NKHOTAKOTA SECONDARY SCHOOL

2018 MSCE MOCK EXAMINATIONS

Total Marks
50

BIOLOGY PAPPER II

PRACTICAL

Marks Scored

NAME:_____CLASS _____

50 MARKS

Subject Number: M022/II

Friday, March 16, 2018 **Time Allowed: 2 Hours**

Instructions:

- Write your name and class stream you belong to in the spaces created above.
- Answer all questions.
- Hand in this paper as soon as time is called for you to stop writing.

1. You are provided with specimen **Y**. use it to answer questions that follow:
   a) In the spaces provided just below, draw specimen **Y** and label any two parts [2]

b) Briefly explain how you can test for the presence of starch in the specimen.

_____

_____

_____

_____

_____ [3]

c) Starch is manufactured in leaves of specimen Y. Explain how this starch finds itself in the specimen Y.

_____

_____

_____

_____

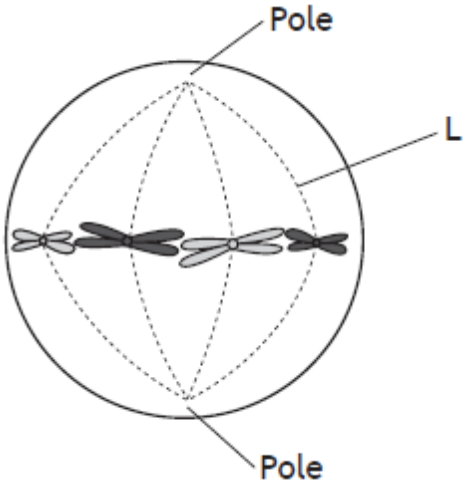
_____

_____

_____

_____ [4]

2. The diagram represents a cell during one of the stages of mitosis.



a) Name the part labelled L in the diagram.

_____ [1]

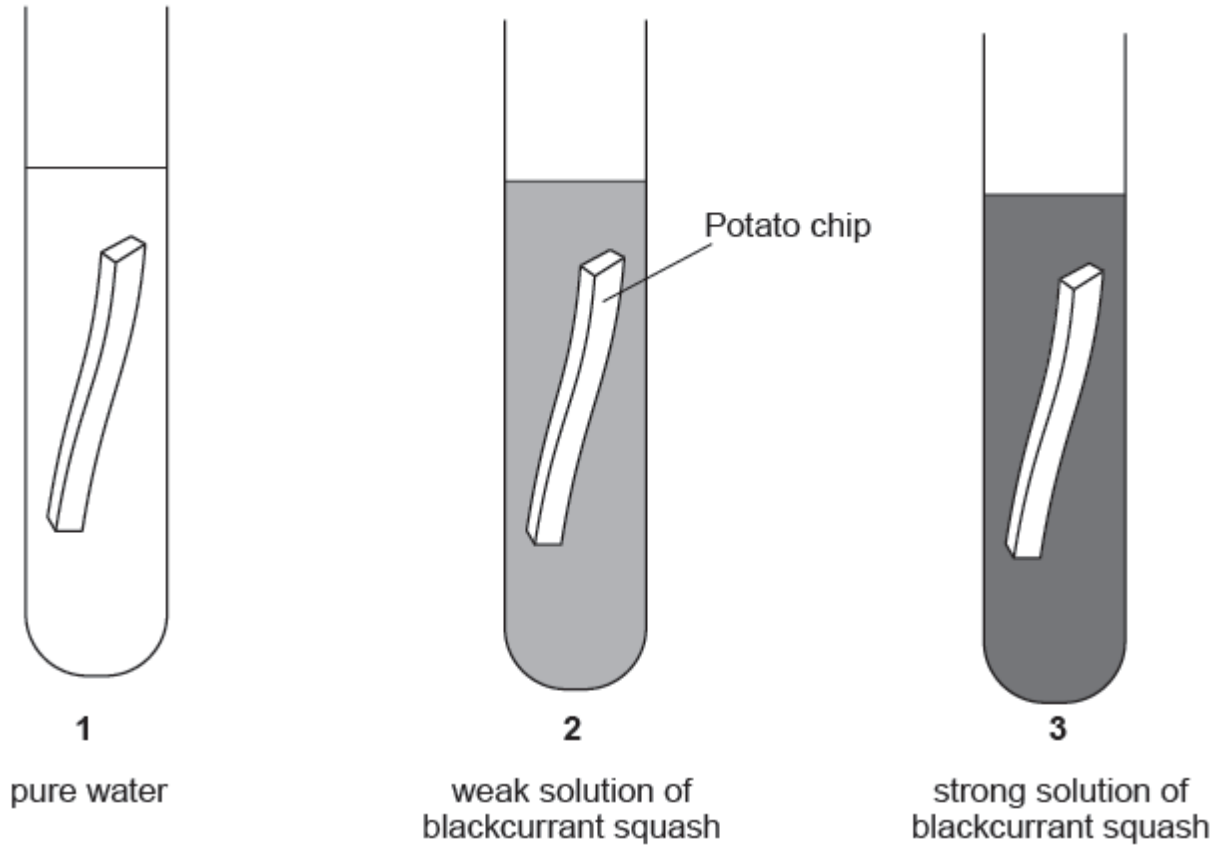
b) During mitosis a pair of chromatids was pulled apart, each moving away from the equator, towards opposite poles, at a rate of 1 micrometre per second.

