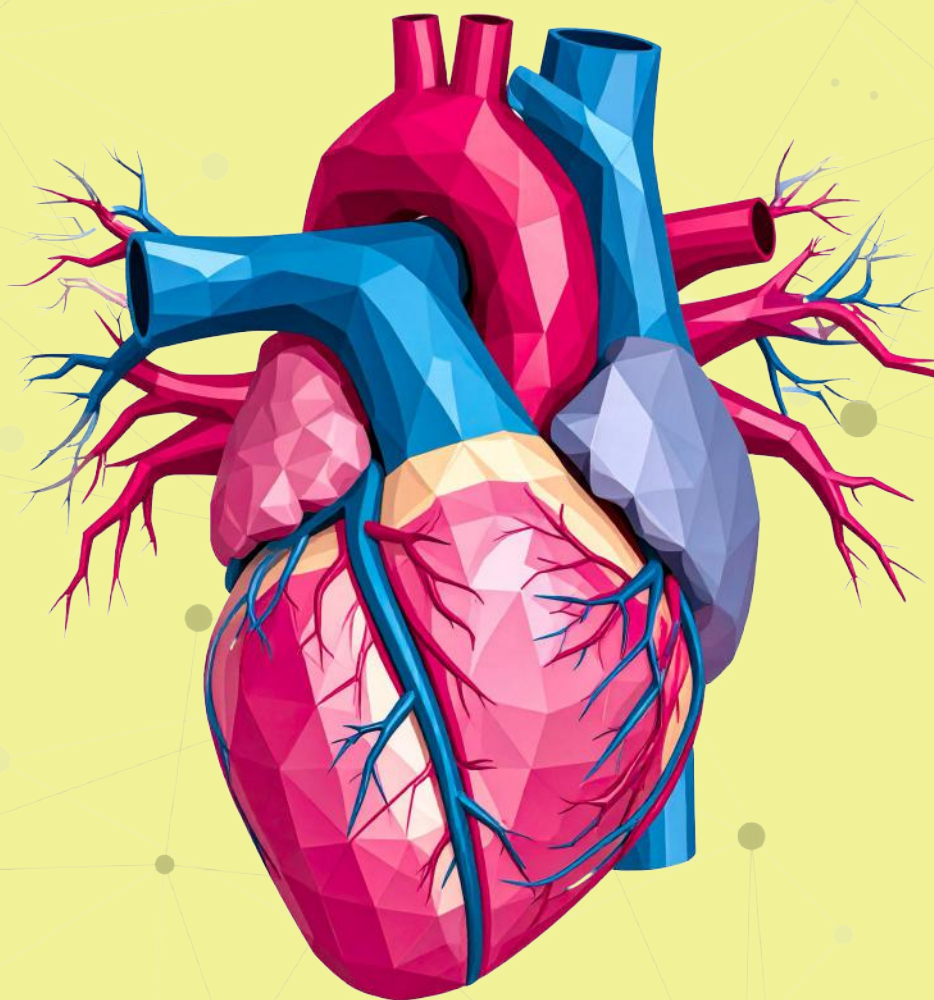


edexcel 

AS

Biology



**LATEST
SYLLABUS**

**Unit 1
2019 – 2025
Classified
Questions**



 **SCAN ME**

NUCLEIC ACIDS

- 7 DNA is a very important molecule in living organisms as it carries the genetic code. Before a cell divides, the DNA molecule replicates so that each resulting daughter cell is genetically identical to the original parent cell.

(a) Explain the nature of the genetic code.

(2)

The code is made of 4 bases: A, T, C and G

The genetic code is described as being a triplet code

The code is non-overlapping (3 bases to each code)

Each triplet of bases codes for one amino acid

And universal (same code for all living organisms)

The code is degenerate (one amino acid can be coded by more than one triplet)

*(b) Describe the process of DNA replication.

(5)

DNA replication is semi-conservative

The original DNA molecule unwinds by breaking hydrogen bonds

This is catalysed by the enzyme helicase

Mononucleotides line up along both strands

According to the complementary pairing rules (A=T and C=G)

New hydrogen bonds are formed between bases

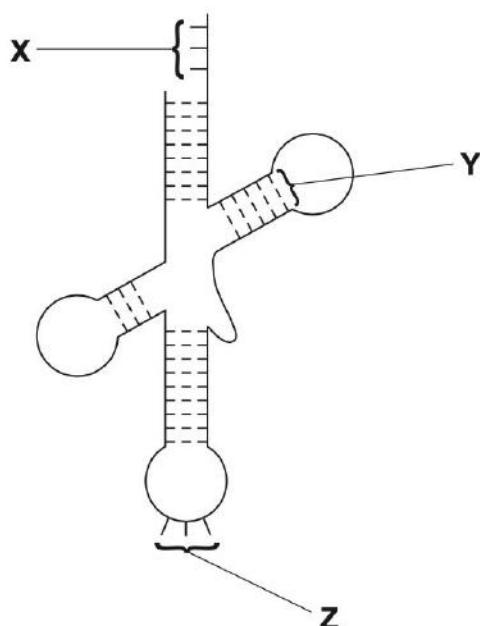
Phosphodiester bonds form between adjacent mononucleotides

