KCSE MOCKS

BIOLOGY PAPER 2

Consists 3 KCSE Mock set Exams.

(Class of KCSE March 2021)

For Marking Schemes Contact Mr Machuki 0795491185

Kenya Educators Contacts:

+254795491185

kenyaeducators@gmail.com

For more e-learning resources contact Kenya Educators via the contacts above.

PRE-MOCK 1

NAME …… **INDEX NO** ……..……..

SCHOOL …… **SIGNATURE** ……...……...…….

DATE ……..……..

231/2
BIOLOGY
PAPER 2
(THEORY)
TIME: 2 HOURS

KCSE PRE-MOCK 1

Kenya Certificate of Secondary Education (K.C.S.E)

INSTRUCTIONS TO CANDIDATES

- Write your name and Index Number in the spaces provided above.
- This paper consists of **two** sections. Section **A** and section **B.**
- Answer **ALL** questions in section **A** in the spaces provided. In section **B** answer question **6** (compulsory) and either question **7** or **8** in the spaces provided after question 8.
- This paper consists of 10 Printed pages. Candidates should check the question paper to ensure that all the papers are printed as indicated and no questions are missing

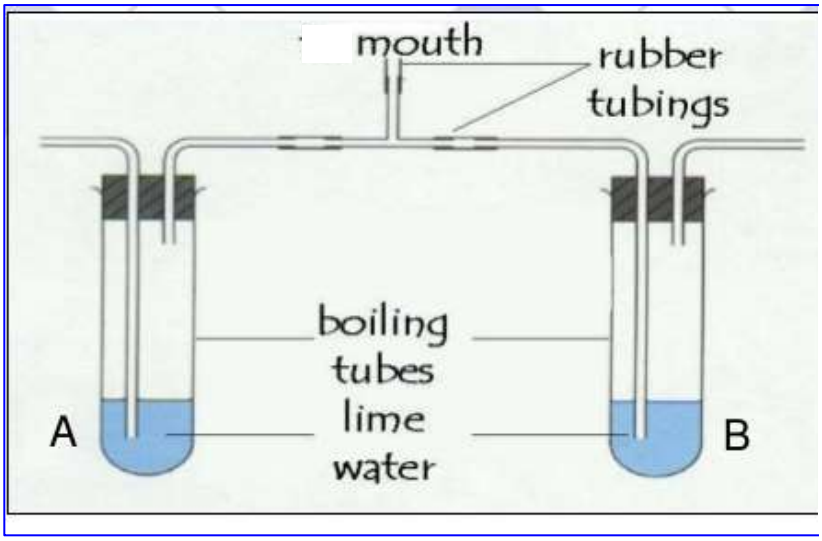
For Examiners use only.

Section	Question	Maximum score	Candidates score
A	**1**	**8**	
	2	**8**	
	3	**8**	
	4	**8**	
	5	**8**	
B	**6**	**20**	
	7	**20**	
	8	**20**	

Total score	**80**	

SECTION A. 40 MARKS
Answer all the Questions in this section.

1. The diagram below illustrates an experimental set up to compare relative amounts of a gas in inhaled air and exhaled air.



a) On the diagram, show with arrows the direction of movement of inhaled and exhaled air into and out of the mouth. (2mks).

b) What is the name of the gas being investigated in the experiment (1mk)

……

……

c) What will happen to the lime water in. (2mks)

Boiling tube A?

……

……

Boiling tube B?

……

……

d) Explain the observations made in (c) above. (3mks).

……

……

……

……

……

2. A human gene which is Y-linked controls premature baldness. One allele leads to normal hair pattern while the other produces premature baldness

(a) What are alleles? (1mark)

……

……...

b) If a man with premature baldness marries, work-out the phenotypes of his children. (Use letter R to represent gene for premature baldness). (4 marks)

c) Explain why this trait is not observed in females (2marks)

……

……

……

……

d) Give one other trait in man that is Y—linked (1mark)

……

……

3. a) What is active transport? (1mk)

……

……

……

(b) State three factors that increase the rate of active transport. (3mks)

……

……

……

……

(c) Give two roles of osmosis in animals. (2mk)

