Nucleotides and Nucleic acids – 2021/20 GCE Biology A Component 02

1. Nov/2021/Paper_H420/02/No.4

Genes are not expressed during cell division because chromosomes are more tightly wound around histone proteins than during interphase.

Which of the following shows the level at which gene expression is being controlled when DNA is more tightly wound during cell division?

A post-transcriptional

B post-translational

C transcriptional

D translational

Your answer ☐ **[1]**

2. Nov/2021/Paper_H420/02/No.16(a, c)

DNA is a biological molecule that varies between individuals.

Sections of DNA code for proteins.

(a) **Fig. 16.1** shows the structure of part of a DNA molecule.

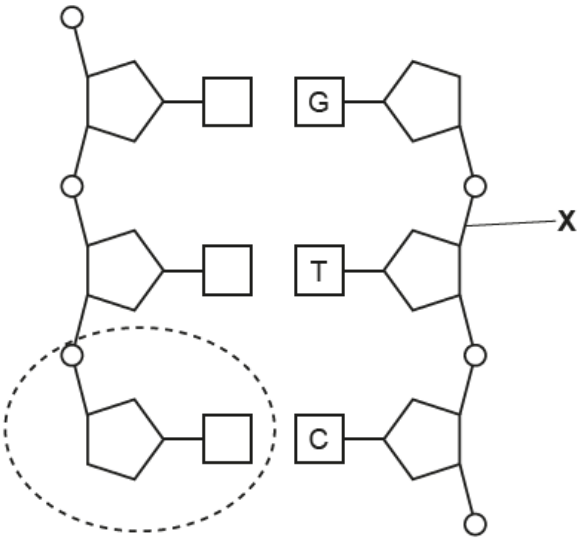

Fig. 16.1

(i) The circled region shows one nucleotide.

Name the components of **this** nucleotide.

.....

.....

..... **[3]**

(ii) State the name of the bond labelled **X** and the type of reaction that forms this bond.

Name .....

Type of reaction .....

[2]

(c) DNA codes for proteins within the cell. Some regions of DNA are described as non-coding.

(i) Explain why some regions of DNA can be described as 'non-coding'.

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..... **[2]**

(ii) Non-coding regions of DNA show more variation than coding regions. This makes non-coding regions useful in DNA profiling.

Suggest why non-coding regions of DNA show more variation.

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..... **[1]**

3. Nov/2020/Paper_H420/02/No.9

Which of the following statements is/are evidence that DNA replication is semiconservative?

1 After one replication, the number of adenine nucleotides is equal to the number of guanine nucleotides.
2 After two replications, two DNA molecules have one original and one new strand, and two DNA molecules have two new strands.
3 After three replications, there are eight DNA molecules, only two of which have strands from the original DNA.

A 1, 2 and 3

B only 1 and 2

C only 2 and 3

D only 1

Your answer ☐ **[1]**

4. Nov/2020/Paper_H420/02/No.16(a)

The body plan of multicellular organisms is under genetic control.

(a) Complete the passage below using the most appropriate words from the list.

analogous	**archaea**	**development**	**DNA**	**domains**
homeobox	**homologous**	**homozygous**	**kingdoms**	**operon**
phyla	**plant**	**preserved**	**prokaryotes**	**regulator**
ribosomes	**transcription**	**translation**		

The development of body plan in eukaryotic organisms is controlled by ..... genes. These genes code for proteins that are able to bind to ..... and turn specific genes on and off and are known as ..... factors. These proteins contain a sequence of base pairs that varies little between species within the animal, ... or fungus ..... .

[5]