <li>Oxidation of glucose molecule during cellular respiration</li> <li>Energy released used to form bond between ADP and inorganic phosphates</li> <li>Reaction catalysed by ATP synthetase</li> </ul> </li> </ul>	1 1 1	3
(c)	<ul> <li>Able to state the uses of ATP molcules</li> <li>Sample answer :</li> <li>Root hair cells: <ul> <li>Release energy for active transport of mineral salts from the soil into the cell sap.</li> </ul> </li> <li>Neurones: <ul> <li>Release energy for the synthesis of neurotransmitters</li> </ul> </li> </ul>	1	2
(d)(i)	Able to explain the difference in number of ATP molecules Sample answer: Aerobic respiration: F: All available energy stored in glucose molecule are released E1: Glucose molecule is completely oxidized by oxygen E2: Carbon dioxide and water are produced as waste products Anaerobic respiration: F: Much energy still trapped in the lactic acid molecule	1 1 1 Any 2 1	2
	Oxygen		

		TOTAL	13	
		· · ·		
	E: Cause dena ation of enzyme / change shape of active site/ change shape anzyme molecule	1		
	Sample answer: F: Enzyme interacts / stop enzyme action / stop chemical reactions in ceastalysed by enzymes	1	2	
(d)(ii)	Able to relate effect of toxic substances on enzyme action			

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QUESTION

No	Marking criteria	Маг	ks
(a)	Able to name the processes : J. Ultrafiltration K: Reabsorption M: Secretion	1 1 1 1	3
(b)	<ul> <li>Able to explain the charges in filtrate composition</li> <li>Sample answer : From J to K, where</li> <li>F1 : Glomerular filtrate become more concentrated</li> <li>E1 : Reabsorption of water into the blood capillaries by osmosis</li> <li>F2 : Glomerular filtrate does not contain glucose and amino acids</li> <li>E2 : Reabsorption of all glucose and amino acids by active transport into the blood capillaries</li> </ul> From K to L where F3 : Glomerular filtrate has a higher concentration of urea E3 : Urea not reabsorbed from filtrate but water reabsorbed from filtrate F4 : Glomerular filtrate low in salt E4 : Reabsorption of sodium and chloride ions into blood capillaries by active transport	1 1 1 Any 1F&1E 1 1 1 Any 1F&1E	2
(c)	Able to explain role of kidney in homeostasis		
	Sample answer :		

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		TOTAL	14
		Any 2F&2E	
	E4: Reabsorption of water from glomerular filtrate at distal	1	•
1	E3: Active secret and the area from blood into glomerular filtrate	1	4
	F2: Concentration of urea in urine is 20 g/dm3 which is much	1	
	E2: Hig pressure of blood forces out fluid from blood plasma	1	
	sar ∋ as in glomerular filtrate	1	
	Sample answer : F1: Core entration of urea in blood plasma is 0.3 g/dm3 which is	1	
(d)	Able to compare and explain the differences in urea concentrations in the 3 samples .		
	E4: Less water is conbsorbed into the blood E5: Aldosterone f in adrenal gland cause reabsorption of sodium ions it is blood	1 1 Any 1F&3E	
	<ul> <li>F : More urine is produced and more dilute/ less concentrated</li> <li>E1: Blood osmotic pressure drops below normal range osmoreceptors in hypothalamus less stimulated</li> <li>E2: less antidiuretic hormone secreted from pituitary gland</li> <li>E3: Distal convoluted tubule and collecting duct less permeable to water</li> </ul>	1 1 1 1 1	4

# **QUESTION 4**

No	Marking criteria	Mar	ks
(a)(i)	Able to describe the menstrual cycle Sample answer: F1: Monthly reproductive cycle controlled by hormones F2: consist of follicle development, ovulation, thickening of	1	
	endometrium and menstruation	1	2
(a)(ii)	Able to explain imbalance of hormones on ovulation Sample answer : F1: Hormone P is oestrogen and hormone Y is luteinising		
	normone	FZ&F3	
	r2. undersecretion of normone P( destrogen )inhibits secretion of		