……

……

……

……

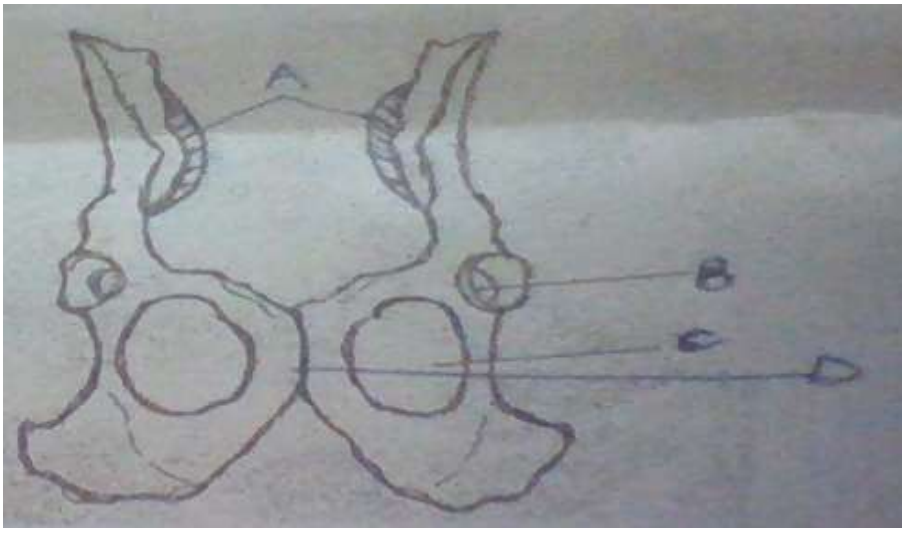
(d) What would happen if a plant cell is placed in a hypotonic solution (2mks)

……

……

……

4. The diagram below shows two fused bones of a mammal.



(a) Identify the fused bones. (1mk)

……..

(b) Name:

i) The bone that articulates at the point labelled A. (1mk)

……

……

ii) The structure labelled B. (1mk)

……

……

(c) State the type of joint formed at structure B. (1mk)

……

……

(d) (i) Name: the structure labelled C (1mk)

……..

ii) State two functions of the structure named in d(i) above (2 mks)

……

……

(e) i) Name the structure labelled D (1mk)

……

ii) State what happens to the structure during childbirth. (1mk)

……

5. Use the diagram below to answer the questions that follow;

(a) Name the class the plant belongs to. (1mk)

……

(b) Give three OBSERVABLE characteristics that place the plant to the class named in (a)above (3mks)

……

……

……

……

(c) If a cross section was done on the young stem, draw and label the section observed. (3mks)

SECTION B (40 MARKS)

Answer question 6 (compulsory) and either 7 or 8

6 .In an ecological study, a grasshopper population and that of crows was estimated in a certain grassland area over a period of one year. The results are as shown in the table below.

Months	*J*	*F*	*M*	*A*	*M*	*J*	*J*	*A*	*S*	*0*	*N*	*D*
Number of adult grasshoppers x 10_2	*90*	*20*	*11*	*25*	*2500*	*1652*	*120*	*15*	*10*	*35*	*192*	*456*
Number of crows	*4*	*2*	*0*	*1*	*8*	*22*	*7*	*2*	*1*	*1*	*5*	*15*
Amount of rainfall	*20*	*0*	*55*	*350*	*520*	*350*	*12*	*10*	*25*	*190*	*256*	*350*

(a) (i) What is the relationship between the rainfall and grasshopper population?(1 mark)

……

……

……

……

(ii) Account for the relationship stated in a *(*i) above. (3 marks)

……
……
……
……

(b) Explain the relationship between the grasshopper population and that of the crows. (3 marks)

……
……
……

(c) If the data was used in the construction of pyramid of numbers, what would be the trophic of;

(3 marks)

(i) Grasshoppers ……

(ii) Crows ……

(iii) The grass in the study area ……

(d) If the area studied was one square kilometer, state:

(i) one method that could have been used to estimate the crow population. (1 mark)

……

(ii) One method that could have been used to estimate the grasshopper population.(1mark)

……

(e) Suggest what would happen f a predator for grasshoppers entered the study area.