Calculate the distance between them after 20 seconds.

Space for calculation

_____ micrometres [3]

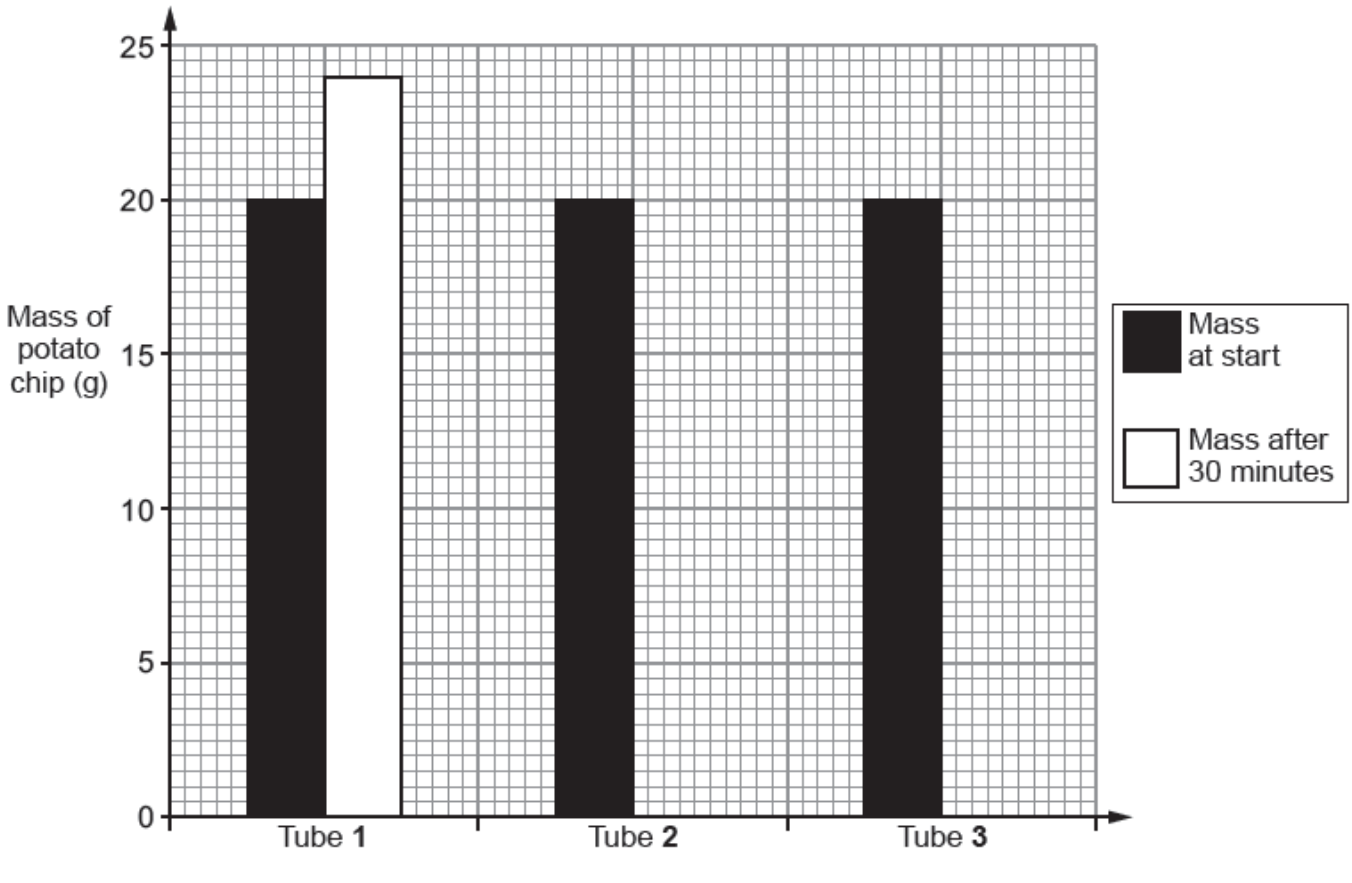
3. Form 4 students investigated osmosis in potato chips. They set up three test tubes containing blackcurrant squash and water as shown in the diagram below. Blackcurrant squash contains sugar. A potato chip of exactly the same size and mass was added to each tube.



