NAME: ……..... **SIGNATURE: …….**

S.6 BIOLOGY ASSESSMENT TEST

TIME: 90 MINUTES TOPIC: CELL DIVISION & GENETICS

INSTRUCTIONS: Attempt all questions.

1. (a) Illustrating with a cell of one pair of homologous chromosomes, draw diagrams in the space below to show

(i) Mitotic anaphase ***(02 marks)***

(ii) Meiotic anaphase I ***(02 marks)***

(iii) Meiotic anaphase II ***(02 marks)***

(b). Explain how meiosis contributes to genetic variation ***(04 marks)***

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2. (a) Give any;

(i) Two similarities between DNA and RNA molecules. ***(02 marks)***

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(ii) Four differences between DNA and RNA ***(04 marks)***

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(b) The diagram shows the sequence of bases on one strand of a short length of DNA **ACC CGA CCC CAG**. This sequence should be read from the left to right.

(i) Give the base sequence that will be produced as a result of transcription of the complete length of DNA shown in the diagram. ***(01 mark)***

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(ii) Give the base of the transfer RNA which will correspond to the sequence of base shown in the box on the diagram. ***(01 mark)***

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(iii) Identify the enzymes involved in b(i) and (iii) above. ***(02 marks)***

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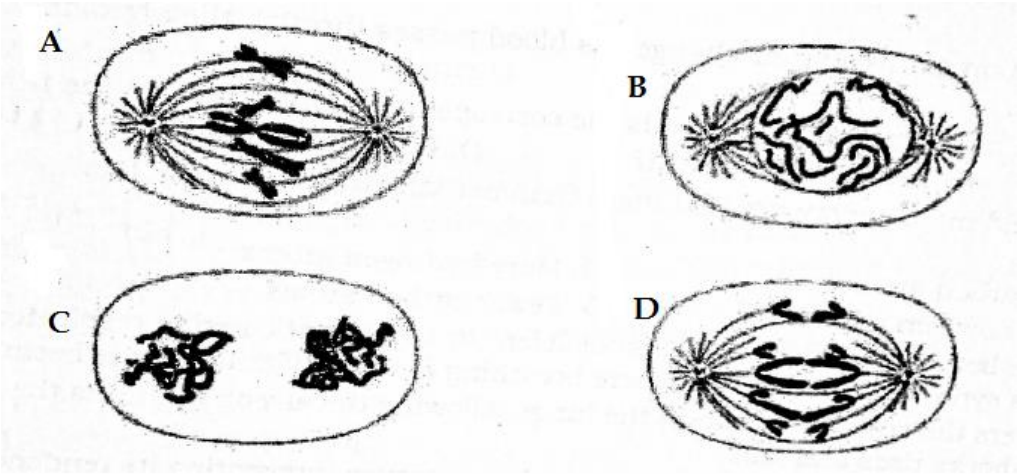
3. The diagram shows a cell in various stages of the mitotic cell cycle.



(a) Name the stage represented by each diagram, and arrange them in the correct sequence. ***(03 marks)***

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(b) Describe the role of spindle microtubules in mitosis ***(03 marks)***

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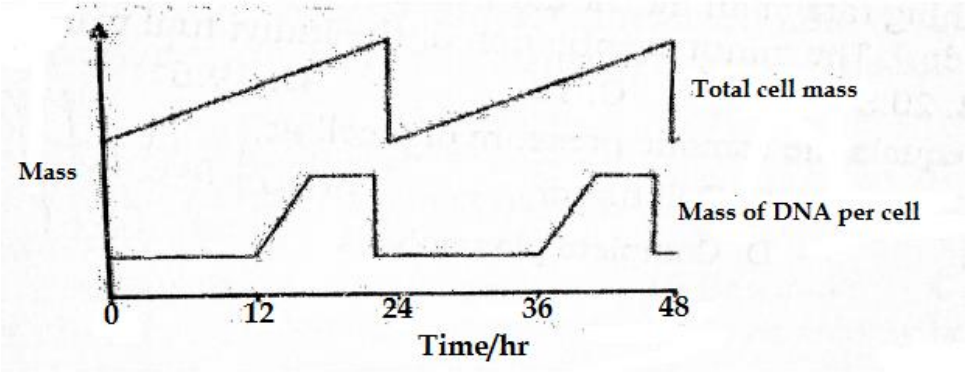
(c) Figure 3 below shows these changes in the mass of DNA per cell and total cell mass during two cell cycles.



(i) On the graph, write letters X and W to indicate a time at which DNA replication and cytokinesis respectively are taking place. ***(01 mark)***

(ii) Distinguish the roles of mitosis and meiosis in living organisms. ***(03 marks)***

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4 (a)Distinguish between

(i) Mitosis and Meiosis ***(02 marks)***

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(ii) Cell division and nuclear division ***(02 marks)***

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(b). Explain the role of mitosis in the development of a mature embryo sac. ***(03 marks)***

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(c) State one importance of each of the following events in meiotic cell division and the stage where each occurs. (06 marks)

	Event	**Stage of occurrence**	**Importance**
(i).	Synapsis		
(ii).	Crossing over		
(iii)	Non-disjunction		
(iv)	Cytokinesis		

5. In a garden pea plant there are two forms of heights. When a pure breeding tall pea plant was crossed with a short pea plant all the offsprings obtained where tall when the offsprings were selfed a phenotype ratio of 3 : 1 was obtained in F_2.

(a) Using suitable genetic symbols, workout the genotypes and phenotypes of the F_2 generation ***(06 marks)***

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(b) What are the phenotypic and genotypic ratios of the F_2 generation ***(03 marks)***

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(c) Explain how you would determine the genotype of F1 tall pea plants formed ***(04 marks)***

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(d) Suppose 700 pea plants where produced in the F_2 generation

i. How many were tall? ***(02 marks)***

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ii. How many were short? ***(02 marks)***

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6. (a) State Mendel's Laws of Inheritance ***(03 marks)***

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(b). Inheritance of some traits in the population does not obey Mendelian Laws. State eight conditions which disobey Mendelian Laws? ***(04 marks)***

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(c). Give reasons why Mendel preferred garden peas in his experiment. ***(05 marks)***

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END!!!

"Don´t ask what the world needs. Ask what makes you come alive, and go do it."