(2 marks)

……
……
……
……

(f) What is meant by the term carrying capacity? (1 mark*)*

……

……

……

(g) Why would the carrying capacity of wild animals in a woodland grassland be higher than that of cattle? (2 marks)

……

……

……..

(h) What is an ecosystem? (3 marks)

……

……

……

……

7. Describe how water from the soil reaches the leaves of a tall tree and eventually to the atmosphere.

(20mks)

8. Explain how the human alimentary canal is adapted to perform its functions. (20mks).

……

……

……

……

……

……

……

……

……

……

……

.....

.....

.....

.....

.....

.....

.....

.....

.....

MOCK 1

Name……. Index No……/…….

School…… Date ……

Candidate's Signature……

231/2

BIOLOGY

(THEORY)

Paper 2

Time: 2 Hours

KCSE MOCK 1

Kenya Certificate of Secondary Education (K.C.S.E)

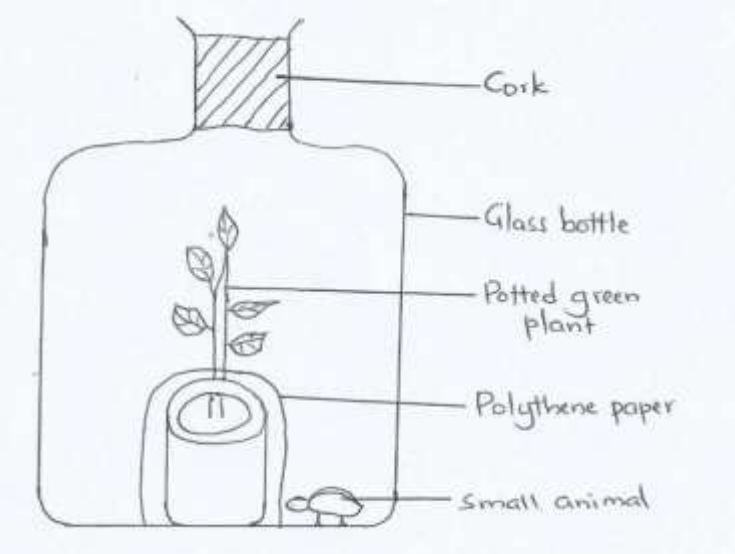
INSTRUCTIONS TO CANDIDATES

- This paper consists of two sections **A** and **B**.
- Answer **ALL** questions in section **A**
- Answer question **6** (compulsory) and either question **7** or **8** in section **B**.

SECTION A (40 marks)

*Answer **all** questions in this section in the spaces provided*

1) An experiment was set up to investigate a factor in autotrophism in green plants.



Vaseline was applied at joint between the cork and the mouth of glass bottle and set up was left under sunlight for 6 hours.

a) Explain why it was necessary to apply Vaseline.

(1 mark)

……

……

……

b) Explain why it was necessary to cover the pot with polythene paper.

(1 mark)

……

……

……

c) What was the purpose of including the small animal?

(2marks)

……

……

……

……

……

d)i)What would happen to the small animal if the set up was left overnight in darkness?

(1mark)

……

……

……

ii) Account for the answer above

(1 mark)

……

……

……

e)Explain why organisms in phylum Arthropoda die when Vaseline is applied on its thorax.

(2marks)

……

……

……

……

2. (a) In a field study to estimate the population of grasshoppers in the school field of 0.4 km^2, 60 grasshoppers were caught using sweep nets, marked with red paint and released back to the field. The following day students went back with their sweep nets and caught 100 grasshoppers, of which 20 were found to be already marked.

(i) Calculate the population size of grasshoppers in the field.
(2 marks)

(ii) Calculate the population density of the grasshoppers in the field.
(2 marks)

(iii) What two factors would maintain the population of grasshoppers at the carrying capacity?
(2 marks)

.....
.....

.....
.....

