**Multiple Choice.** Select the best answer. (2 marks each)

1 . Replication refers to the synthesis of:

1. ATP
2. **DNA**
3. bacteria
4. BGH

2. What modifications are necessary to rewrite the following DNA strand as an RNA strand?

**DNA strand: GGCATTGCA**

1. **CCGUAACGU**
2. GGCAUUGCU

### C. CCGTUUGCA

D. GGCUAACGU

Use the following diagram to answer questions 3 to 6about DNA:

3. The structure labelled X is a

1. **base**
2. deoxyribose sugar
3. phosphate group
4. nucleotide

4. The structure labelled Y is a

1. base
2. **deoxyribose sugar**
3. phosphate group
4. nucleotide
5. Z represents a
	1. base
	2. deoxyribose sugar
	3. **phosphate group**
	4. nucleotide
6. Taken together, structures X, Y, and Z represent a
	1. base
	2. deoxyribose sugar
	3. phosphate group
	4. **nucleotide**
7. Which of the following can be produced using recombinant DNA techniques?
	1. testosterone
	2. glycogen
	3. **insulin**
	4. cholesterol

**Short Answer:**

1. Describe the structure of DNA. Include the components of a nucleotide, the types of bonds found between bases, and complementary base pairs. You may choose to draw and label a diagram. (5 marks)



1. Identify and **describe** in detail the three steps involved in DNA replication. Use the enzymes: topoisomerase, ligase, RNA primase, and DNA polymerase in your explanations. (5 marks)

|  |  |
| --- | --- |
| DNA REPLICATION | DETAIL |
| INITIATION | * Topoisomerase “relaxes” the double helix to prevent re-binding
* Helicase unzips the 2 original strands
* Single Strand binding proteins (SSB) bind to the nitrogenous bases to prevent re-binding
 |
| ELONGATION | * RNA primase flags the origin and building points
* DNA polymerase builds the complimentary strands on the leading & Okazaki fragments on the lagging strand
 |
| TERMINATION | * Ligase glues Okazaki fragments together
* DNA polymerase auto-corrects any coding error
* 2 Semi-conservative DNA strands ( 1 original & 1 built)
 |

1. Identify three differences between the structures of RNA and DNA. (5 marks)

RNA: single strand, uracil not thymine, sugar is ribose

DNA: double strand, thymine, sugar is deoxyribose

4.Label the diagram below with the terms: *DNA helicase, DNA polymerase, RNA Primase, topoisomerase, Okazaki fragment, ligase, daughter strand, complimentary strand, lagging strand, leading strand, chromatin, chromatid, chromosome, centromere, nitrogenous base pairs, DNA sugar-phosphate backbone, H-bond*

