# Answer Key for Exam $\boxed{\text{A}}$

## Section 1. Short Answer Questions

1. (20 points) Please examine the sagittal sections in Figure 1 carefully and for each sagittal section, answer the following questions:

    (a) (9 points) Write down labels corresponding to the sound depicted in the figure. Describe each label briefly explaining the production of the sound in question.
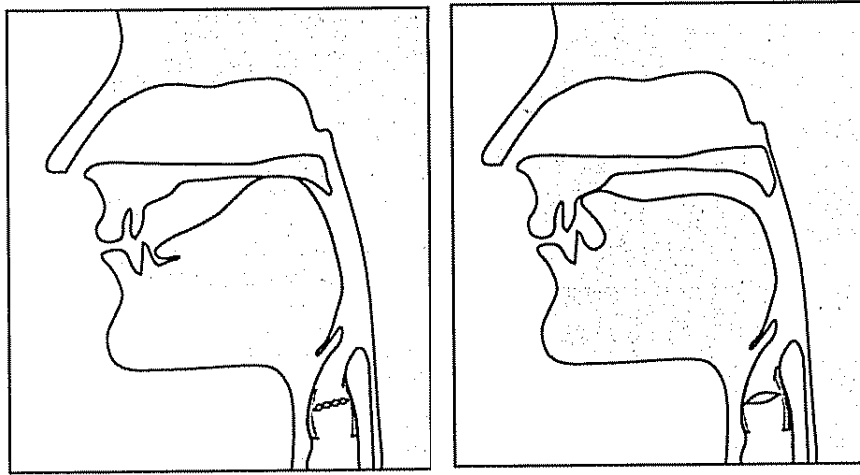    (b) (1 point) Identify the sound in question.



Figure 3: Sagittal sections

      t : Alveolar Stop Voiceless (Tip of tongue touches alveolar ridge to block the air completely in the oral tract; Vocal folds are far apart and don't vibrate strongly)

      N : Velar Nasal Voiced (Back of the tongue touches velum and air flows out through the nasal cavity through the lowered velum; Vocal folds are close and vibrate strongly)

2. (10 points) Evaluate the bee dance in terms of the following design features: Arbitrariness, Discreteness and Displacement.

(a) **Arbitrariness 4pts**: This property of language refers to the degree to which the meaning of the message is predictable from its form. The bee dance is not arbitrary in nature. This is because the characteristics of the dance actually mirror various pieces of information about the honey source. Specifically, the shape of the dance pattern indicates the approximate distance to the honey source:

1. Round pattern - Food is less than 20ft away
2. Sickle pattern - Food is located between 20 to 60ft from the hive
3. Tail-wagging pattern - Food is located greater than a distance 60ft away fomr the hive

Moreover, the repetition rate of dancing is inversely proportional to the distance from the hive. i.e. Slower dance means longer distance to the food source. Plus the angle of the dance indicates the direction towards the food source.

(b) **Displacement 3pts**: This property refers to the ability of language to communicate about things, events, actions or ideas that are not present in the immediate space or time where is the speaker is located. The bee dance encodes displacement in terms of communicating information about an object (i.e. food source) located at some distance from the hive. However, the dance cannot signify displacement in terms of time i.e. as to whether the food source was discovered a day ago or an hour ago. There is also an absence of creativity as when a bee was made to walk to the hive, it reported longer distance but the special circumstance of travel was NOT present in the message.

(c) **Discreteness 3pts**: The property of language by which the message is constructed by combining smaller units to form bigger units. This property can be considered to be absent from the bee dance. It is not the case that the dance can be split into constituent units which have been combined by means of rules.

(5 points) What evidence do we have that modern human languages resulted from adaptation and natural selection?

3.
- It is generally agreed that modern language abilities, most specifically the ability to produce spoken language, would not have been possible without two modern human characteristics: (a) A vocal apparatus that allows for the production of a variety of distinct speech sounds (phonemes); and (b) The ability to exert a high degree of very fine control over that vocal apparatus

- Fossil evidence for the above

4. (5 points) What is the criticism of the above view of language evolution?

- "all-or-nothing" view of language evolution

- Reverse engineering

- Hard to argue that stable and uniform selective pressures (hunting, sociality, technology) that could have shaped the human physiology across all diverse regions

(20 points) Analyze the Greek data shown in Figure 2 and answer the questions there.

The sounds [k] and [x] are contrastive, e.g., [kano] 'do' versus [xano] 'lose'. The sounds [c'] and [c] are contrastive, e.g., [c'ino] 'pour' versus [cino] 'move'. The sounds [k] and [c] are in complementary distribution: the palatal stop appears before front vowels, whereas the velar stop appears elsewhere. The sounds [c'] and [x] are in complementary distribution, patterning in a parallel fashion with the stops, i.e., palatal before front vowels, but velar elsewhere.

5.

Modern Greek is an Indo-European language spoken in Greece. Examine the sounds [x], [k], [ç], and [c] in the following data. [k] represents a voiceless velar stop, [x] a voiceless velar fricative, [ç] a voiceless palatal fricative, and [c] a voiceless palatal stop. Which of these sounds are in contrastive distribution, and which are in complementary distribution? State the distribution of the allophones.

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| **a.** | [kano] | 'do' | | **j.** | [kori] | 'daughter' |
| **b.** | [xano] | 'lose' | | **k.** | [xori] | 'dances' |
| **c.** | [çino] | 'pour' | | **l.** | [xrima] | 'money' |
| **d.** | [cino] | 'move' | | **m.** | [krima] | 'shame' |
| **e.** | [kali] | 'charms' | | **n.** | [xufta] | 'handful' |
| **f.** | [xali] | 'plight' | | **o.** | [kufeta] | 'bonbons' |
| **g.** | [çeli] | 'eel' | | **p.** | [çina] | 'goose' |
| **h.** | [ceri] | 'candle' | | **q.** | [cina] | 'china' |
| **i.** | [çeri] | 'hand' | | | | |

Figure 4: Greek data