Centre No.						Paper Reference							Surname	Initial(s)
Candidate No.						6	1	3	1	/	0	1	Signature	

Paper Reference(s)

6131/01

Edexcel GCE

Biology (Salters-Nuffield)

Advanced Subsidiary

Unit Test 1

Monday 4 June 2007 – Morning

Time: 1 hour 15 minutes

Examiner's use only

Team Leader's use only

Question Number	Leave Blank
1	
2	
3	
4	
5	
6	
7	
Total	

Materials required for examination
Ruler

Items included with question papers
Nil

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initial(s) and signature.
The paper reference is shown above. Check that you have the correct question paper.
Answer ALL SEVEN questions in the spaces provided in this booklet.
If you need to use additional answer sheets, attach them loosely but securely inside this booklet.
Show all the steps in any calculations and state the units. Calculators may be used.
Include diagrams in your answers where these are helpful.

Information for Candidates

The marks for individual questions and parts of questions are shown in round brackets: e.g. **(2)**.
The total mark for this question paper is 60.

Advice to Candidates

You will be assessed on your ability to organise and present information, ideas, descriptions and arguments clearly and logically, taking into account your use of grammar, punctuation and spelling.

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Leave blank

Answer ALL questions in the spaces provided.

1. Sunil has angina and has been recommended to control his diet to reduce his chance of a heart attack.

(a) Explain how atherosclerosis could cause the chest pain associated with an attack of angina.

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(3)

The table below shows some of the relevant dietary information for assessing the content of three alternative breakfasts that Sunil normally eats.

Meal	Food	Energy /kJ	Carbohy-drate/g	Saturated fatty acids/g	Unsaturated fatty acids/g	Cholesterol /mg
A	2 slices of whole-wheat toast	580	26	0.5	1.5	0
	margarine	180	0.1	1	3.8	0
	baked beans	1113	52	0.25	0.5	0
	Total		**78.1**	**1.75**	**5.8**	**0**
B	2 slices of white toast	662	29	0.3	1.7	0
	margarine	180	0.1	1	3.8	0
	2 fried eggs	772	0.8	4	8	210
	Total		**29.9**	**5.3**	**13.5**	**210**
C	2 slices of white toast	662	29	0.3	1.7	0
	margarine	180	0.1	1	3.8	0
	2 slices of cheddar cheese	948	0.8	6	5.8	58
	Total		**29.9**	**7.3**	**11.3**	**58**

Leave blank

(b) (i) Complete the table by calculating the total energy of each meal.

(1)

(ii) Give the letter of the meal that contains the highest energy content.

Meal with highest energy content .....

(1)

(iii) Suggest which meal you would recommend to Sunil if he wishes to reduce his risk of coronary heart disease. Explain the reasons for your choice.

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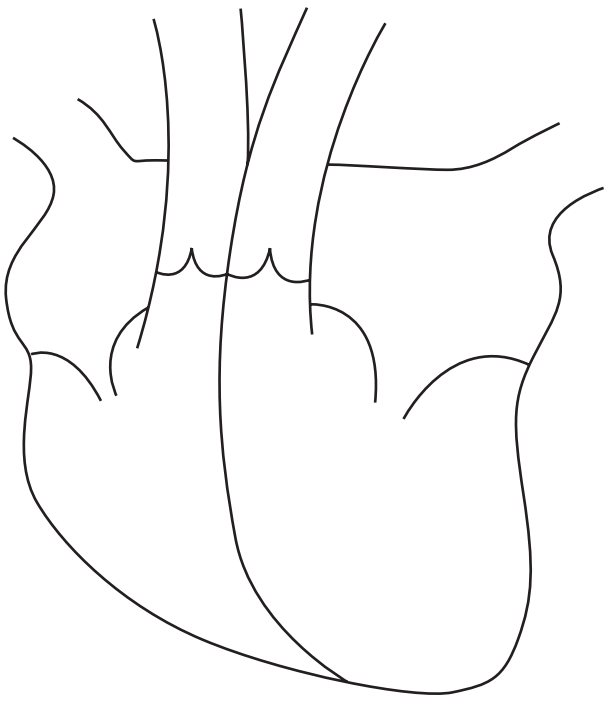
(3)

Q1

(Total 8 marks)

Leave blank

2. (a) The figure below shows a simplified diagram of the heart.



(i) Draw arrows on the diagram to show the direction of blood flow through both sides of the heart during diastole.

