4. Biological molecules

4.1 Biological molecules

Paper 1 and 2

Question Paper

Paper 1

Questions are applicable for both core and extended candidates

1 Which substances are made by linking together glucose molecules only?

A cellulose, glycogen and starch

B fats, cellulose and proteins

C proteins, oils and glycogen

D starch, fats and oils

2 Four solutions were tested to see if they contained protein, starch or glucose.

The colours of the solutions after the tests are recorded in the table.

Which solution contained protein and glucose but **not** starch?

	biuret test	iodine solution test	Benedict's solution test
A	blue	yellow-brown	brick-red
B	blue	blue-black	blue
C	purple	yellow-brown	brick-red
D	purple	blue-black	blue

3 A sample of food was tested with biuret reagent.

Which colour would be seen if the food sample contained protein?

A blue-black

B brick red

C yellow-brown

D purple

4 Which elements are found in fats?

A carbon, hydrogen and iron

B carbon, hydrogen and oxygen

C carbon, hydrogen and nitrogen

D carbon, oxygen and nitrogen

5 Which carbohydrate is used to make cell walls?

A cellulose

B glycogen

C starch

D sucrose

6 Large biological molecules are made of smaller molecules.

Which row correctly matches the large molecule with the smaller molecules?

	large molecule	smaller molecules
A	cellulose	fatty acids
B	fat	amino acids
C	protein	amino acids
D	starch	fatty acids

7 A student tests a solution for protein.

Which row shows the correct food test and a positive result?

	name of test	colour seen with a positive result
A	Benedict's test	blue-black
B	Benedict's test	purple
C	biuret test	blue-black
D	biuret test	purple

8 Iodine solution is added to a food sample that contains starch.

What is the colour of the sample after the iodine solution has been added?

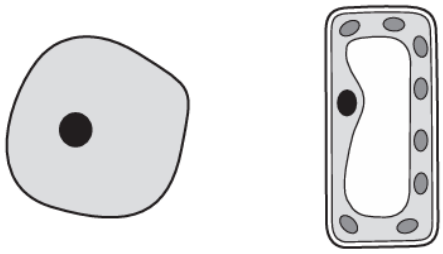
A blue-black

B purple

C red

D yellow

9 The diagram shows two cells.



Which process happens in only one of these cells?

A controlling the chemical reactions in the cell

B controlling the movement of substances into the cell

C making starch inside the cell

D using glucose inside the cell

10 What is the colour change shown by Benedict's solution when heated with a reducing sugar?

A blue to purple

B blue to red

C brown to blue-black

D red to yellow

11 Which row identifies the chemical elements in proteins?

	carbon	hydrogen	oxygen	nitrogen
A	✓	✓	✓	✓
B	✓	✗	✓	✗
C	✗	✓	✓	✓
D	✓	✓	✗	✗

key
✓ = present
✗ = absent

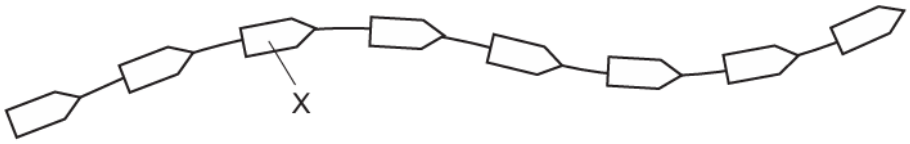
12 The table shows some large biological molecules and some small biological molecules.

	large biological molecules	small biological molecules
1	cellulose	glucose
2	oil	amino acids
3	glycogen	glucose
4	protein	ethanol

Which rows correctly pair large molecules with the smaller molecules used to make them?

A 1 and 2 **B** 1 and 3 **C** 2 and 3 **D** 3 and 4

13 The diagram shows part of a protein molecule.



What does X represent?

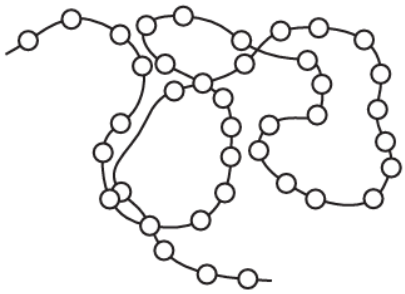
A amino acid

B fatty acid

C glycerol

D sugar

14 The diagram represents a protein molecule.



What do the small circles represent?