This reaction is catalysed by DNA polymerase

Through condensation reaction

NUCLEIC ACIDS

14 The diagram below represents a tRNA molecule.



For each of the statements below, put a cross (☒) in the box that corresponds to the correct statement.

(i) Part **X** binds to

(1)

- ☐ **A** an amino acid for transcription
- ☒ **B** an amino acid for translation
- ☐ **C** mRNA for transcription
- ☐ **D** mRNA for translation

(ii) Part **Y** is a

(1)

- ☐ **A** glycosidic bond
- ☒ **B** hydrogen bond
- ☐ **C** peptide bond
- ☐ **D** phosphodiester bond

(iii) Part **Z** binds to

(1)

- ☐ **A** an amino acid during transcription
- ☐ **B** an amino acid during translation
- ☐ **C** mRNA during transcription
- ☒ **D** mRNA during translation

NUCLEIC ACIDS

A scientist analysed a section of DNA from a sea urchin. The section was 249 base pairs long and 17.5% of the bases were cytosine.

Put a cross ☒ in the box to complete each of the following statements.

(i) The maximum number of amino acids this section of DNA could code for is

(1)

☐ A 82

☒ B 83

☐ C 164

☐ D 166

$$249 \div 3$$

(ii) The percentage of thymine bases present in this section of DNA is

(1)

☐ A 17.5%

☒ B 32.5%

☐ C 35.0%

☐ D 65.0%

(c) The sequence of some of the bases in a section of DNA from a sea urchin is shown below.

A	C	C	G	A	C	T	T
---	---	---	---	---	---	---	---

Describe the roles of RNA molecules in the synthesis of a protein using this section of DNA as a template.

(5)

A complementary mRNA strand formed from the DNA template

The mRNA moves out of the nucleus to the cytoplasm

mRNA associates with the ribosomes

tRNA with its anticodon pairs up with the codons on mRNA

Adjacent amino acids on the tRNA molecules bind together by peptide bonds

(Total for Question 16 = 9 marks)

GENETICS

1 Albinism is a genetic trait resulting from the inheritance of **recessive alleles**.

(a) (i) Distinguish between the terms **allele** and **gene**.

(2)

An allele is a the different form a of a gene

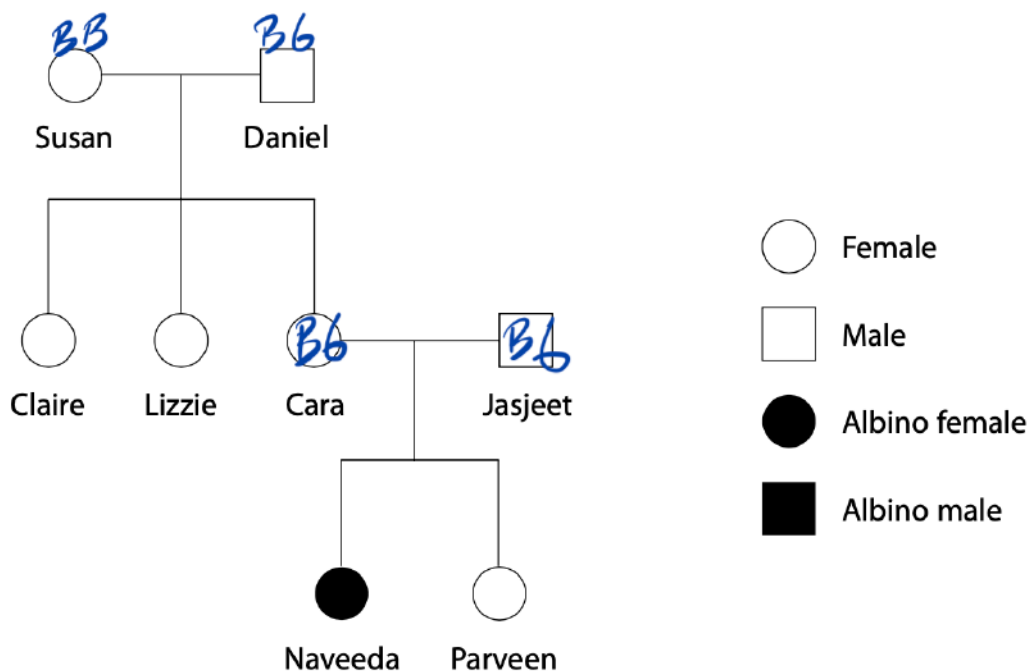
A gene is a section of DNA (occupies a locus on a chromosome) that codes for a protein

(ii) Explain the meaning of the term **recessive** allele.