(b)	<ul> <li>Follicle stimulating hormone from pituitary gland</li> <li>F3: No development of Graafian follicles so no ovulation occur or no secretion of luteinising hormone from pituitary gland so no ovulation occur</li> <li>F4: Oversecretion of hormone P stimulates secretion of hormone Y from pituitary gland Ovulation occur earlier</li> </ul>	F1&F4	2
(0)		1	1.
·	Corpus luteum h shrunken/ become smaller in size		
(c)	Sole to explain the tenship between structure T with hormone Q Solenple and the		
	<ul> <li>16<sup>u</sup>-21<sup>st</sup> day</li> <li>F1: hormone Q(progesterone) rises to a high level to induce endocletrium to thicken and vascularised</li> <li>E1: Sulucture T (corpus luteum) developed and become active</li> </ul>	F1&E1	2
	E2 <sup>nd</sup> -28 <sup>th</sup> day F2: hormone Q downwees to a very low level resulting in menstruation	1	
:	E2: Structure Theorem tegenerated and not active	F2&E2 1	
(d)	Able to explain how drug can enter foetus Sample answer:		
	<ul> <li>F1: The harmful chemicals in drugs taken by mother can enter foetus through the placenta</li> <li>E1: The chemicals are small enough to diffuse from the</li> </ul>	1 1 1	3
	mother's blood into the foetal blood E2: across chorionic villi of the placenta	1 F1 &	
	E3: long term occurrence leads to addiction in baby	any 2E	
		OTAL	10

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## **QUESTION 5**

No	Marking	riteria	Marl	(S
(a)(i)	Able to draw histogram and bar of and 5.2 Sample answer :	chart from data in the table 5.1		
	Number of students	- 193 -		
	8 6 4 2 2 120 - 152 - 120 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	175 - 171 Height / cm	1 1 axis & shape correct	2
(a)(ii)	Number of students		1	
	24 18 12 6		1 Axis & shape correct	2
(b)	Attached	Unattached ear lobe Type of ear lobe		
<b>V</b> = 7	Sample answer:	Tune of ear lobe		
	Height (continuous variation)	(discontinuous variation)		
	Have no distinct catogories into which individuals can be placed Have a range of values Usually controlled by large number of genes (polygenes)	Have distinct categories into which individuals can be placed No intermediate values Usually controlled by one pair of genes	Any 2	2
	Are significantly affected by	Are largely unaffected by		

(d) Able to Sample		ividuals for natural	1	2
E1: Pla / n E2: Pla E2: Pla	ection in the process of evo ossing over activeen the no mologous comosomes pr nes in the ground et explain effect of environn on e answer : fects of environmental facto nts / clones recorded differ ineral nutrients / water/ fer nts exposed to different soi	olution on sister chromatids of roduce new combination of mental factors on continuous ors on the cloned banana plants rent amount of light intensity rtilizers il type /soil pH	1 1F&E1 1F&2E	3

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# Paper 2 Marking scheme Section B

No.	Marking Criteria	Ma	arks
6(a)	Able to:	}	
	1. name the methods to overcome infertility		
	1': give explanations		
	1 Artificial insemination	1	
	E1 : Impotence in the husband/ erectile dysfunction require the sperms to be collected and then injected into the cervix of the wife of the time of the woman's ovulation.	1	
	Here Low by a count / immobile sperms/ abnormal sperms of the hubband can be overcomed by obtaining healthy sperms from a couble donor in a sperms bank and then inject into the colopian tubes of the wife during ovulation.	       	
	F: In vitreation ( inoperable blocked fallopian tubes)E1: Permablocked oviducts in the wife preventsecondary orfrom being fertilized by the sperms.	1	
	E2: Wife treated with follicle – stimulating Hormone (FSH) and Iuteinising hormone (LH) to increase the oocyte production.	1	
	E3: Oocytes collected and placed in a Petri dish containing a suitable medium similar to the fallopian tubes.		
	E4: The oocytes are mixed with the husband's sperms. E5: 2 days old embryos are transferred into the wife's	1	
	uterus for implantation.	1	
	F: In vitro fertilization (Postponement of motherhood) / having children later in life.	1	
	E1: Eggs / oocytes of women are collected, frozen and stored when less than 34 years old.	1	
	E2: Oocytes are used later when the women decide to start a family.	1	
	F: Surrogate mother MOZ@C	1	