(1)

(ii) Name the part of the heart responsible for the initiation of the cardiac cycle.

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(1)

Leave blank

(b) Abigail reports to her doctor that she is suffering from breathlessness and a lack of energy. Her doctor listens to her chest with a stethoscope and hears a characteristic swirling sound linked to a problem with one of her atrioventricular valves.

(i) Suggest how an atrioventricular valve that does not shut properly could lead to Abigail's symptoms.

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(2)

(ii) Name one further diagnostic test that could be used to check Abigail's heart.

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(1)

Q2

(Total 5 marks)

Leave blank

3. Achondroplasia is an inherited form of restricted growth in humans caused by a dominant allele. Individuals homozygous for the allele for achondroplasia are rarely born alive.

(a) Selecting suitable letters to represent the alleles, draw a genetic diagram to calculate the probability of a child inheriting achondroplasia if the mother is heterozygous for achondroplasia and the father has normal growth.

(3)

Leave blank

(b) Two people who both have achondroplasia would like to have children together, but they are concerned about the risk of their child inheriting two achondroplasia alleles and dying before birth.

(i) Name one method that could be used to obtain material suitable for use in a prenatal genetic screening program.

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(1)

(ii) Outline the steps involved in testing any cells for the presence of a particular allele.

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(5)

Q3

(Total 9 marks)

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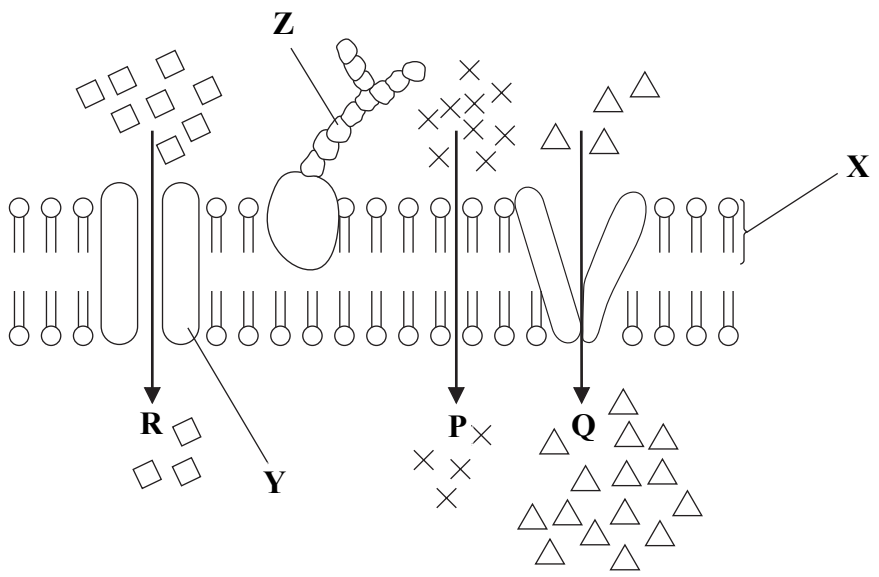
4. (a) The diagram below shows a model of the cell membrane and various molecules being transported through the membrane into the cell.



(i) Name the structures labelled X, Y and Z.

X .....

Y .....

Z .....

(3)

(ii) Name the transport process across the membrane shown by the different molecules and their arrows P, Q and R.

P .....

Q .....

R .....

(3)

Leave blank

(b) Cystic fibrosis is caused by a mutation in a gene coding for a membrane protein. Explain why people suffering from cystic fibrosis find it difficult to digest their food.

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(4)

Q4

(Total 10 marks)

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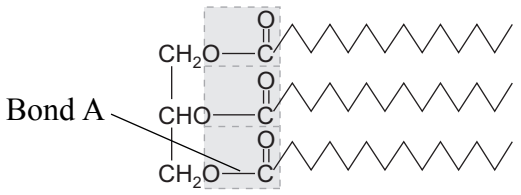
5. (a) The diagram below shows the structure of a triglyceride.



triglyceride

(i) Name Bond A on the diagram.

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(1)

(ii) Name the type of reaction that will break down the triglyceride into its constituent parts during digestion by lipase enzymes.

.....

(1)

(iii) Name **two** products formed when triglycerides are completely digested.

1 .....

2 .....

(2)

(iv) Some triglycerides have several double bonds (C═C), others have none. Describe one way in which the physical property of triglycerides which include several double bonds will differ from triglycerides which have no double bonds.

