

NAME _____ INDEX _____

DATE _____ SIGNATURE _____

**BIOLOGY 231/2
FORM 4
1ST TERM 2016
2 HRS.**

**Kenya Certificate of Secondary Education
BIOLOGY 231/2
FORM FOUR 1ST TERM EXAMINATION 2016**

Instructions

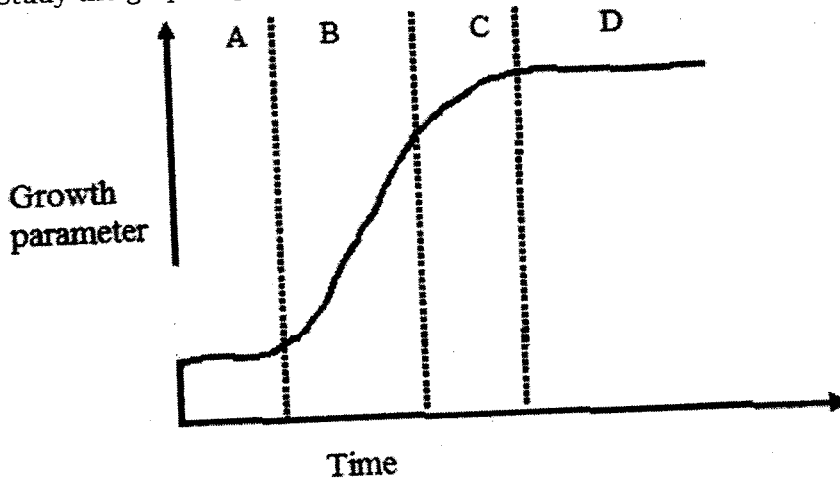
- WRITE YOUR NAME AND INDEX NUMBER IN THE SPACES PROVIDED ABOVE
- THIS PAPER CONSISTS OF TWO SECTIONS; A AND B .
- ANSWER ALL QUESTIONS IN SECTION A.
- IN SECTION B ANSWER QUESTION 6 (COMPULSORY AND EITHER QUESTION 7 OR 8.

For Examiner's Use Only

SECTION	Questions	Maximum score	Candidates score
A	1	8	
	2	8	
	3	8	
	4	8	
	5	8	
B	6	20	
	7	20	
	8	20	
		80	

This paper consists of 9 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.

1. Study the graph representing the growth of a certain multicellular organism



a) Identify the type of growth curve represented by the graph. (1mark)

b) Suggest one possible parameter that might have been used to come up with the above graph (1mark)

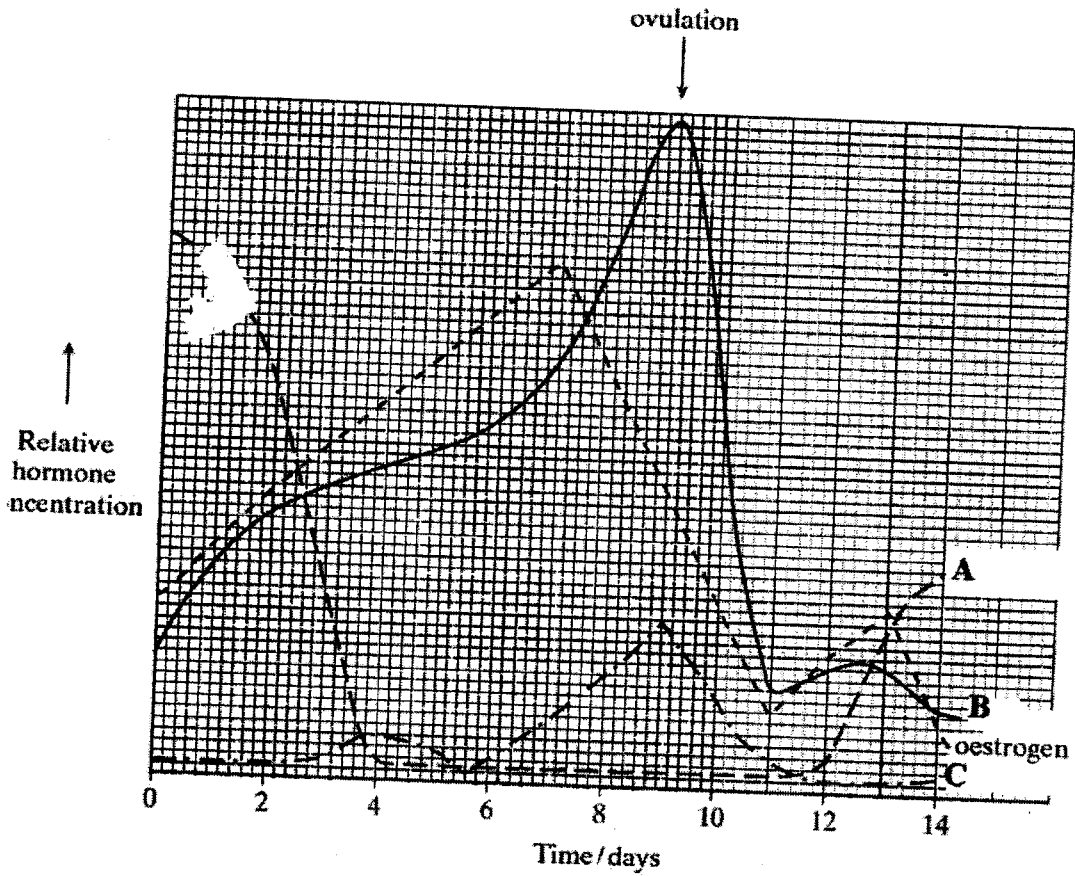
c) Account for the following phases (2marks)

