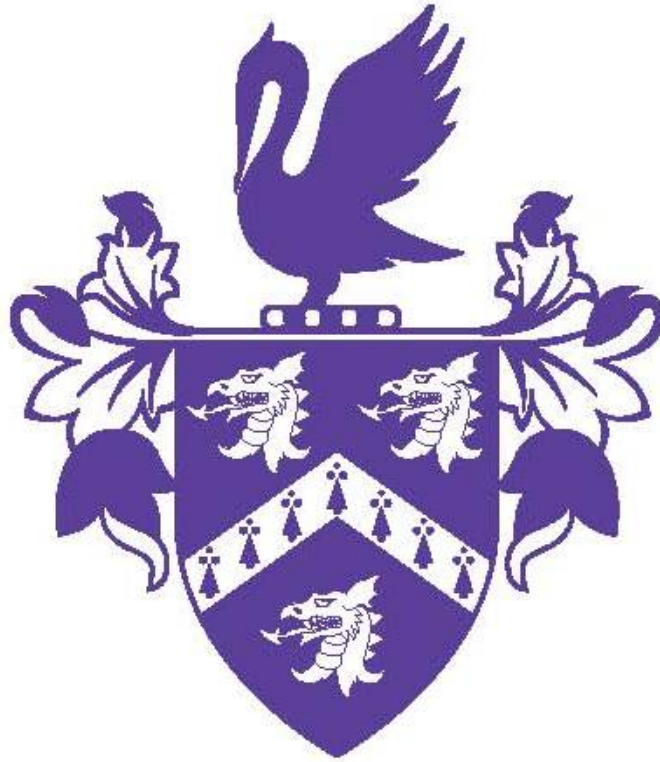


13+ English

The Perse School Entrance Test



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Time allowed: 1 hour and 10 minutes

Instructions to candidates (**please read this information before the examination starts**):

1. There are **three** sections in this paper: you must attempt all three of them. Section One is worth ten marks, Section Two is worth twenty marks and section Three is worth ten marks.
2. For Sections One and Two, read the passage below and answer the questions that follow it. Section One is **Multiple Choice** and you only need to write the question number and letter(s). For Section Two, you will need to write **extended answers** using full sentences.
3. For Section Three, write about **one** of the subjects.
4. You are **strongly** advised to spend time reading and thinking before beginning your answers.
5. Write in full sentences wherever possible.
6. Remember to leave enough time to answer all three sections properly.

A lazy afternoon in the Reptile House at London Zoo: lizards lie motionless on the floor of their cell; a chameleon occasionally shifts from one twig to another. And there is a gecko – what is his idea of relaxation? He hangs on the wall on one side of his glass-box compartment, face downwards for fifteen minutes or more, and then he moves across to do the same on the other side. It seems to cost the gecko no effort to do this; something – not his muscles – is holding him to the wall.

Geckos have always astonished everyone who has ever seen them – and that includes Aristotle, back in the fourth century BC – with their ability to run vertically up and down at will. They can scale a perfectly smooth wall, even glass, and walk across a ceiling. Whether the surface is rough or smooth, wet or dry, it is all the same to the gecko.

So, what are geckos? They are a group of nocturnal lizards, about eight hundred and fifty species in all, found across all the southern continents and as far north as southern California, southern Europe and central Asia. The gecko on which most of the research has been done is the Tokay gecko, a large Asian species.

The Tokay gecko is the prime gecko in every respect. It is three times more energy efficient than most creatures and its senses are very finely honed. For nocturnal hunting, it has enormous eyes and it can hear the movement of an insect on a wall from across the lab. Unlike other lizards, it vocalises. During the Vietnam War, it became notorious as the ‘FU lizard.’ Jumpy soldiers at night often heard a noise which sounded like the enemy taunting them in a foreign language: ‘FU, FU, FU’ it screeched. The old hands never told the new recruits about the creature until they had discovered it for themselves.

The gecko really began to yield up its secrets in the mid-1990s in Professor Bob Full’s laboratory at the University of California. Professor Full is an expert on animal locomotion and he is at the centre of collaborative efforts between different scientific disciplines and various universities. Early on, he saw the potential for robotics in the way that animals move. Much of his work has focused on insect motion – the six legged gait of creatures such as cockroaches, for example – but the gecko’s grip on vertical surfaces would obviously be attractive in a robot. One possible use of the gecko’s ability to adhere to walls is to create a climbing robot: the Mecko Gecko.