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No.	Marking Criteria	Ma	rks
	E1: Wife unable to have babies herself. And need another younger, healthier woman to bear her child. E2: Woman become pregnant by artificial insemination or by in vitro fertilization.	1	
	Any 9 correct KS: Ability to describe one treatment method correctly.	1	9 1
	TOTAL		10
(b)	Able to : • give opinion F: Relate occurrence of growth and development at each stage of life E: Justification Opinion : Agree	1	1
	<ul> <li>F: Infancy ( birth – 2 years )</li> <li>E1: Growth and development occur at a rapid rate.</li> <li>E2: Head and brain develop faster than rest of the body.</li> <li>E3: Lymph tissues well developed</li> <li>(thymus) to give immunity to diseases</li> <li>F: Childhood</li> <li>E1: Period of steady growth and body proportions change.</li> <li>E2: Steady increase in height and organ size.</li> <li>F: Adolescence</li> <li>E1: Period of rapid growth/ acceleration of growth.</li> <li>E2: Development of reproductive system, sexual organs become functional / attains puberty/gametogenesis</li> <li>E3: Rapid changes in height, weight, fat distribution and body proportions.</li> <li>E4: Males experience growth spurts later females and grow for a longer period of time.</li> <li>F: Adulthood</li> <li>E1: Period of no new growth / stationary phase.</li> <li>E2: functional organ system / physical peak.</li> <li>E3: Growth and specialization of new cells continue to occur to replace dead cells/ damaged tissues , eg blood cells, liver cells , skin cells.</li> </ul>	1 1 1 1 1 1 1 1 1 1 1 1 1 1	8
	KIN: Ability to describe the human growth curve correctly / reflects the sigmoid shape. TOTAL	1	1 10

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No.	Marking Criteria	Ma	rks
7(a)	Able to compare joint S and joint T according to the		
	Iollowing criteria:		
•	C1 Name of the joint		
	C2 Characteristic of the joints		
	Sample answer:	2	
	Similarities:		
	F1 Both Joint S and Joint T has a cavity filled with		
	Synovial fluid // fined with Synovial memorane		
	bones // which secretes synovial fluid into the synovial		
	$\frac{\text{cavity.}}{\text{T}}$		
	F2 The end surfaces of the numerus bone of Joint S and		
	ligaments		
	E2 to <u>absorb shock // reinforce the articulation of bones</u>		
	Differences:		
	F3 Joint S is hinge joint while Joint T is ball-and-socket joint		
1	E3 Joint S allows the movement of bones in one plane		
	all directions /		
	E4 Joint S is the point where the distal end of humerous	_	
	articulates with the ulna and radius while Joint T is the	Any 5	5
	point where proximal end of humerous articulates with	correct	
	the scapula.		
(b)	Able to describe the antagonistic action of muscles M and		
	N		
	C1 State the name of muscles M and N correctly		
	C2 the action of muscles and the resulting movement		
	Sample answer:		
	F1 M is the biceps and N is the triceps		
	E1 When the $M / biceps$ contracts, the tendons transmit the		-
	pulling force produced by the contraction to the radius	Any	5
	E2 At the same time the $N / \text{triceps relaxes}$ resulting in the	5 correct	
	bending of elbow joint // the forearm moves upwards.		
	E3 When the triceps contracts the tendons transmit the		
	pulling force to the ulna		
	E4 At the same time the <u>biceps relaxes</u> , the <i>Jorearm</i> is		
	sir uignieneu / exienaeu.		

No.	Marking Criteria	Ma	rks
7(c)	Able to identify the adaptive characteristics in birds and explain their functions respectively in enabling them to fly	10	10
	according to the following criteria:		
	C1 Name the adaptive characteristic	5	
	C2 Explain its function	5	
	Sample answer:		•
	F1 Birds have hollow bones / small head / no fat in the		
	body		
	E1 to <u>achieve light weight</u> .		
	F2 The body is streamlined	·	
	E2 to reduce air resistance/ drag (while flying in the air).		
	F5 Having leatners in their tails and wings		
	ES to <u>increase the surface area which enables the birds to</u>		
	F4 Howing correfail wings		
	F4 maying action wings		
	F5 Having a pair of antagonistic muscles // pectoralis		
	major and nectoralis minor		
	E5 which enable the birds to flap their wings up and down.		
	Lo which chaole the onds to hap then whigs up and down.	Total	20
8(a) (i)	Able to define a Balanced Diet correctly.		<u>.</u>
	Sample answer:		
	F1 A balanced diet contains all the seven major nutrients	1	
	which include carbohydrates, proteins, lipids,		
	vitamins, minerals, water and roughage/ (dietary)	2	
	fibre		2
	F2 in the correct amount and ratio // in the correct	1	· 2
	proportions to meet the <u>daily requirement</u> of the body.		
·			
(ii)	Able to explain the different daily energy requirement for		
	different group of people.		
	Sample answer:	.	
	<b>F1</b> Males require more energy input than a female.		
	E1 bigger body size// higher metabolic rate// thinner layer		
	of insulating fat.	1	
	F2 A person who does heavy work needs more energy.		
	than a person who is moderately work / sedentary work	1	
	E2 types of occupation determine the rate at which energy	1	
	from food is utilized.	1	