A amino acids

B fatty acids

C glycerol

D simple sugars

15 Which chemical is used to test for the presence of protein in a food sample?

A Benedict's solution

B biuret solution

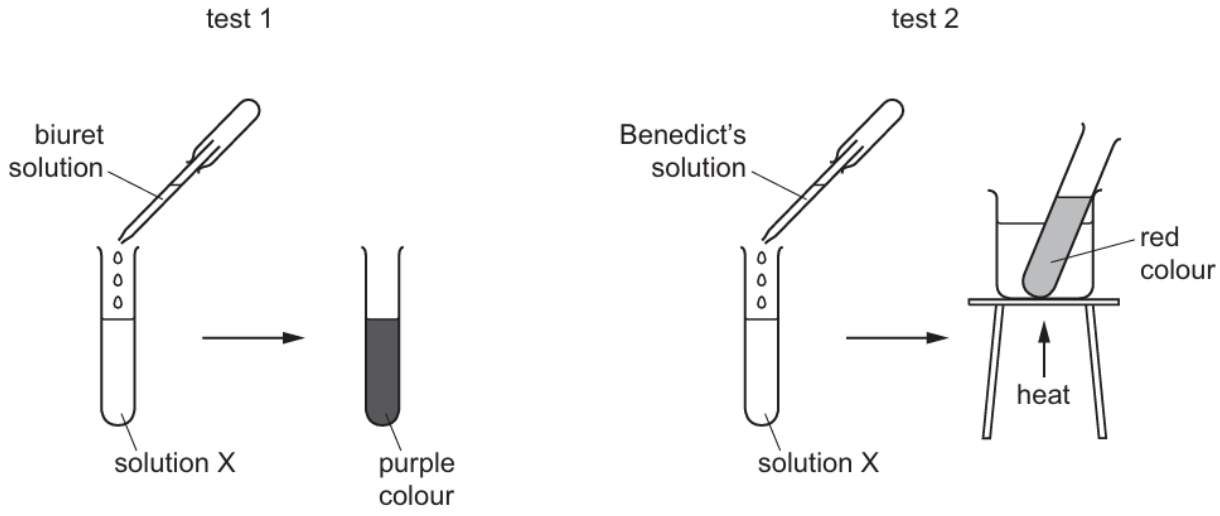
C DCPIP

D iodine solution

16 What are the smaller basic units of starch and glycogen molecules?

	starch	glycogen
A	amino acids	fatty acids and glycerol
B	amino acids	glucose
C	glucose	fatty acids and glycerol
D	glucose	glucose

17 The diagram shows two food tests being carried out on solution X.



Which nutrients are present in solution X?

A protein and starch

B protein and sugar

C starch and fat

D starch and sugar

18 Which reagent is used to test for the presence of vitamin C?

A Benedict's

B biuret

C DCPIP

D ethanol

19 Which element is found in proteins but **not** carbohydrates?

A carbon

B hydrogen

C nitrogen

D oxygen

20 Which food-testing solution shows a positive result when it turns from blue to purple?

A Benedict's solution

B biuret solution

C ethanol

D iodine solution

Paper 2

Questions are applicable for both core and extended candidates unless indicated in the question

21 A test was performed on a food substance. A positive result was shown by a colour change to blue-black.

What solution was used for the test?

A biuret solution

B DCPIP solution

C iodine solution

D Benedict's solution

22 The diagram shows the bases in a section of DNA from one strand only.

A–C–T–T–C–A–G–T–C

23 What is the base sequence on the complementary DNA strand? **(extended only)**

A G–C–T–T–C–G–A–T–C

B G–T–C–C–T–G–A–C–T

C T–C–A–A–C–T–G–A–C

D T–G–A–A–G–T–C–A–G

Which base in a DNA molecule always pairs with a G base? **(extended only)**

A A **B** G **C** C **D** T

24 Which statement about biological molecules is correct? **(extended only)**

A DNA molecules contain pairs of bases: A pairs with G and C pairs with T.

B Fatty acids and glycerol molecules can be joined together to form proteins.

C Glucose molecules can be joined together to make cellulose and glycogen.

D Starch molecules are made of maltase.

25 The structure of DNA involves two strands coiled together to form a double helix. **(extended only)**

Which pairing of bases between the two strands is correct?

A A and G **B** A and T **C** C and A **D** C and T

26 DNA contains pairs of bases.

Which pair shows a correct combination of bases? **(extended only)**

A A and C **B** C and G **C** G and A **D** T and G

27 The bases on one of the strands of a DNA molecule have the sequence shown.

A-A-T-C-T-G

What is the corresponding sequence of bases on the other strand? **(extended only)**

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

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

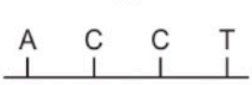
C G-G-C-T-C-A

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

28 The diagram shows a short section of a single strand of DNA.

Which strand of DNA will combine with this strand to form part of a double helix? **(extended only)**

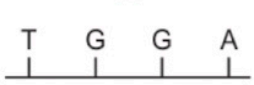
A



B

C

D



29 The sequence of the bases present on one strand of a DNA molecule is shown.

ATTGGACGGT

Which sequence shows the bases present on the opposite strand? **(extended only)**

A CGGTTCATTG

B TCCAATGAAC

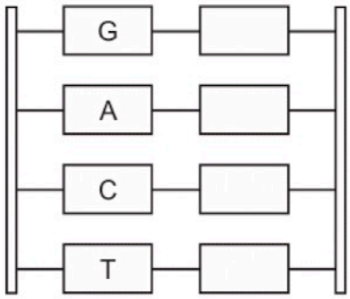
C TAACCTGCCA

D ATTGGACGGT

30 When bases pair up in the formation of DNA, what is one of the pairings? **(extended only)**

A G with A **B** G with C **C** G with G **D** G with T

31 The diagram shows a section of DNA, with four bases identified on one strand.



Which sequence of bases would be on the other strand, starting from the top? **(extended only)**

A AGTC **B** CTGA **C** GACT **D** TCAG

32 Small molecules are used as the basic units in the synthesis of large food molecules.

Which statement is correct?

A Amino acids are basic units of carbohydrates.

B Fatty acids are basic units of glycogen.

C Glycerol is a basic unit of oils.

D Simple sugar is a basic unit of protein.

33 Which row shows the chemical elements contained in fats?

	carbon	hydrogen	nitrogen	oxygen
A	✓	✓	✗	✓
B	✓	✓	✓	✓
C	✗	✓	✓	✗
D	✓	✗	✓	✓

key

✓ = present

✗ = absent