

**St. Joseph’s College (Autonomous)**

**III Semester B.Sc Examination — December 2022**

**L1 General English (NSA Special course) L1 GE- 322**

Time allotted: 2 hours Max Marks: 60

**Instructions**

* This paper is for **III semester** students who have opted for the NSA **Special course**
* Please write **NSA Special** on the front page of your answer booklet.
* You are allowed to use a dictionary during the examination.
* This paper contains **TWO** sections and **FOUR** pages

**I. Read the below excerpt from an article by Matti Friedman in the Smithsonian Magazine**

It’s possible to divide the world in two: the part that venerates the humble-seeming fruit known as the date, and the part that does not. The part that does is home to hundreds of millions of people, from the Atlantic coast of Morocco across North Africa and Egypt to Mesopotamia. In this part of the world there aren’t really “dates,” because only a philistine would speak in such generalizations. There’s the plump sugar-bomb medjool, the chewy khalas beloved of Emirati connoisseurs, sweet and sticky Saudi sukkary, tart yellow barhi peeled and eaten fresh, the varieties picked early, called rutab, and served frozen with coffee at the upscale cafés of Riyadh or Abu Dhabi. There’s ajwa from Medina, said to be the favorite of the Prophet, the dark Persian kimia, the translucent deglet noor, and many others with evocative names like halawi or Sagai VIP.

I grew up in the part of the world that doesn’t care (in my case, Canada), where supermarkets banish this queen of fruit to remote corners of the health-food aisle with the lowly prune and the most obscure nuts. But I’ve spent the last three decades living and writing in Israel, part of the world where the date reigns. Now when I visit North America and see these fruits languishing on their remote shelves, it feels like climbing into an Uber with that Washington, D.C. driver who was once finance minister of Afghanistan. You can almost hear them whispering: Don’t you know who I am?

The date palm is a very old plant. Fossilized remains show that its ancestors were already flourishing 50 million years ago. It was only recently, around 4000 B.C., that enterprising humans in the vicinity of modern-day Iraq domesticated the trees. In the right conditions, a modern date palm can reach the height of a five-story building, live past 100, and produce more than 150 pounds of fruit a year.

Long before refrigeration, dried dates could keep for years, making them invaluable for travelers across seas and deserts. They can be turned into honey by boiling and straining the fruit; in fact, the biblical phrase “land of milk and honey” refers to honey from dates, not bees. They can also be fermented into liquor, like the date wine enjoyed by ancient Babylonians, according to the historian Herodotus. The tree itself was a source of fiber for ropes and baskets, fronds for shelter and shade and columns for construction. That led one rabbi to remark at least 1,500 years ago, long before environmentalism was cool, “This date palm—no part of it is wasted.”

**I. A. Answer the questions that follow in FIVE to EIGHT sentences. (3x5=15)**

1. ‘It’s possible to divide the world in two: the part that venerates the humble-seeming fruit known as the date, and the part that does not.’ Which part do you think you belong to and why?

2. “It feels like climbing into an Uber with that Washington, D.C. driver who was once finance minister of Afghanistan.” Why does the author use this analogy?

3. The article is titled, “Available Dates: A Sweet and Sticky History” What do you think the author is doing with the title? What title would you suggest for the article?

**I. B. Answer ANY ONE of the following questions in about 150 words each:**

**(1x10=10)**

4. Which of the types of dates mentioned in the article appeal to you the most? Give reasons.

5. ‘Dry fruits are linked to a range of health benefits. But the price of these food items makes them inaccessible to a large section of the population.’ Comment on the above sentences using your personal experience.

**II. Read the below excerpt from an article by Athena Aktipis published in the Scientific American**

A humpback whale is among the largest animals on this planet, now or ever. It is also a gigantic society made of quadrillions of cooperating cells. Different cell types orchestrate eating, breathing, swimming, reproduction, reacting to other animals, and all the functions that are necessary for a whale to survive and thrive. If you look inside an elephant, a person or even a saguaro cactus, you will see a similarly well-functioning cellular civilization.