a) State the number of the tube which contained the **lowest** concentration of **water**.

_____ [1]

b) After 30 minutes they removed the potato chips and recorded the mass of each.



Tube	Mass of potato chips at start (g)	Mass of potato chips after 30 minutes (g)
1	.....	.....
2	.....	20
3	.....	15

i. Use the bar chart to **complete** the results table above. [4]

ii. **Complete** the bar chart for tubes **2** and **3**. [2]

iii. State the number of the tube in which the concentration of water in the chips was the **same** as that in the solution, giving a reason for your answer.

Number of tube_____ [1]

Reason _____

_____ [2]

iv. Explain why the potato chip in tube 1 gained mass.

_____

_____

_____ [2]

4. Figure below is a photograph of a ground-living beetle.

a) In the spaces provided below, make a simple large drawing of this beetle.

[1]

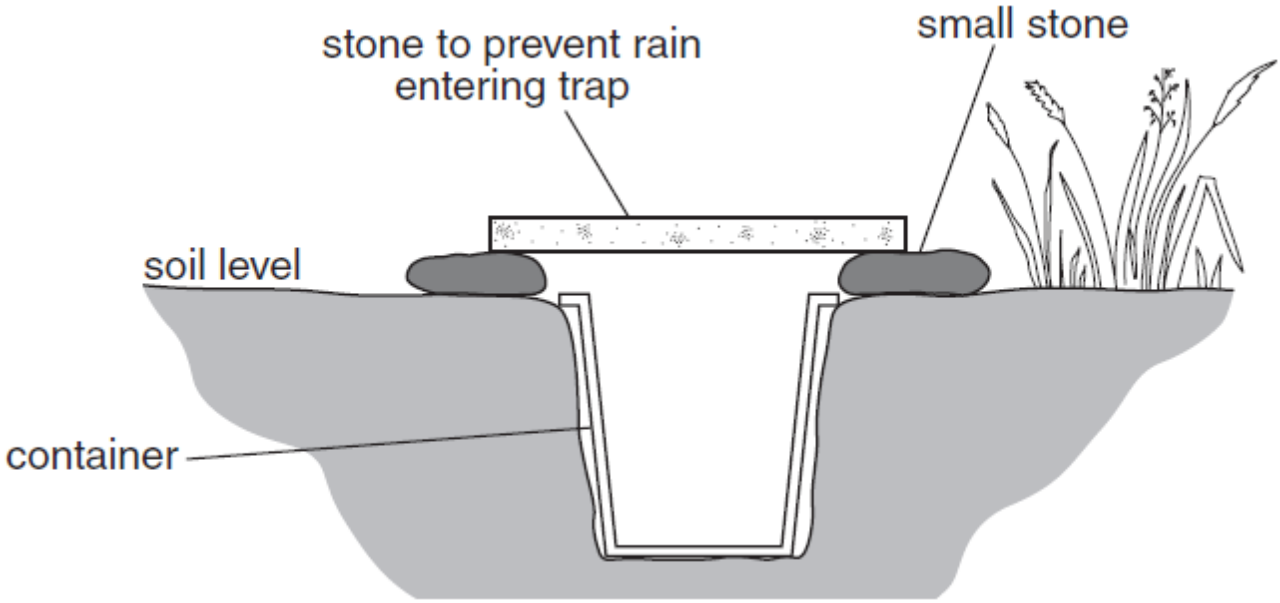
b) Measure and record:
the length of the beetle in figure above _____