(b) Giving an example, state what is meant by the term symbiosis.
(2 marks)

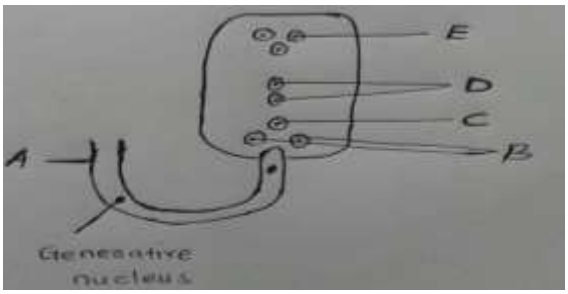
.....
.....

.....
.....

.....
.....

.....
.....

3 .The figure below shows the embryo sac before fertilization.



a) Identify the structures labeled A and B (2mks)
A……
……
B……
……

b) identify the structures labeled in the diagram that will develop into the following after fertilization (2mks)

(i) Embryo

……
…

Endosperm

……
……

c) State the ploidy of each of the following nuclei after fertilisation (2mks)
(i)
C……
……

(ii)D……
……

d) Briefly outline the process of double fertilisation in flowering plant (2mks)
……
……
……
……
……
……..

4. In an experiment, a black mouse was mated with a brown mouse; all the off-springs were black. The off-springs grew and were allowed to mate with one another. The total number of (F2) generation off-springs was 96.

a) Using the letter symbols capital letter **B** for the gene of black colour and small **b** for brown colour, Work out the genotype of the F1 generation. (3mrks)

b) From the information above, work out the following for the F2 generation.

i) Genotypic ratio. (2mrks)

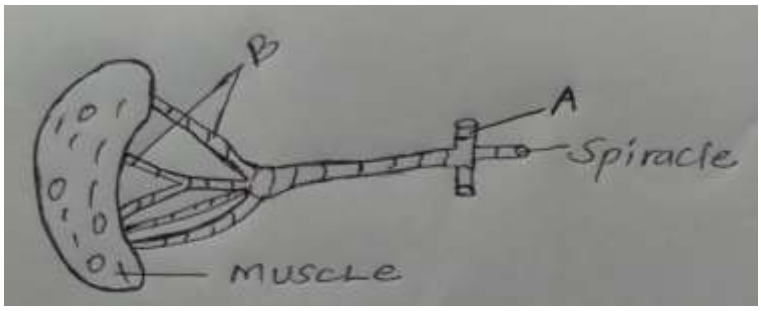
……

ii) Phenotypic ratio. (1mrk)

……

iiii) The total number of brown mice (2mrks)

5. The diagram below shows part of gaseous exchange system in an insect. Study it and answer the questions that follows.



a) What is the structural adaptations of the parts labeled A and B to their functions (2mks)

A……
……
……
……

……
…

B……
……

b) Name the parts of the following animals that carry out the same functions as part B above (2mks)

(ii) Tilapia fish

c) Name the structures used for gaseous exchange in plant growing in waterlogged soils (1mk)

……
……

d) (i) Give two reasons why accumulation of lactic acid during vigorous exercise leads to an increase of heart beat

(2mks)

……
……
……
……
……
……

(ii) In what form is oxygen transported from lungs to the tissues (1mk)

……
……

SECTION B (40 MARKS)

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

6. The table below shows how the quantities of urine and sweat vary with external temperature

External temperature(^oC)	**Urine (cm^3/hr)**	**Sweat (cm^3/hr)**

0	100	5
5	90	6
10	80	10
15	70	20
20	60	30
25	50	60
30	40	120
35	30	200

(a) On the grid provided, plot the quantities of urine and sweat produced against external temperature
(7 marks)

(b) At what temperature is the amount of sweat and urine produced equal?
(1 mark)

.....
.....

(c) What happens to the amount of sweat produced as the temperature rises? Explain your observation
(3 marks)

.....
.....

.....
.....

.....
.....

.....
.....

(d) Explain the observation made on the amount of urine produced.
(3 marks)

.....
.....

.....
.....

.....
.....

.....
.....

.....
.....

(e) How are the following parts of the mammalian skin adapted for temperature regulation during cold weather?
(6 marks)

Hair:.....
.....

.....
.....

.....
.....

Sweat glands
.....

.....
.....

.....
.....

Blood
vessels.....
.....

.....
.....

.....
.....

7. a) Describe the opening and closing of the stomata using the photosynthetic theory.

