

Panini Linguistics Olympiad 2017 (SENIORS)

Solutions

Problem #1: Akamu's Table

Box Number	Word	Box Number	Word
(a)	<i>kolu</i>	(g)	<i>iva</i>
(b)	<i>iwa</i>	(h)	<i>rua</i>
(c)	<i>rima</i>	(i)	<i>toru</i>
(d)	<i>'ua</i>	(j)	<i>tolu</i>
(e)	<i>'ima</i>	(k)	<i>fa</i>
(f)	<i>hitu</i>	(l)	<i>valu</i>

Explanation:

The vowels remain exactly the same across the languages. The pattern across consonants is described by the columns in the following table:

	Col1	Col2	Col3	Col4	Col5	Col6	Col7	Col8
Hawaiian	k	h	\$h	l	m	n	?	w
Maori	t	h	\$wh	r	m	n	?	w
Nuku Hiva	t	h	\$h	'	m	n	?	v
Rarotonga	t	'	\$'	r	m	n	ŋ	v
Samoa	t	s	\$f	l	m	n	ŋ	v

Note that column three (characters beginning with \$) indicates consonants that are placed at the beginning of a cardinal number. Maori and Samoa treat the consonant at the beginning of their words differently than the other three languages.

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Problem #2: Circles and Dots

Assignment Number: Question Instruction: No part marking	Your Answer
2: Among the schemes 6, 7 and 8, which one(s) has/have the same problem as 1, 3 and 5?	6
3: Any prefix code will avoid the problem that schemes 1, 3 and 5 have. TRUE or FALSE?	TRUE
4: For a code to be useful, it must be a prefix code. TRUE or FALSE?	FALSE

Explanation

The codes are not uniquely decodable. That is if a sequence is presented in the code, it is possible to have multiple corresponding words.

Examples (many answers are possible):

Scheme 1: ○○⊙ = D or FG

Scheme 3: ○• = G or BA

Scheme 5: ⊙•○○○○ = AF or DG

Assignment 3:

In a prefix code, if the first n characters code for, let's say X , then there is no other character Y that is coded by the first $n-i$ or $n+i$ characters for all $i > 0$. Hence, the first n character has to represent X . The same logic can be applied, by induction the rest of the string after taking out X . In this way, the whole string can be uniquely decoded.

Assignment 4:

All prefix codes are uniquely decodable, but all uniquely decodable codes are not necessarily prefix codes. For instance scheme 2 is NOT a prefix code (B a prefix of E) but it is uniquely decodable because one can apply the same logic as above but from the end of the string. Since no code is a suffix of another string, such a scheme can also be uniquely decoded.

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Problem #3: The Matses Hunter Boy

Assignment 1: Write down the number (1 to 6) of the Matses sentence next to the scenarios (A to F) that it corresponds to.			
Scenario	Matses sentence #	Scenario	Matses sentence #
A	6	D	1
B	4	E	3
C	5	F	2
Assignment 2: Write down the Matses translations.			
a) They passed by.	<i>kuen-nëdak-onda-şh</i>		
b) Non-Matses Indians built a hut.	<i>matses-utsi bëste-wa-nëdak-o-şh</i>		
c) Matses Indians built a hut.	<i>matses bëste-wa-ak-o-şh</i>		

Explanation:

Assignment 3:

Translation: *Abhishek built a hut.*

The actual translation is : "I (the speaker) **found out long ago** that Abhishek built a hut a **long time before that.**"

Any scenario that meets the following two criteria will work :

1. The speaker found out that Abhishek built the hut a long time after Abhishek built it.
2. The moment of discovery (when the speaker found out about Abhishek building the hut) happened a long time before the present moment.

E.g. The speaker can utter this sentence in 2020 if Abhishek had built the hut in 2000 and the speaker found out about it in 2010.

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Assignment 4:

4a. Tense and evidentiality:

	Recent past	Distant past
When did the event occur? (with reference to my discovery of the event) Tense marker	ak	nēdak
When did I “discover” or gain knowledge about the event? (with reference to current time, i.e. time of speech) Evidentiality marker	o	onda

4b. Distinguishing between recent past and distant past

Based on the data of the problem, recent past includes everything from the immediate past to a few days ago. The distant past includes everything before a few days ago.