the length of your drawing _____ [2]

Use the space below to calculate the magnification of the beetle in your drawing. Show your working clearly.

magnification _____ [3]

It is sometimes useful to know how many living organisms are present in a particular habitat, but impossible to catch and count them. One way of estimating how many ground-living beetles there are in a habitat is to use pitfall traps, similar to that shown in figure below.



A number of pitfall traps are placed in the habitat and left for a period of time.

- The containers in the pitfall traps are collected, any beetles in them are counted and recorded **[A]**, marked and then released back into the same habitat.
- The containers in the pitfall traps are replaced after a day and left for the same period of time as before. Again the containers in the traps are collected and the number of beetles counted and recorded **[B]**.
- The number of beetles with marks in this second group are counted and recorded **[C]**.

You are provided with a bag of maize to represent the beetles, labelled **P.**

- Remove 12 maize seeds. These represent the beetles in the first sample **[A]** and this figure has been recorded already in the table below.
- Mark each of these 12 maize seeds with a visible dot using your pencil or ball-point pen ink
- Put these marked maize seeds back into the bag. Shake the bag gently to mix these with the other maize seeds.
- Remove a handful of maize seeds and place on your desk in front of you and count them.

- Record the total number of maize seeds in this handful in the table below in column **B**.

c) Count and record separately the number of maize seeds in this handful that have been marked and record this in column **C** in the table.

A	B	C
12		

[2]

Using the **capture-release-recapture formula**, estimate the total number of 'beetles' in the bag.

Space for calculation

Estimated *number* of beetles = _____ [3]

d) Count all of the maize seeds in the bag to find the difference between your estimated number and the actual number.

actual number .....

difference ..... [2]

e) Some students used pitfall traps to estimate the number of ground-living beetles in two different habitats, an open grassland area and a shady wooded area.

They recorded the numbers of ground-living beetles caught in the traps each day for 5 days, returning the beetles to the same habitat each day. The results are shown in the table below.

day	number of ground-living beetles found in the pitfall traps	
	open grassland	shady woodland
1	12	16
2	6	15
3	8	10
4	14	22
5	10	17
6	Mean = 10	Mean = ……

Complete the table above by calculating the mean number of ground-living beetles in the shady woodland. [1]

f) Suggest **two** reasons why there were more ground-living beetles found in the shady woodland area compared with the open grassland area.