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No.	Marking Criteria	Marks	
· .,	<b>F3</b> Growing children needs more energy per body weight.	1	
	E3 the metabolic rate is higher because they require more		
	energy for growth.	1	
	<b>F4</b> Adolescent requires more energy for growth and		
	physical activities.		
	E4 They have reached maturity / puberty and are very	1	
	active	1	
	<b>F5</b> Fregnant mother needs more energy than non-pregnant	1	8
	B5 to geter for the developing features in their wombs/	1	o
	nerform respiration digestion and excretion for the	1	
	developing foetus		
	Note: Max 8 marks		
$\frac{8}{(h)}$	Sample answer:		
0(0)	F1 Vitamins eg: vitamin A/ B/ C/ D/ E/ K/ folic acid/		
	biotin	1	
	F2 Minerals eg: calcium/ iron/ sodium/ potassium/		
	chlorine/ magnesium/ iodine/ sulphur/ phosphorus/	11. J.	
	fluorine/ chlorine	1	
ŧ	F3 (dietary) fibre/ roughage, eg: cellulose from fruits/		
÷	vegetables/ plants	1	
	F4 Water	1	4
		e.	]
(c) $(i)$	F1 Malnutrition results from taking an unbalanced diet	1	
	F? Certain nutrients are in excess lacking or in the wrong	1	2
	proportions.	•	_
(ii)	Sample answer:		* . ·
()	F1: kwashiorkor	¥	
	E1: protein deficiency	1	
	F2: marasmus	1	
	E2: protein deficiency combined with a lack of energy-	1	
	providing nutrients		
	F3: Scurvy	1	
	E3: deficiency in vitamin C	1	
	F4: Osteoporosis/ osteomalacia	1	· · · · · ·
	E4: deficiency in calcium/ phosphorus / vitamin D	1	
	F5: Obesity		
	E5: excess carbohydrates and lipids	1	
	F6: Diabetes mellitus	1	
	E6: excess sugar	1	
	F /: cardiovascular disease/ high blood pressure	1	
	E/: excess saturated fat/ cholesterol	1	<b>A</b>
	INOIC. IVIAX. 4 IIIAIKS	Total	20
		TUTAL	<b>4</b> 0

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No:	Marking Criteria	M	arks
9(a)	Able to explain according to the following criteria:		
	C1 The causes of acid rain	4	
	C2 The effects of acid rain to the environment	4	
	C3 Suggestions on how to overcome the problems	2	
			,×.
	Sample answer:		
	Causes of acid rain:		
	F1 The combustion of fossil fuels from <u>power stations</u> /		
	factories/ domestic boilers/ vehicles releases large		
	quantities of sulphur dioxide/ SO <sub>2</sub> and oxides of		
	<b>nitrogen</b> / NO and NO <sub>2</sub> .		
	F2 Both sulphur dioxide and oxides of nitrogen combine		
	with water vapour in the atmosphere to form	1	
	Sulphuric acid and nitric acid respectively.		
	F3 they will fall back to the earth as acid rain.	l I	
	r4 Kain is naturally acidic with a pH of about 5.6 due to		
	appresence of dissolved carbon dioxide which forms	1	
	E5. The nU of acid rain is however is loss than 5.0		
	(Max: 4 marks)	. 1	
	(1) $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$ $(1)$		
1	Fffects of acid rain:		
	agriculture		
	F1 The soil becomes very acidic and unsuitable for the		
	cultivation of crops	1	
	F2 Acid rain causes the leaching of minerals such as	-	
-	potassium/ calcium /magnesium which affects the		
· .	growth of crops.	1	
	Acuatic ecosystem:		
(	F3 Acid rain causes insoluble aluminium ions to		ĺ
	accumulate in lakes and rivers. An increase in the		
	accumulation of these ions can kill aquatic organisms	1	
	(such as fish /and invertebrates).		
	Health:		
	F4 Acidic soil releases the ions of certain heavy metals		,
Í	such as <u>cadmium</u> / <u>lead</u> / <u>mercury</u> which may		
	contaminate/ harm the supply of drinking water.	, 1	
	F5 Increased acidity in the aquatic ecosystem also kills		
	phytoplankton (which changes the food chain).	1 (	
	F6 Photosynthetic tissues are destroyed. Plant leaves turn		ļ
	yellow and fall off. The roots are damaged and cannot	· · · [	
	absorb minerals.	1.	
		ľ	

