30 Why are lymphocytes the only cells that produce antibody proteins?

A Lymphocytes express all the genes in the nucleus.

B Lymphocytes have twice as many genes as other cells.

C Other cells do **not** have the genes for antibodies.

D The genes for antibodies are only expressed in lymphocytes.

31 During protein synthesis, what is the function of the ribosome?

A It assembles amino acids in a chain.

B It carries a copy of a gene to the cytoplasm.

C It contains the code for the synthesis of a protein.

D It determines the order of bases in the protein.

6 Fig. 6.1 is a diagram of a cell that shows how DNA is involved in protein synthesis.

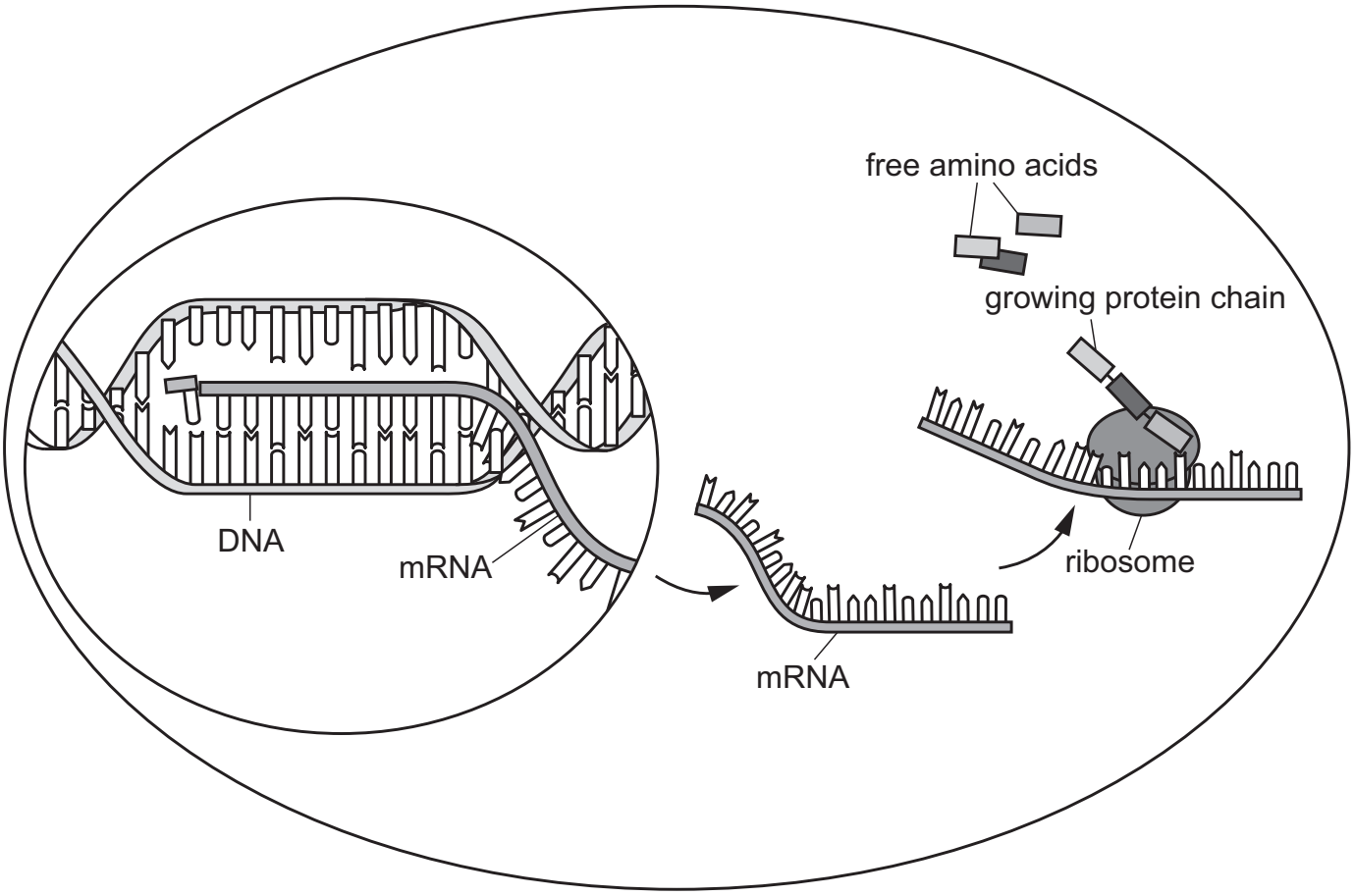

Fig. 6.1

(a) State the name of the part of the cell that contains DNA.

..... [1]

(b) DNA controls cell function by controlling the production of proteins.

State the name of **one** type of protein.

..... [1]

(c) Using Fig. 6.1, explain how mRNA is involved in protein synthesis.

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..... [3]

[Total: 5]

4 In a DNA molecule, bonds between pairs of bases hold two strands together. High temperatures can break these bonds to form two single strands of DNA.