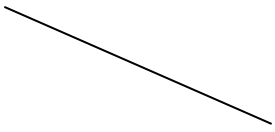
(10marks)

b)Describe blood sugar regulation in mammals.

(10marks)

8.a) Describe how urea is formed in the liver cells from excess amino acid
(5mks)

b) Describe the roles of hormones in the growth and development in plants
(15mks)



POST MOCK 1

BIOLOGY PAPER 2
(THEORY)
TIME: 2 HOURS

NAME:.....CLASS:.....ADM NO:.....

SIGNATURE.....DATE.....

INSTRUCTIONS TO CANDIDATES:-

- Write your name and admission number in the spaces provided above.
- This paper consists of two sections; A and B.
- Answer all the questions in section A in the spaces provided.
- In section B, answer question 6 (compulsory) and either question 7 or 8 in the spaces provided after question 8.

For Examiner's Use Only:

Section	Question	Maximum score	Candidates score
A	**1** **2** **3** **4** **5**	**8** **8** **8** **8** **8**	
B	**6** **7 or** **8**	**20** **20** **20**	
TOTAL SCORE		**80**	

This paper consists of 8 printed pages. Candidates should check to ascertain that all the pages are printed as indicated and that no questions are missing.

SECTION A

1. An investigation was carried out to study the effects of the concentration of sucrose solutions on pieces of tulip stem 44mm in length. The pieces were placed in different concentrations of sucrose solutions and measured after two hours of immersion. The results are shown in the table below.

Sucrose concentration (moles per litre)	0.2	0.3	0.4	0.5	0.6	0.7	0.8
Length after 2 hours (mm)	50	48	46	44	42	42	42

a. Explain the effect of the 0.2 moles per litre sucrose solution on the length of the pieces of the tulip stem. (3mks).

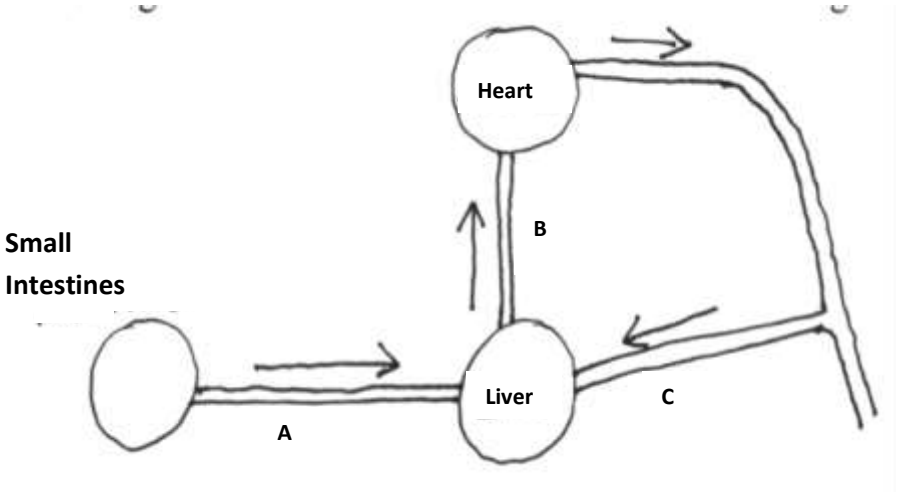
b. Use information from the table to predict the concentration of a sucrose solution isotonic to the cells in the tulip stem. (1mk).

c. (i) Give the term which would be used to describe the cells in the tulip stem after immersion in a solution with a sucrose concentration of 0.7 moles per litre. (1mk)

ii. Draw the appearance of a cell from the tulip stem after immersion in a solution with a sucrose concentration of 0.7 moles per litre. (2mks).

d. State one role of the process being investigated in plants. (1mk)

2. The diagram below illustrates circulation in certain organs of the mammalian body.



a) Identify the blood vessels represented by A, B and C. (3mks)

A…….

B…….