Multicellular creatures evolved in the first place because cells that cooperate had advantages over loners such as a single-celled bacterium. Sharing resources allowed life-forms to become larger—a benefit that helps them resist predators—because nutrients and chemical signals that cells need could be transported around the body. Dividing labor let cells specialize and build useful parts such as a stomach or legs. And teamwork gave them the ability to maintain a healthy extracellular environment so they could live longer than they otherwise would.

But cooperation is a fragile proposition. Within multicellular life, cheaters can prosper. By hogging resources, they replicate more quickly than cooperators and take over, unless there are mechanisms to enforce cooperation. Cheating cells can take advantage of the cooperative cellular society they are living in, over proliferating, monopolizing nutrients and otherwise disrupting the harmony that makes multicellular organisms viable in the first place. This cellular cheating is what we know as cancer.

Cancer cells break the rules of normal cells. They divide when they should not, do not die when they should, rob other cells of essential supplies, shirk their cellular jobs and pollute the extracellular space. While cooperating cells curb excess growth and proliferation, cancer cells often evade growth-suppressing signals. Cooperating cells have limited lives, but cancer cells resist cell death and hide from an immune system that would typically destroy them. Normal cells distribute nutrients and chemical signals essential to survival, but cancer cells grow extra blood vessels to grab more resources for themselves. These contrasts show us that cheating is not merely a metaphor for cancer. It is a description of cancer's cellular reality.

The Cooperation Game

I was first drawn to this evolutionary interplay between cooperation and cheating when I was getting my undergraduate and graduate degrees in psychology. I wrote computer programs that tested the effects of different strategies on hypothetical populations, rather like nodes in a network. Generally, in such models, without countervailing forces such as genetic relatedness or social norms of reciprocity to keep them in line, cheaters outcompete cooperators. At first I was trying to understand what helps keep cooperation stable in human societies. But then as I looked deeper, I discovered that cellular cheating manifests as cancer and cancer like phenomena in many complex organisms, from humans to clams to cacti.

Plants, for example, exhibit cancer like protrusions called fasciations. One of the most striking examples is the crested cactus. Saguaro cacti can develop mutations in meristem cells (equivalent to stem cells in animals) on the growing tips of the plant. These lead to cell over proliferation and abnormal growths that fan out into crests. The fasciations can be quite beautiful, but like cancer in people, they can take a toll. Crested cacti often have disrupted flowering, which impairs reproduction, and are more vulnerable to disease and injury.



(Fasciations seen in Saguaro cacti)

I realized that many of these breakdowns in cellular cooperation bore an uncanny resemblance to the “hallmarks of cancer,” a framework developed by cancer biologists to describe general tendencies of malignancies. In addition to things such as excess proliferation, invasion of other tissues is one of the hallmarks of cancer, and an evolutionary approach suggests that invasion might be a consequence of cellular cheating. When cancer cells overuse resources in their local environments—producing enzymes that digest nearby tissue, for instance—the process often destroys their normal cellular surroundings. We know from ecology that organisms that deplete resources in their environments are under greater pressure to evolve the ability to move via “dispersal evolution.”

**II. A. Answer ANY TWO questions that follow in about 150 words each:**

**(2x10=20)**

6. How did the lens of ‘evolution and cellular cooperation’ give you a new insight into the way cancer works?

7. Is the target audience of the article, lay people? Is the ‘interplay between cellular cooperation and cheating’ a good way of explaining to people how cancer works?

8. “Plants, for example, exhibit cancer like protrusions called fasciations… The fasciations can be quite beautiful, but like cancer in people, they can take a toll.” Why does the author bring in a comparison in the second sentence? Are analogies important to understand complex concepts?

**II. B. Answer the following question in about 200 words. (1x15=15)**

9. Write a dramatic story featuring heroes and gangsters to explain cancer and its effects to a 10-year-old.

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