The base pair C and G is held together more strongly than the base pair A and T.

Two DNA molecules containing the same number of bases were studied.

- In DNA molecule 1, 20% of bases are T.
- In DNA molecule 2, 20% of bases are C.

Which DNA molecule would require the lowest temperature to break into single strands?

A DNA molecule 1, because there are more A bases present.

B DNA molecule 1, because there are more G bases present.

C DNA molecule 2, because there are more A bases present.

D DNA molecule 2, because there are more G bases present.

5 **(a)** Organisms can be classified by their features and by studying the sequence of bases in their DNA.

Fig. 5.1 is a diagram showing the evolutionary relationships between some different groups of organisms.

Each branch shows the point at which organisms developed new features that classify them as a new group.

The point where the branch starts also indicates a common ancestor shared by the new groups.

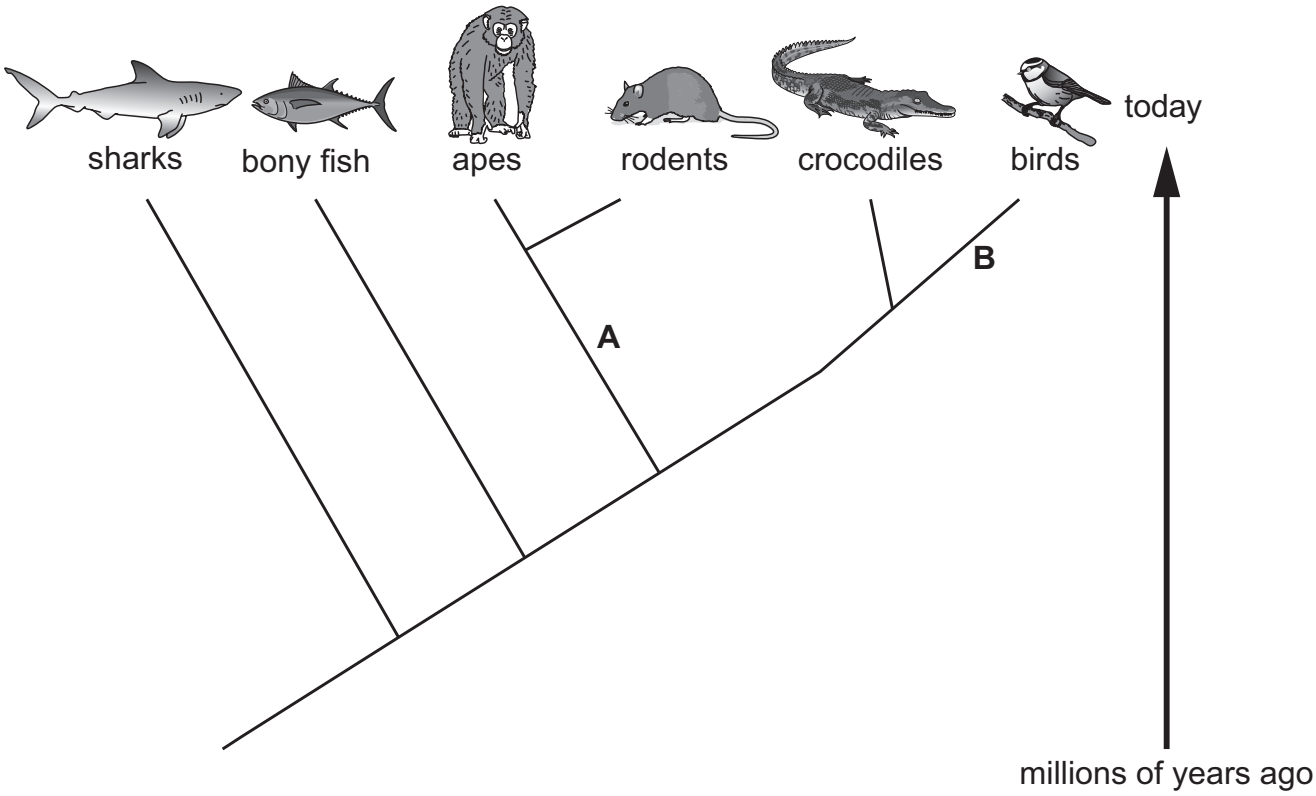

Fig. 5.1

(i) Suggest which visible features have developed at **A** and **B** in Fig. 5.1.

A .....

B .....
[2]

(ii) Identify the names of the **two** groups that share the most recent common ancestor in Fig. 5.1.

..... and ..... [1]

(iii) Suggest the groups with the most similar and least similar DNA base sequences to crocodiles in Fig. 5.1.

most similar .....

least similar .....
[2]

(b) Describe the structure of a DNA molecule.

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..... [4]

(c) Outline how the base sequences in DNA control cell function.

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..... [3]

[Total: 12]

29 Which term is defined as a length of DNA that codes for a protein?

A amino acid

B chromosome

C gene

D mutation