C…….

b) Explain why blood from the small intestines goes to the liver before it goes to any other organ of the body. (2mks)

……

……

……

c) Compare the blood in vessels B and C. (1mk)

……

……

d) Outline how a glucose molecule in vessel A finally reaches the heart. (2mks)

……

……

……

3. Polydactyl is a genetic disorder in which people inherit an extra digit. Polydactyl is caused by a dominant allele (B). The table below describes the different genotypes for polydactyl.

a) Complete the table below by giving the correct genotype, alleles of each genotype and the expected number of fingers per hand. (4mks)

Genotype	Alleles	Expected number of digits per hand.
Homozygous dominant		Six
	bb	
Heterozygous.	Bb	

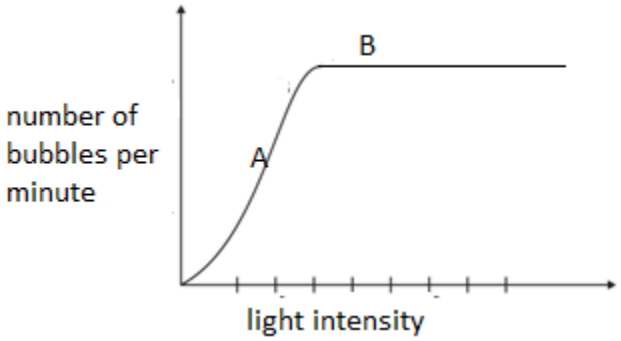
b) The table below shows results of marriages between various parents. Complete the table by writing the probability of each marriage producing a child with polydactyl. One has been done for you.

(2mks)

Parental genotypes.	Probability of child with polydactyl
Bb X BB	
Bb X bb	0.5
Bb X Bb	

c) State the two types of variation (2mks)

3. Cuban pond weed (*Elodea cubiensis*) is a common water plant that produces tiny air bubbles of oxygen during photosynthesis. The number of bubbles produced per minute indicates the rate of photosynthesis. The graph shows how the rate of photosynthesis in the pond weed relates to light intensity.



a). write the equation to account for the air bubbles. (1mk)

b). Name the factor that affects photosynthesis at point A. Explain. (2mks)

c). Explain why the rate of photosynthesis does not increase any further at high light intensity.(point B) (2mks)

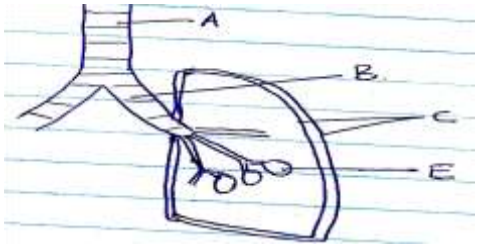
d). Explain the role of the following in photosynthesis.

i) Chlorophyll. (1mk)

ii) Water. (1mk)

e). Name one product of the light stage of photosynthesis used in the dark stage of photosynthesis. (1mk)

5. Study the diagram below and answer the questions that follow.



a) Name the part labeled A and B (2marks)

b) State the function of the part labeled C (2marks)

c) How is he part labeled E adapted to its function (2marks)

d) Identify the structure that perform the same function as one illustrated above in (2marks)
i) Amoeba