4c. Morphology, Syntax, Vocabulary:

- SOV : Subject_Object_Verb
- subject*_object_verb_tense marker_evidentiality marker_person marker/ʃh
 - subject is optional (null subject) if the subject is
 - 3rd person pronoun i.e. he/she/it/they)
 - *There isn't enough data to tell whether the last morpheme is merely 'ʃh' or a specific grammatical person marker.*
- -utsi is used as a negation marker. (matses-utsi = non-Matses Indian)

4d.

bēste = hut; wa = to build; kuen = to pass by; chotac = foreigner; matses = Matses Indian

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Problem #4: Yash in Rwanda

Assignment 2: Translate to English
a) <i>Ibaruwa araandikwa nabogabo</i> The men are writing the letter. (OR: The letter is being written by the men.)
b) <i>Ibaruwa araandikwa numugore kuabogabo</i> The woman is writing the letter for the men. (OR: The letter is being written by the woman for the men.)
c) <i>Abogabo barabonera umugore abohungu</i> The men are seeing the boys for the woman.
Assignment 3: Translate to English
d) <i>Ikarumu araandiishwa ibaruwa numagabo</i> The man is writing the letter with the pen. (Or something semantically equivalent)
e) <i>Abogore barabonerwa abohungu numugabo</i> The man is seeing the boys for the women. (Or something semantically equivalent)
Assignment 4: Translate to Kinyarwanda
f) The boys are writing the book. [2 translations] Translation 1: <i>Abohungu <u>baraandika</u> igitabo</i> Translation 2: <i>Igitabo araandikwa <u>nabohungu</u></i>
g) The boy is writing the book for the women. [4 translations] Translation 1: <i>Umuhungu araandika <u>igitabo</u> <u>kuabogore</u></i> Translation 2: <i>Igitabo araandikwa <u>numuhungu</u> <u>kuabogore</u></i> Translation 3: <i>Umuhungu araandikera <u>abogogore</u> igitabo</i> Translation 4: <i>Abogore <u>baraandikerwa</u> igitabo <u>numuhungu</u></i>

Explanation:

The basic word order is S-V-(O)-(Obl). Obl stands for the oblique case marked argument (prefixed with *n-* or *ku-*).

The suffix *-er-/iish-* on the verb promotes the instrument (*n-*) or the beneficiary (*ku-*) argument respectively to the status of the primary object (and the primary object becomes the secondary object).

In other words, $S V-a O ku\text{-}Ben/n\text{-}Instr \rightarrow S V\text{-}er/iish\text{-}a Ben/Instr O$

The suffix *-wa* turns active sentences into passives. The object is promoted to subject and the subject becomes a *n*-marked oblique argument.

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In other words, S V-a O → O V-w-a n-S.

-w- can also be paired with -er/-iish-. First, -er/-iish- promotes the oblique argument to object, which is promoted to subject by -w-.

In other words:

S V-a O ku-Ben/n-Instr → S V-er/iish-a Ben/Instr O → Ben/Instr V-er/iish-w-a O n-S.

Finally, the suffix -a is added after er/iish/w.

The verb agrees with the subject (not necessarily denoted by S in the rules above; rather, the argument that precedes the verb) in number. The prefixes for number are: null for singular and b- for plural. (Alternatives such as ara- for singular, and bara- for plural are acceptable.)

Animate nouns have the prefix umu- for singular and abo- for plural. (One may also add that inanimate nouns (which only appear in the singular in this data) have the prefix i- : this is not a true generalisation for Kinyarwanda however, though it is true for this data).

Before their animacy/number prefix, nouns may also take a case marking prefix: n- for instruments/agents (“with,” or “by” or instrumental case) and ku- for beneficiaries (“for” or dative case).

The stems are:

Nouns: gabo - man, gore - woman, hungu - boy, alimu - teacher, (i)karumu - pen, (i)baruwa - letter, (i)jisho- eye, (i)gitabo - book

Verbs: kor - work, gend - go, bon - see, andik - write

(the student can also mention the stem with the prefixes ra/ara etc.- (example, rakor or araandik) provided that their prefixes for number (eg. null vs. b-) are compatible with the stems that they give)

Problem #5: Aryabhat’s Enigma

Assignment 1: Write down the numbers corresponding to the words				
Words	Numbers	Words	Numbers	Marks Total = 10
a) jāveda	600000000026	d) dāsa	108	
b) kāli	5001	e) sāhira	10130	
c) tulasī	169050			