i) Phase A

ii) Phase B (2marks)

iii) Phase D (2marks)

2. The graph shows the concentration of four hormones during part of the menstrual cycle of a female mammal.



- (a) Name the hormones labelled A, B and C. (3marks)

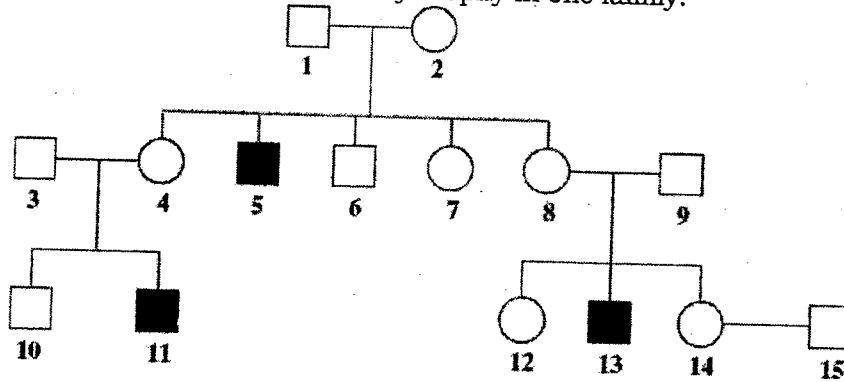
A:

B:

C:

- (b) Use the graph to explain the role of these hormones in the graph in controlling the events in the ovary between days 0 and 12. (5marks)

3. Duchene muscular dystrophy is a sex-linked inherited condition which causes degeneration of muscle tissue. It is caused by a recessive allele. The diagram shows the inheritance of muscular dystrophy in one family.



Key:

- = male with muscular dystrophy
- = unaffected male
- = female with muscular dystrophy
- = unaffected female

- (a) Give evidence from the diagram which suggests that muscular dystrophy is sex-linked. (1mark)

- (i) caused by a recessive allele. (1mark)

- (b) Using the following symbols, X^D , X^d and Y, give the possible genotypes of persons 5, 6, 7, 8 and 9. (5marks)

5:

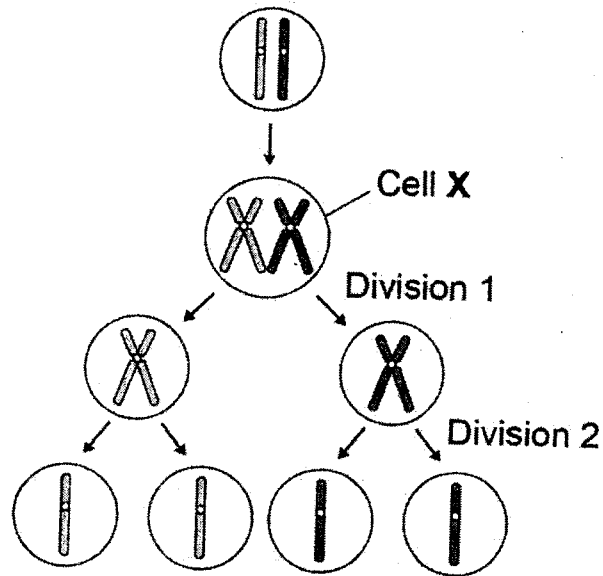
6:

