**NAME: …………………… INDEX NUMBER: ………….………………….. SCHOOL………… SIGNATURE: ………............. DATE: ………………….**

**231/3**

**BIOLOGY PRACTICAL**

**PAPER 3**

**FORM 4**

**TIME: (1¾ HOURS)**

**DECEMBER EXAM 2021**

**KENYA CERTIFICATE OF SECONDARY EDUCATION**

**BIOLOGY**

**PAPER 3**

**INSTRUCTIONS TO CANDIDATES**

* *Write your name and index number in the spaces provided at the top of this page.*
* *Answer* ***all*** *questions in the spaces provided after each question. Additional pages must not be inserted.*
* *You are required to spend the first 15 minutes of the1 ¾ hours allowed for this paper reading through the whole paper carefully before commencing your work.*
* *Candidate may be penalized for recording irrelevant information and for incorrect spelling especially of technical terms*

**For Examiners Use Only**

|  |  |  |  |
| --- | --- | --- | --- |
| **Question** | | **Maximum Score** | **Candidate’s Score** |
| **1** | | **14** |  |
| **2** | | **14** |  |
| **3** | | **12** |  |
| **Total score** | **40** |  |

***This paper consists of 6 printed pages. Candidates should check the question paper to ensure that all pages are printed as indicated and no questions are missing.***

1. Study photographs shown below then answer the questions.



**R1**

**R**

**Q1**

**Q**



**S**

**S1**



**A**

**B**

**C**

**M**

**A1**

**B1**

**C1**



(a) ***State*** the type of evolution represented by structures **Q1**, **R1** and **S1**. (1mk)

…………………………………………………………………………………………………

(b) ***Explain*** the type of evolution identified in (a) above. (1mk)

…………………………………………………………………………………………………

(c) ***Give*** the evolution term used to describe structures:

(i) **Q1, R1** and**S1** (1mk)

…………………………………………………………………………………………………

1. **A1**, **B1**and **C1** (1mk)

…………………………………………………………………………………………………

d) ***What*** type of evolution is illustrated by the limbs **A1**, **B1** and **C1**? (1mk)

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………

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e) (i) ***Name*** class for each **Q, R** and **S.**

**Q** ………………………………………………………… (1mk)

**R** ………………………………………………………… (1mk)

**S** ………………………………………………………… (1mk)

(ii) ***Give two*** observable reasons for your answer for class **S.**  (2mks)

……………………………………………………………………………………………………………………………………………………………………………………………………

(f) (i) ***Suggest*** the diet of animals **B** and **R**.

**B**……………………………………………………… (1mk)

**R**……………………………………………………… (1mk)

(ii) How is beak of animal **B** adapted to its function? (1mk)

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………

g) How are animals A, B and C adapted for thermoregulation? (1mk)

……………………………………………………………………………………………………………………………………………………………………………………………………………………………………

2. You are provided with Iodine solution, starch suspension and visking tubing.

* Wet the visking tubing in running water to soften it and make it easy to open. Tie one end of the tubing tightly.
* Using a dropper, put starch suspension into the tubing until about three-quarters full.
* Tie the open end of the tubing tightly.
* Ensure that there is no leakage at both ends of the tubing.
* Clean outer surface of the visking tubing over running water to remove all traces of starch Suspension.
* Place the visking tubing containing starch suspension into the beaker with iodine solution and leave the set up undisturbed for about 30minutes.
* Remove the tubing from the beaker and observe.

1. Record your observation in a table by indicating the colour of the solution at the beginning on at the end of the experiment. (4mks)

|  |  |  |
| --- | --- | --- |
|  | **Starch solution inside tubing** | **Iodine solution in the beaker** |
| **Start experiment** |  |  |
| **End of experiment** |  |  |