(1)

An allele that is only expressed in the phenotype of an organism if the dominant allele is not present

(b) The pedigree diagram below shows the inheritance of albinism in one family.



(i) Naveeda is homozygous. Explain the meaning of the term **homozygous**.

(1)

Both alleles of a particular gene are the same

THE CIRCULATORY SYSTEM

2 Many animals have a heart and circulatory system.

(a) Give **one** reason why many animals have a circulatory system.

(1)

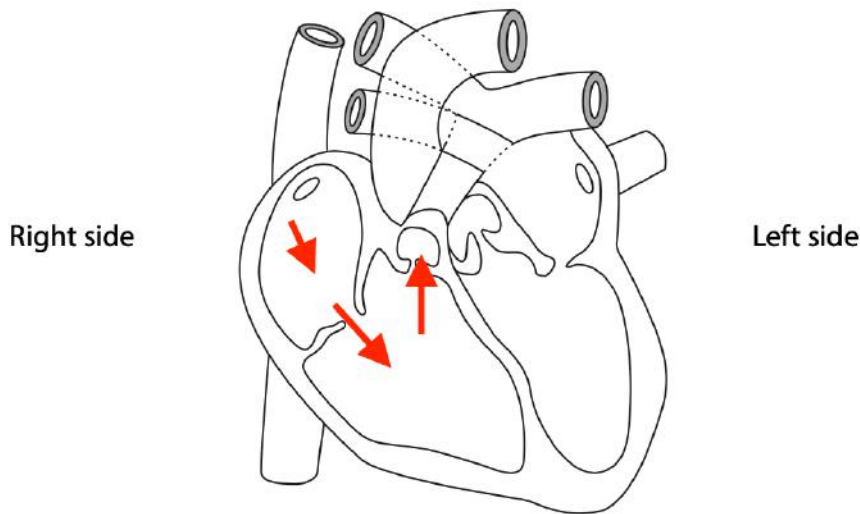
To overcome the limitation of diffusion

To transport materials around tissues

For heat transfer

(b) The diagram below shows a section through a mammalian heart.

On the diagram, draw arrows to show the flow of blood into and through the right side of the heart during one beat of the heart.



(3)

(c) Explain why a mammalian heart is divided into a right side and a left side.

(2)

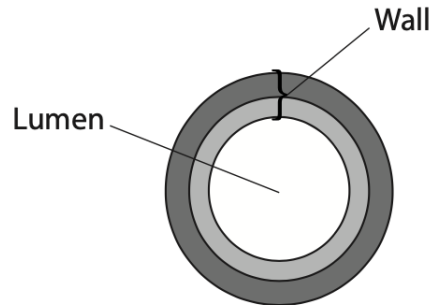
To keep oxygenated and deoxygenated blood separate

This helps to deliver as much oxygen as possible to the tissues

To pump blood at two different pressures

THE CIRCULATORY SYSTEM

(d) The diagram below shows a cross-section of an artery.



(i) The diameter of the lumen of this artery is 1.9 mm.

Calculate the cross-sectional area of the lumen. Show your working.

The area of a circle is calculated using the formula πr^2 , where r is the radius of the circle and $\pi = 3.14$.

(2)

$$1.9 / 2 = 0.95$$

$$0.95^2 \times 3.14$$

Answer **2.83** mm²

(ii) Explain how the structure of an artery is related to its functions.

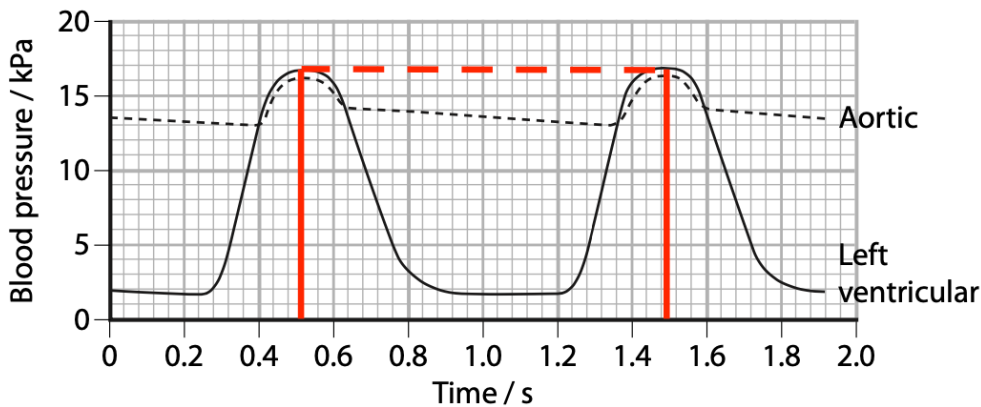
(3)