7:

8:

9:

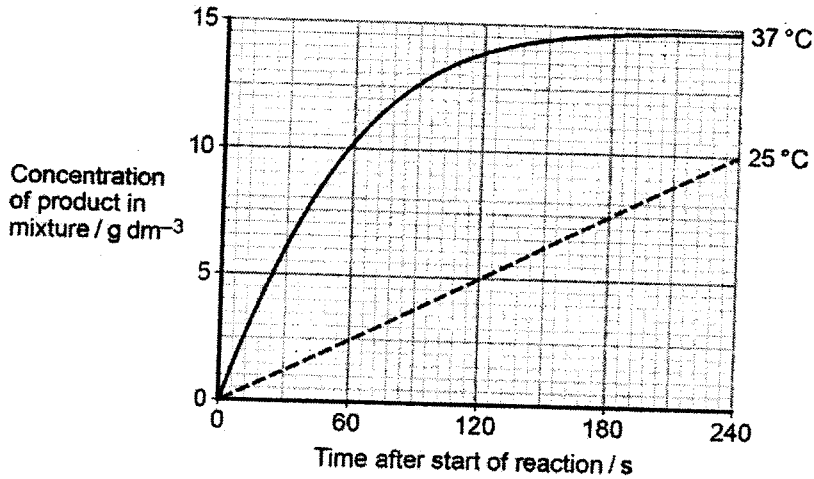
5. The figure below summarizes the process of meiosis. The circles represent cells and the structures within each cell represent chromosomes.



- a) Describe and explain the appearance of **one** of the chromosomes in cell **X**. (3marks)
-
-
-
-
- b) Describe what has happened during division 1 in figure above. (2marks)
-
-
- c) Identify **one** event that occurred during division 2 but **not** during division 1. (1mark)
-
-
- d) Name **two** ways in which meiosis produces genetic variation. (2marks)
-
-

- (c) A blood test shows that person **14** is a carrier of muscular dystrophy. Person **15** has recently married person **14** but as yet they have had no children. What is the probability that their first child will be a male who develops muscular dystrophy? (1mark)

4. A student investigated the effect of temperature on the rate of an enzyme-controlled reaction. At each temperature, he started the reaction using the same volume of substrate solution and the same volume of enzyme solution. The figure below shows the results.



- a) Give one factor that the student could have controlled. (1mark)
-
- b) Calculate the rate of reaction at 25° C. (2marks)
- c) Describe and explain the differences between the two curves. (5marks)

SECTION B (40 marks)

Answer question 6 (compulsory) and either question 7 or 8 in the spaces provided after question 8.

6. Malaria is a disease that is spread by insects called mosquitoes. In Africa, DDT is a pesticide used to kill mosquitoes, to try to control the spread of malaria. Today, some mosquitoes have a gene (**R**) that gives them resistance to DDT. The other allele (**r**), does not give resistance. Scientists investigated the frequency of the resistance allele in a population of mosquitoes in an African country over a period of 10 years. The table below shows the scientists' results.

Year		1999	2001	2003	2005	2007	2009
% of mosquito population resistant to DDT		0	3	20	31	46	54

- a) On the grid provided, draw a graph of the percentage mosquito population resistant to DDT against time. (6marks)
- b) Name the causative agent of malaria. (1mark)
-
-
- c) Explain how mosquitoes spread malaria. (3marks)
-
-
-
-
- d) State the process through which the resistant mosquito came about. (1mark)
-
- e) Explain the change in percentage of resistant mosquito population over the 10 year period. (3marks)
-
-
-
-

f) Work out the percentage of the offspring that will be resistant to DDT when a heterozygote is crossed with a non-resistant mosquito. (4marks)

g) Describe two ways of controlling the population of mosquitoes. (2marks)

7. Explain how various structural features of plants affects the rate of transpiration. (20marks)

8. Describe how each of the following theories explains mechanism of evolution. (7marks)
a) Lamarch's theory.

b) Darwinian theory of natural selection. (13marks)