i. _____

_____ [1]

ii. _____

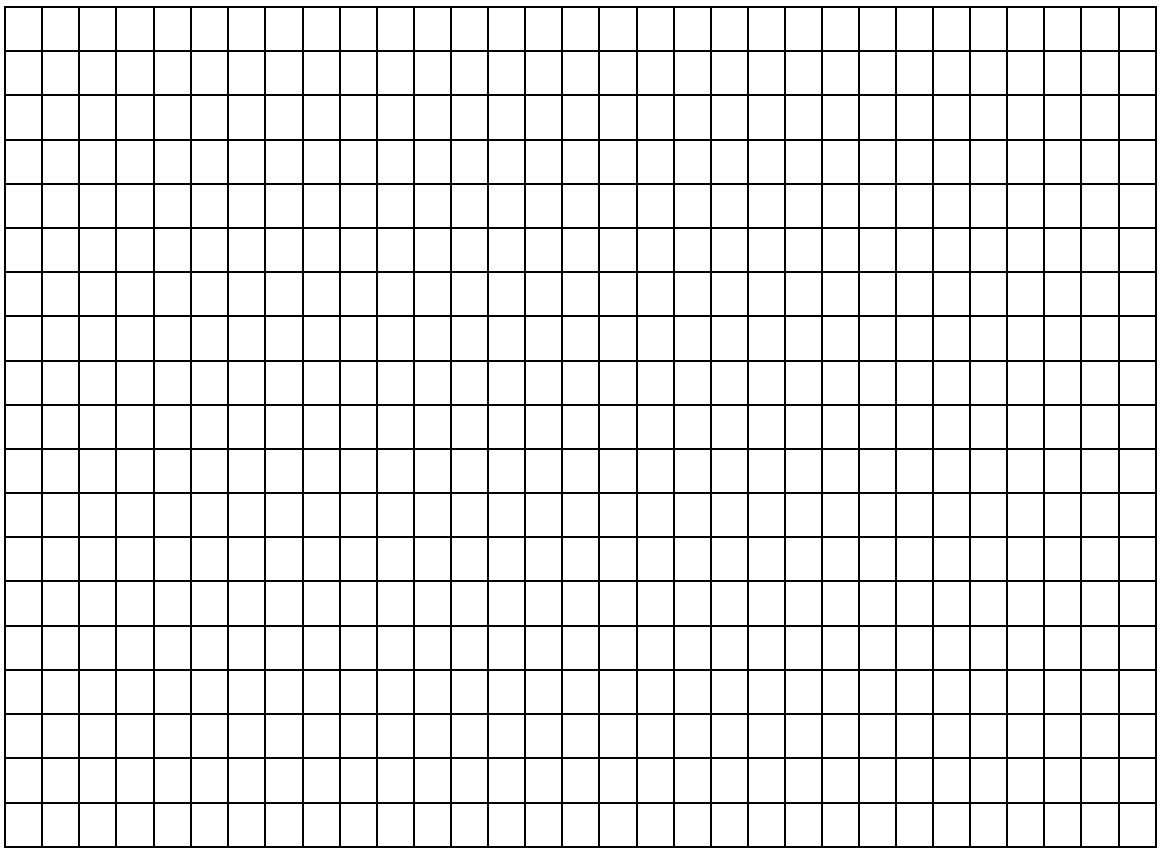
_____ [1]

g) Suggest why the number of beetles varies from day to day.

_____

_____ [1]

h) On the grid provided construct a bar chart of the two mean values. [3]



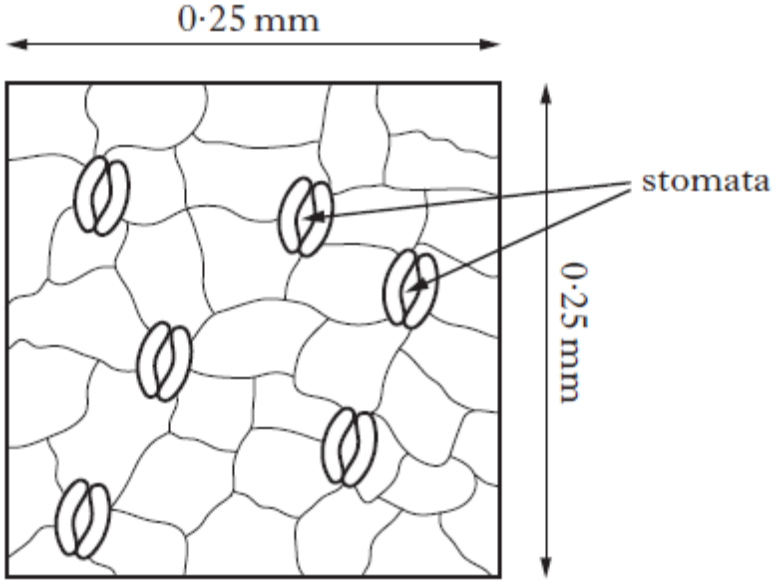
i) Suggest one reason why the results from the open and shady areas differ.

_____

_____

_____ [2]

5. The diagram below shows information about the distribution of stomata on the surface of a leaf.



Calculate the expected number of stomata present in an area of 1 mm^2.

Expected number of stomata present _____ [3]

END OF QUESTIONS