1. Account for the observations. (6mks)

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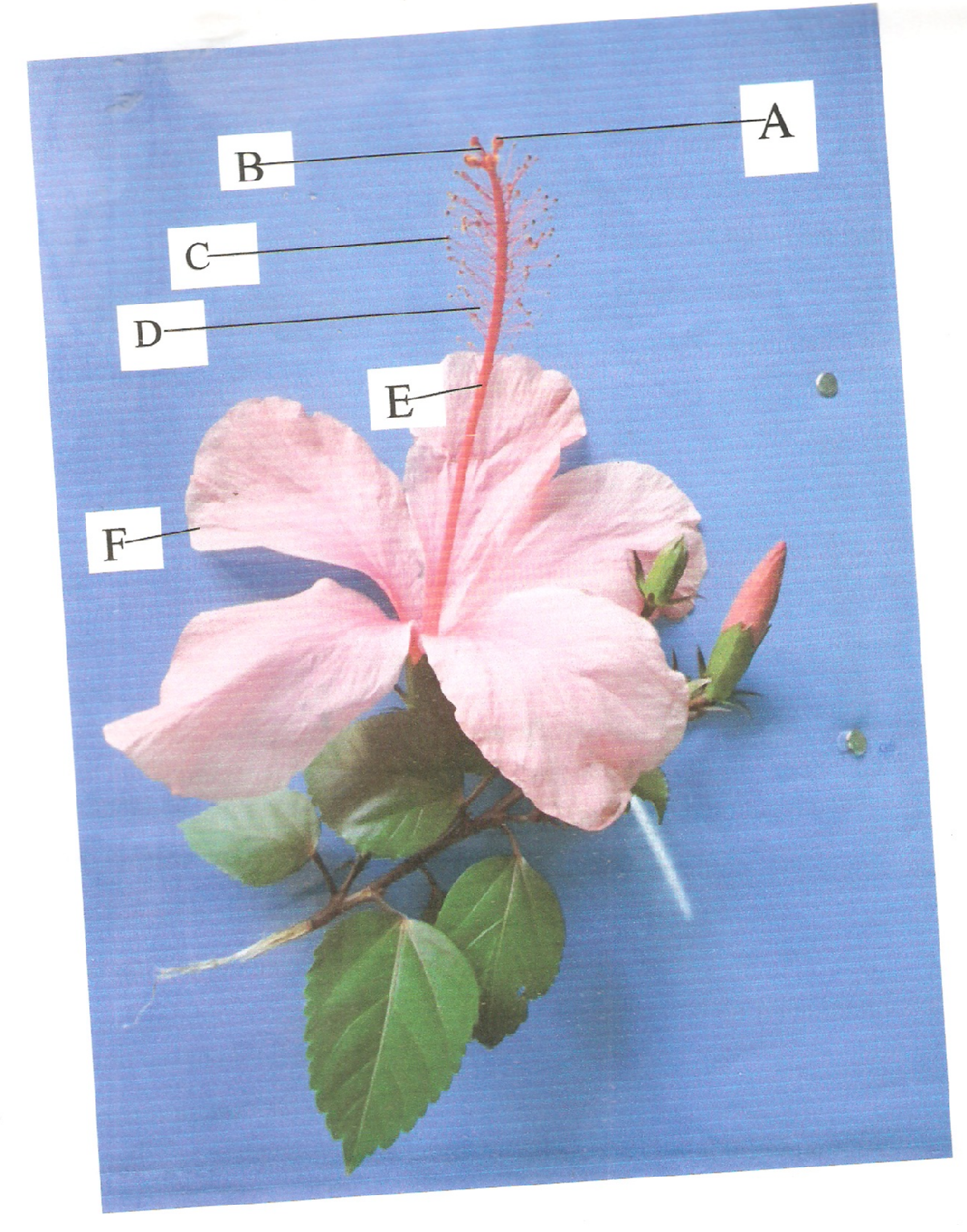
(c) Explain the modifications you could have made to realise faster results in the above experiment. (2mks)

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1. State the importance of the process under investigation in the above experiment in both plants and animals as far as reproduction is concerned. (2mks)

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1. You are provided with a photograph of a flower of a higher plant.



X

Y

1. With reasons, state the class of kingdom plantae from which the specimen in the diagram was obtained.

Class (lmk)

…………………………………………………………………………………………

Reasons (2mks)

……………………………………………………………………………………………………………………………………………………………………………………

(b) Name the parts labeled A, E, and F. (3mks)

A: ……………………………………………………………………………..

E: ……………………………………………………………………………..

F: ……………………………………………………………………………..

(c) State how the specimen shown in the photograph is adapted to its mode of pollination. (2mks)

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(d) Label the structure in the photograph which protects the flower before it blooms. (1mk)

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(e) Which letter in the photograph represents structure where the male gametes are produced. (lmk)

…………………………………………………………………………………………………………

(f) Calculate the image magnification of the leaf from point X to Y if its actual length was 2cm. show your working. (2mks)