1. Wall of arteries contains elastic fibres
2. To allow stretching to accommodate higher pressure
3. And to recoil and maintain pressure
4. Endothelium is folded which allows stretching at high pressures
5. Wall also contains smooth muscles which contract to exert pressure
6. Smooth endothelium to reduce friction and minimise resistance to blood
7. Narrow lumen to maintain high blood pressure
8. Collagen fibres in the wall to prevent rupture

(Total for Question 3 = 12 marks)

THE CIRCULATORY SYSTEM

- (c) The graph below shows changes in the blood pressure in the aorta and the left ventricle during two complete cardiac cycles.



- (i) Use the information in the graph to calculate the heart rate. Show your working.

(3)

Time to complete the cardiac cycle = 0.96 0.98 sec

Every 1 cycle takes 0.96 sec

X cycle occurs 60 sec

60 / 0.96

Answer **62.5 bpm**

- (ii) During the cardiac cycle, the pressure in the right ventricle rises to a maximum of about 3.3 kPa. Suggest reasons for the difference between this pressure and the maximum pressure in the left ventricle, as shown in the graph.

(3)

Pressure in the left ventricle is significantly higher

As the left ventricle pumps blood to the entire body

This results from the higher amount of muscles in the left ventricle

The right ventricle pumps blood only to the lungs

Blood under high pressure would damage the lung tissues

THE CIRCULATORY SYSTEM

- (ii) Describe **two** differences between the structure of a capillary and the structure of a vein.

(2)

1 **Capillary wall is only one cell thick
and without elastic fibres or collagen**

Capillary walls contains pores

2 **Lumen is narrow in capillaries and there are no valves**

- (b) (i) Suggest how the location of the atheroma results in the position and size of this region of dead heart muscle.

(3)

The area of dead heart muscle will be downstream of the atheroma

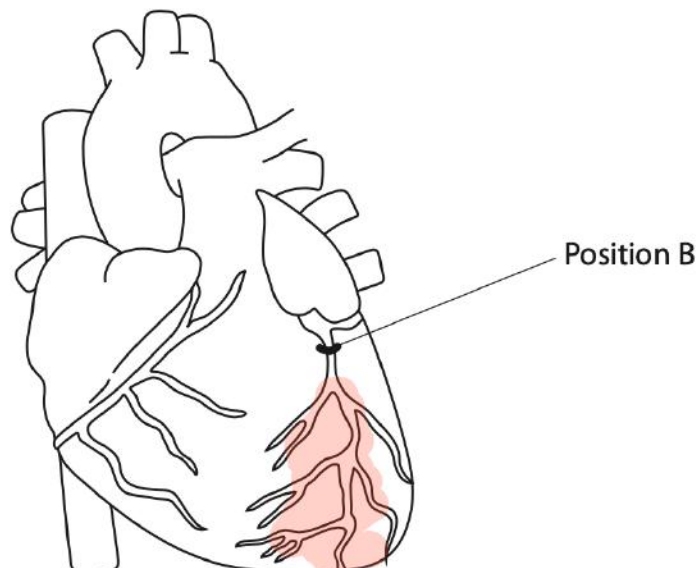
Coronary arteries supply cardiac tissues with oxygen and glucose

Lack of respiration will cause those tissues to die

**However, in this case, the atheroma is located near the end so
only a small section of the cardiac muscle is likely to die**

- (ii) On the diagram below, shade an area to show the position and size of dead heart muscle, if the atheroma occurred at position B.

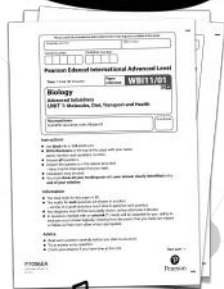
(2)



The Complete Course for IAL AS Biology



Videos that cover the entire syllabus

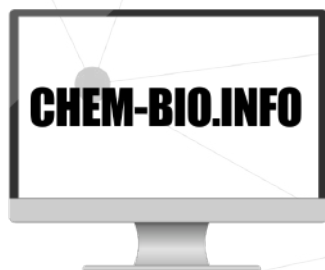


Exam-expert solved past papers



Test your knowledge on each topic.

JOIN NOW



WHATSAPP



51375709



50144115



chem_bio.info