School	*Candidate's Name (PLEASE PRINT)*

WINCHESTER
COLLEGE

Election

2023

Science

PRACTICAL SECTION

Time allowed: ***45 minutes***

You will be given ***three minutes*** *to read the paper and check you have the correct equipment. You should not write anything during this time.*
This is ***not*** *included in your 45 minutes.*

Maximum marks = 35
+ 5 marks awarded by your invigilator for good experimental technique.

Write all your answers in the spaces on this question paper.

You may use a calculator.

You have been given a pellet which has been *regurgitated* by a Barn Owl. Barn Owls typically feed on mice, shrews, voles and field rats. The owls have no teeth to chew their *prey*, so they will usually swallow them whole. *Special proteins* produced by the stomach break down the food. The stomach muscles allow the useful nutrients (such as *proteins*, *carbohydrates*, vitamins and water) to pass into the intestine where they can be *absorbed*, but prevent the indigestible bones and hair from going any further. The bones and hair are expelled through the mouth. As the bones are no longer surrounded by the flesh, they could get stuck in the bird's esophagus. To prevent this, the stomach packs the bones with hair. This slick, cushioned package is then *regurgitated* as a pellet.

Practical procedure

1. Wear the face mask provided to prevent you inhaling any dust from the pellet.
2. Unwrap your owl pellet from the foil wrap, and place it on a white tile.
3. Using the wooden seeker, mounted needle and forceps, carefully pull apart the package of hair and bone, and separate any bones into the petri dish. You do not have time to completely deconstruct your pellet, but you must extract at least 4 different types of bone. Use the chart and diagrams in the Appendix (included as a separate booklet with this paper) to help you identify the different bone types.
   [You should spend no more than 15 minutes dissecting your owl pellet]
4. Select <u>3 different</u> types of bone which are <u>not</u> jaw bones.

   Tape each bone into a box below, and identify the bone type:

Tape bone 1 here:	*Tape bone 2 here:*	*Tape bone 3 here:*
Identify bone 1:	*Identify bone 2:*	*Identify bone 3:*

[3]

5. This is a photograph of a rodent jawbone extracted from a Barn Owl pellet:

Using the scale in the photograph, determine the actual length of the jawbone.

…… [2]

6. Calculate the magnification of the jawbone in the photograph (show your working).

……

……

…… [2]

7. (a) Suggest what type of rodent/rodents the jaw bone belonged to.

……..…

……..…… [2]

(b) Give a reason for your choice.

……

…… [1]

8. Farmers like to erect Barn Owl nest boxes near their fields to encourage owls to the area. Suggest a reason for doing this.

……

……

…… [2]

9. (a) Using a diagram, suggest a food chain which ends with a Barn Owl. [Your food chain should include <u>at least 3</u> different organisms. You do not need to draw pictures of the organisms.]

[3]

(b) Identify one *producer* in your food chain.

…… [1]

10. Swallowing a rodent whole may be like you swallowing a whole hamburger in a single bite! Suggest why Barn Owls may have to catch 10-15 animals per night at certain times of the year.

……

……

……

…… [3]

The paper continues on the next page…

11 Re-read the introductory paragraph (given below with line numbers).

1 You have been given a pellet which has been *regurgitated* by a Barn Owl. Barn Owls
2 typically feed on mice, shrews, voles and field rats. The owls have no teeth to chew
3 their *prey*, so they will usually swallow them whole. *Special proteins* produced by the
4 stomach break down the food. The stomach muscles allow the useful nutrients (such
5 as *proteins*, *carbohydrates*, vitamins and water) to pass into the intestine where they
6 can be *absorbed*, but prevent the indigestible bones and hair from going any further.
7 The bones and hair are expelled through the mouth. As the bones are no longer
8 surrounded by the flesh, they could get stuck in the bird's esophagus. To prevent
9 this, the stomach packs the bones with hair. This slick, cushioned package is then
10 *regurgitated* as a pellet.

(a) Suggest meanings for the words:

(i) *Regurgitate* (line ***1*** and line ***10***)

……

…… [1]

(ii) *Prey* (line ***3***)

……

…… [2]

(b) Suggest a name for the *special proteins* (line ***3***) produced in the stomach.

…… [1]

(c) Suggest two functions of *proteins* (line ***5***) in the owl's body.

……

…… [2]

(d) Explain how plants acquire *carbohydrates* (line ***5***) for their energy needs.

……

……

……

……

……

……

…… [4]

(e) State a common component of your diet which is missing from the list given in line ***5***.

…… [1]

(f) Describe how the owl's intestine may be adapted to aid *absorption* of nutrients (line ***6***).

……

……

……

……

……

…… [3]

Please turn over for final question

12. The scientific name of the Barn Owl is *Tyto alba*. State

(i) the Kingdom the Barn Owl belongs to:

…… [1]

(ii) the Genus the Barn Owl belongs to:

…… [1]

[Total marks: 35]

End of Practical Paper