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(1)

(b) Lipids in membranes have an additional chemical group attached.

(i) Name the chemical group which is added to the lipids in membranes.

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(1)

(ii) Explain how adding this extra chemical group allows the formation of a cell membrane.

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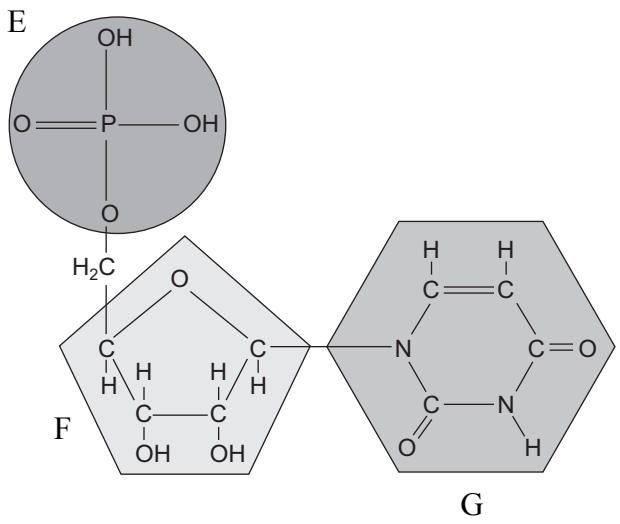
(2)

Q5

(Total 8 marks)

Leave blank

6. (a) The diagram below shows a nucleotide with a nitrogenous base found in RNA but not DNA.



(i) Name the molecules labelled E, F and G.

E .....

F .....

G .....

(3)

(ii) Name the part of the cell where RNA nucleotides are combined to form strands of messenger RNA (mRNA).

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(1)

Leave blank

(b) The table below shows which amino acids are coded for by different codons on mRNA.

First position	Second position				Third position
	U	C	A	G	
U	phe phe leu leu	ser ser ser ser	tyr tyr Stop Stop	cys cys Stop trp	U C A G
C	leu leu leu leu	pro pro pro pro	his his gln gln	arg arg arg arg	U C A G
A	ile ile ile met	thr thr thr thr	asn asn lys lys	ser ser arg arg	U C A G
G	val val val val	ala ala ala ala	asp asp glu glu	gly gly gly gly	U C A G

(i) The letters below represent a section of mRNA coding for the enzyme RNA polymerase. Using the table, give the amino acid sequence coded for by this mRNA sequence.

UACGUGGAAAGA

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.....

(2)

(ii) Name the process that converts the mRNA sequence into a sequence of amino acids.

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(1)

Leave blank

(iii) In one body cell, a mutation occurs that changes the third base, cytosine, into guanine in this sequence of mRNA. Describe and suggest the potential effect this mutation could have on the protein (RNA polymerase) produced.

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(5)

Q6

(Total 12 marks)

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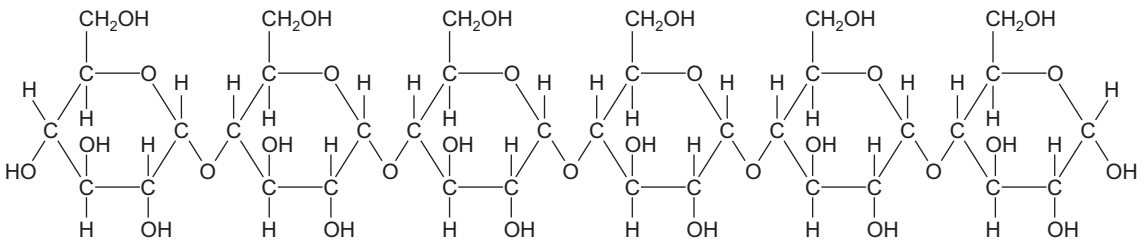
7. The diagram below illustrates part of a glycogen molecule.



(a) State the role of glycogen in the human body.

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(1)

(b) An enzyme is used to break the bonds holding the monomers (glucose molecules) together.

(i) In the space below draw **one** of the monomers that would result from this reaction.

(2)

(ii) Explain why this enzyme will not break the bonds in a protein molecule.

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(3)

Leave blank

(c) Explain the advantages, to living organisms, of using enzymes in biological reactions.

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(2) **Q7**

(Total 8 marks)

TOTAL FOR PAPER: 60 MARKS

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