ii) Fish

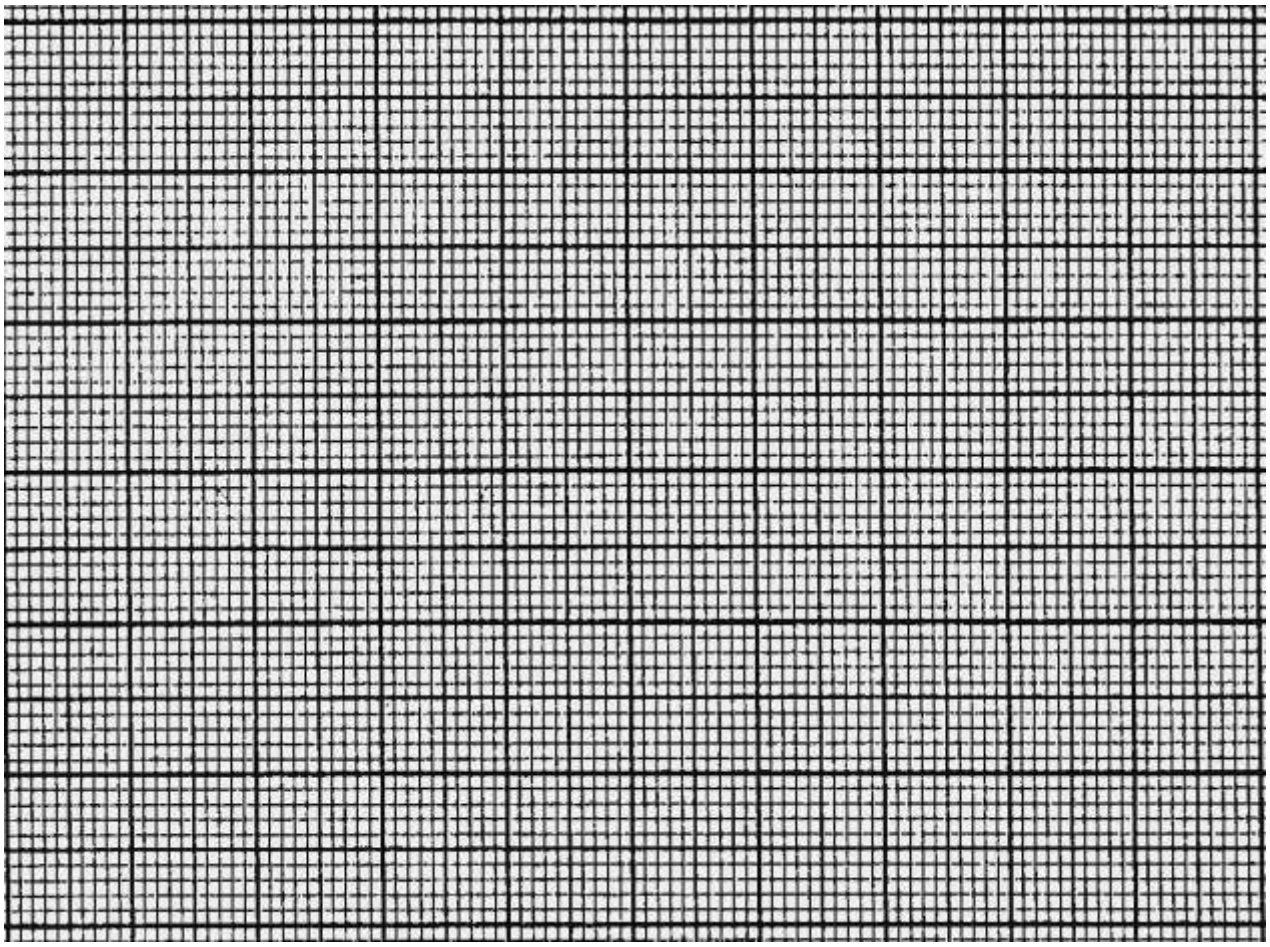
SECTION B (40 Marks)

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

6. The pressure in the flow of blood in a mammal was determined at two different vessels; A and B. The data was taken within a period of 1 minute and was presented as follows.

Time in seconds	Blood pressure in	
	Vessel A	Vessel B
0	160	320
10	165	360
20	170	320
30	180	400
40	170	360
50	160	320
60	160	360

(a) Plot the graph of blood pressure in both vessels against time on the same axis. (7 marks)



(b) Describe the trend of each curve. (2 marks)

……

……

……

(c) (I) From the graph, suggest the possible identity for:

i) Blood vessel A. (1 mark)

……

ii) Blood vessel B. (1 mark)

……..

II) Give reasons for your answer in (c) i) and ii) above. (2 marks)

……

……

……..

(d) Explain a factor that would result to an increase in blood pressure in both the blood vessels above. (2 marks)

……

……

……

(e) State **two** structural differences between the two vessels mentioned in (c) above. (2 marks)

……

……

……

……

(f) i) Name **two** diseases of circulatory system in humans. (2 marks)

……

……

ii) Other than transport of substances give one other function of blood. (1 mark)

……

7. State and explain various areas where knowledge about genetics is applied. (20mks)

8. a) Describe the process of fertilization in flowering plant. (15mks)

b) State the changes that take place in a flower after fertilization. (5mks)

……

……

……

……

……

……

……

……

……

……

……

……

……

……

……

……