Professor Full’s approach is to find the precise principle at work in nature and then work with engineers to create technical systems that do the same job. Here, the gecko expert was Kellar Autumn, a man who had studied geckos for most of his life. Geckos are pretty amazing all round. They are nocturnal and that means that they have to be active at low temperatures. Autumn did his PH.D on the ‘energetics’ of geckos – ‘cold geckos running up a treadmill’ as he puts it. He also spent time in Tibet, collecting geckos in their natural habitat.

Although the gecko’s sticking ability is apparent to anyone who ever saw one, understanding it depends on being able to see the micro-structures on its feet. To our eyes, the pad of the foot is crossed by bands that look like a variation on standard reptile scales. An ordinary light microscope does not reveal much more: the pads seem to have some kind of bristly structure. It wasn’t until scientists had access to electron microscopes that the fine structure of the gecko’s foot was teased out.

The electron microscope shows that that there are very many bristles on the toes of a gecko: almost five hundred thousand on each foot. And more than that, the gecko has, as Autumn says, a 'bad case of split ends': the ends of the bristles fork into between one hundred to a thousand mini-bristles with enlarged and flattened spoon like endings, or spatulas. Professor Full described these spatulas as 'broccoli on the tips of the hairs'. It is these spatulas which make contact with the surface and a single gecko has about one billion of these points of the contact. A gecko's foot is, in truth, an impressive structure.

Section One

- 1) The **most appropriate** title for the article is:
 - a. The Rise of the Robotic Reptiles;
 - b. Lizards and their Sticky Feet;
 - c. Advances in Robotic engineering;
 - d. The Great Gecko Grip;
 - e. Broccoli and Spoon-shaped Toes._____ (1)

- 2) The tone of the article is **best described** as:
 - a. Excited and lively;
 - b. Amazed and informative;
 - c. Serious and boring;
 - d. Objective and thorough;
 - e. 'Conversational' and detailed.

- 3) The adjective which is **best applied** to the lizards in paragraph one is: _____ (1)
 - a. Bored;
 - b. Lively;
 - c. Peaceful;
 - d. Still;
 - e. Sluggish.

- 4) The details in paragraphs one and two **most clearly suggest** that: _____ (1)
 - a. Geckos are happy upside down;
 - b. Geckos have a magic power;
 - c. Geckos have been amazing people for centuries;
 - d. Geckos are very relaxed;
 - e. Geckos don't make much effort.

- 5) The qualities of a gecko can be described as: **(List all that apply.)**
- a. Surprising;
 - b. Premier;
 - c. Relaxed;
 - d. Adhesive;
 - e. Energy Efficient. _____ (1)
- 6) The veteran soldiers did not tell new recruits about the 'Fu Lizard'. This **strongly suggests**:
- a. They wanted the new soldiers to be scared;
 - b. They didn't know what it was themselves;
 - c. It was a form of enemy communication;
 - d. There was nothing to worry about;
 - e. New soldiers needed to get used to the jungle. _____ (1)
- 7) Professor Full works with other scientific disciplines and universities in order to develop his robots. The **best simile** to describe his position is:
- a. Like a spider in a web;
 - b. At the heart of things;
 - c. As involved as possible;
 - d. As free as a bird;
 - e. Like a lone wolf. _____ (1)
- 8) The phrase 'six-legged gait' **most strongly suggests**:
- a. A jerky movement;
 - b. A smooth motion;
 - c. An efficient movement;
 - d. A mechanical movement;
 - e. An insect movement. _____ (1)
- 9) The 'Mecko Gecko' is **best described** as:
- a. A toy;
 - b. An idea;
 - c. A slogan;
 - d. A machine;
 - e. A rock climber. _____ (1)
- 10) The quotation 'some kind of bristly structure' (paragraph 7) **implies that**: (List all which apply)
- a. Geckos have hairy feet,
 - b. There is more to a gecko's foot than meets the eye,
 - c. Scientists are unsure about what the structure is,
 - d. Geckos have special adaptations,
 - e. Geckos' feet are protected. _____ (1)

Section Two

Answer both questions. Half of the marks will be awarded for the **content** of your answers; the other half will be awarded for the **quality** of your writing.

- 1) In your own words, summarise the features which makes the Tokay Gecko special. You should write in full sentences. (10)
- 2) In what ways does the writer make the passage so **engaging** to read? Select words and phrases from the passage to support your answer. (10)

Section Three

Write about ONE of the following. Half of the marks will be awarded for the **content** of your writing; the other half will be awarded for the **quality** of your writing.

The Experiment (10)

The Supermarket (10)

The Concert (10)