No.	Marking Criteria	Ma	irks
	<ul> <li><u>Buildings</u>:</li> <li>F7 Metal railings and bridges corrode.</li> <li>F8 Limestone/ stonework/ marble monuments are eroded due to chemical weathering.</li> </ul>	1 1	
	<ul> <li>(Max: 4 marks)</li> <li>Suggestions to overcome the problems:</li> <li>F1 cleaning up emissions from power stations and industrial plants with scrubbers. This process involves the spraying of water to trap pollutants.</li> <li>F2 cleaning up emissions from vehicle exhausts through the use of catalytic converters. The pollutants react with one another in the catalytic converters to produce less harmful products.</li> </ul>	1	10
9(b)	Able to explain how the phenomenon happens. Able to explain the factors which contribute to the increase of greenhouse gases in the atmosphere. Able to give suggestions on measures to be taken to minimize the problem <u>Sample answer</u> :	4	
: : : :	<ul> <li>Phenomenon of greenhouse effect:</li> <li>F1 The greenhouse effect is an effect in the atmosphere as a result of the presence of certain gases known as greenhouse gases.</li> <li>E2 Carbon dioxide, chlorofluorocarbons (CFCs), methane, nitrous oxide and low level ozone and</li> </ul>	1	
	<ul> <li>water vapour make up the greenhouse gases.</li> <li>E3 As the earth is warmed, heat in the form of infrared radiation is radiated back into space. However, much of this heat does not escape, instead remains trapped by the greenhouse gases.</li> <li>E4 At the same time, greenhouse gases also radiate heat (in the form of infrared in the form of infrared back).</li> </ul>	1	
	<ul> <li>(in the form of infrared radiation) back to the earth.</li> <li>E5 This is similar to the glass planes of a greenhouse which trap heat and warm the greenhouse, hence the term greenhouse effect.</li> <li>(Max: 4 marks)</li> </ul>	1	
	<ul> <li>Factors contributing to the greenhouse effects:</li> <li>F1 Burning of fossil fuels from coal-fired power stations/ vehicle exhausts/ open burning/ industrial effluents like CFCs/ methane / nitrous oxide and ozone contributes to an increase in the amount of atmospheric CO<sub>2</sub></li> <li>F2 Logging/ deforestation causes abundance amount of</li> </ul>	1	

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No.	Marking Criteria	Ma	irks
	$CO_2$ in the atmosphere is not used for photosynthesis.		
	F3 As the concentration of greenhouse gases rises, the	1	
	greenhouse effect becomes more pronounced.		ĺ
	F4 Buildings with glass planes reflects more heat, thus	1	
	worsen the greenhouse effects.		·
	F5 As more heat is trapped, the earth's average	1	
	temperature rises leading to global warming.		
	(Max: 4 marks)		
	suggestions on measures to be taken to minimize the problem: Sample Answer:		
	E1 –Reduce the burning of fossil fuels to conserve energy.	1	
	E2 –Develop alternative sources of energy such as wind/		
	solar/biogass/and geothermal energy.	1	
	E3 –Reduce deforestation for farming purposes.	1	
	E4 –Replanting after deforestation.	1	
	E5 –Policies that control the emission of greenhouse gases	1	
	from industrial sites must be reinforced and strictly implemented.		
	E6 – Promotes green world.	1	10
	(Max: 2 marks)		
		Total	20

## END OF MARKING SCHEME