5.1 Replication & Division of Nuclei & Cells

Question Paper

Course	CIE A Level Biology (9700) exams from 2022
Section	5. The Mitotic Cell Cycle
Topic	5.1 Replication & Division of Nuclei & Cells
Difficulty	Hard

Time allowed: **10**

Score: **/10**

Percentage: **/100**

Question 1

Which of the following requires only mitosis during their production?

A root hairs

B cancerous tissue

C gametes

D antibodies

[1 mark]

Question 2

The diagram shows a cell of an organism after replication division.

What is the diploid number for this organism?

A 10 **B** 20 **C** 40 **D** 46

[1 mark]

Question 3

Around 250 billion red blood cells and 20 billion white blood cells are replaced each day. Blood cells are generated from stem cells in the bone marrow.

What type of stem cells are found in human bone marrow?

A pluripotent

B totipotent

C omnipotent

D multipotent

[1 mark]

Question 4

What is the composition of telomeres and why?

	composition	reason
A	protein	it is able to protect the DNA
B	RNA	it is made of different nucleotides to DNA
C	C/G nucleotides only	forms a high number of hydrogen bonds
D	C/G/A/T nucleotides	because telomeres are like the coding regions

[1 mark]

Question 5

Why does DNA condense into tightly packed chromosomes?

A easier to access genes

B because it contains histone proteins

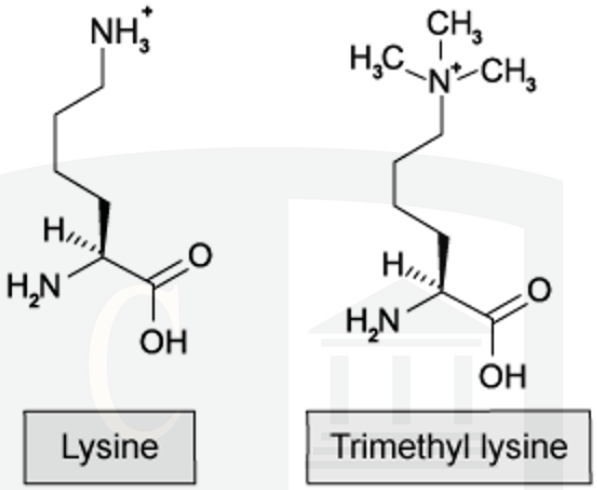
C the volume of the cell is small

D easier to separate the genetic material

[1 mark]

Question 6

Histone proteins were investigated at different genes. The histones at one gene had methyl (CH_3) groups added to the lysine amine group on the surface of the histone.



What effect will this have?

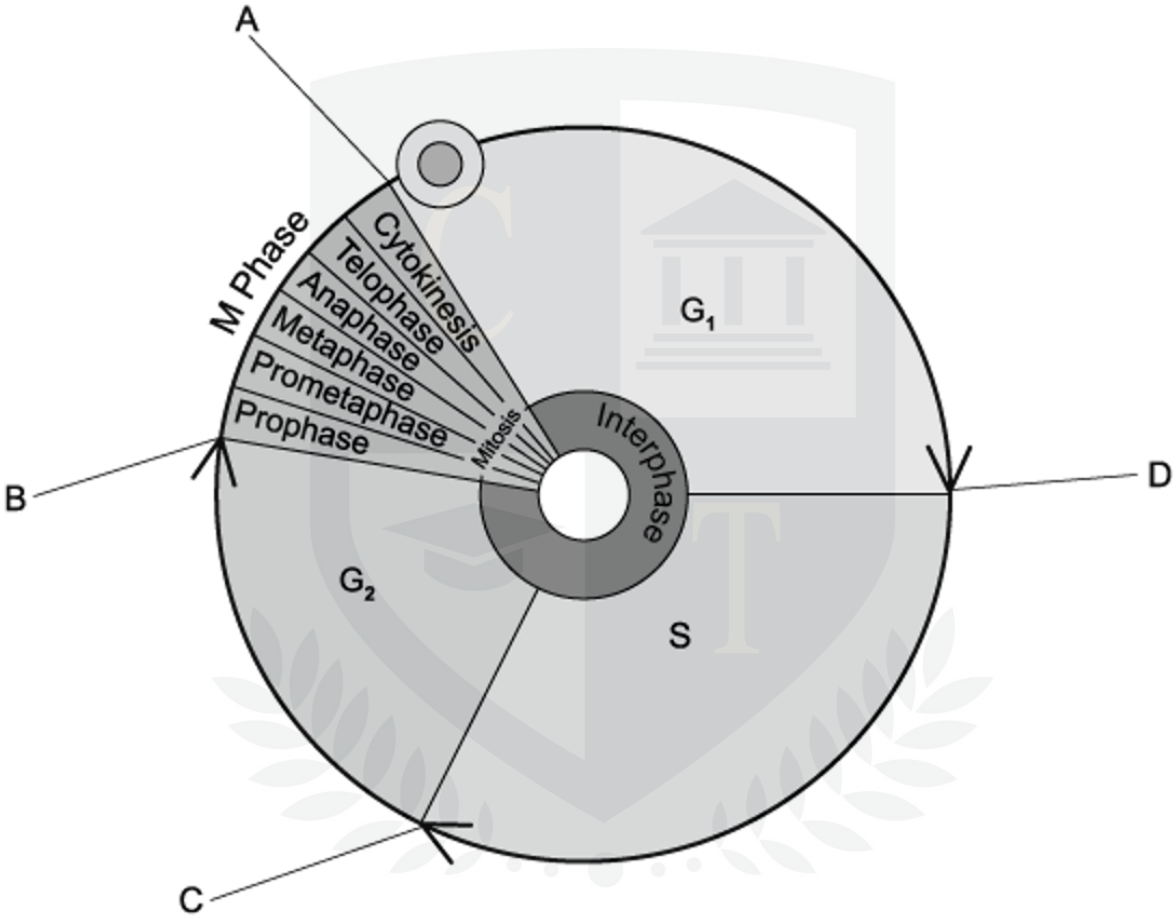
	effect	reason
A	gene is off	histones are bound more tightly to DNA
B	gene is on	histones are bound more tightly to DNA
C	gene is on	histones are bound less tightly to DNA
D	gene is off	histones are bound less tightly to DNA

[1 mark]

Question 7

Cells divide in response to a signal called a growth factor. Growth factors are proteins that bind to receptors on the surfaces of cells.

At which point in the cell cycle will the growth factor bind?



[1 mark]

Question 8

The DNA of cancer cells is mutated.

Which of the following proteins would not cause cancer if mutated?

A DNA repair proteins

B membrane receptor proteins

C cell death proteins

D cell adhesion proteins

[1 mark]

Question 9

If a 14 cm long piece of string was packed into a 7 cm long tube, the packing ratio would be 2. The packing ratio is a useful measure of the degree of compactness achieved.

The linker DNA between nucleosomes is 72 base pairs long. Each base pair occupies a 0.52 nm length of the DNA double helix. Nucleosomes plus their linker DNA form a 10 nm wide fibre.

What is the packing ratio of DNA in this form of chromatin?

A 0.052

B 37.44

C 3.7

D 13.8

[1 mark]

Question 10

Which cells contain telomerase?

1 B-lymphocytes

2 embryonic cells

3 heart cells

A 2 only **B** 1 and 3 only **C** 1 and 2 only **D** 1,2 and 3

[1 mark]