

# **Second International Olympiad in Theoretical, Mathematical and Applied Linguistics**

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## **Individual Contest. Solutions**

### **Problem No.1**

The direct object is expressed by a verb prefix (*i* - for first person, *a*- for the second person). There are different rules of expressing the subject in affirmative and negative sentences. In affirmative sentences, the subject is expressed by a separate pronoun (*ba* for the first person, *ga* for the second person). In negative sentences, the subject is expressed by the same prefixes as the direct object, which are connected to the verb (if it is intransitive) or to the *je* particle, which is positioned before the verb (if it is transitive and the prefix slot is already instantiated by the object prefix). In the negative form, the verb has an additional suffix consisting of *r* + the last vowel of the stem, and a negative particle *kêt* is positioned after the verb. The plural is expressed by the *mê* particle, which is positioned after the separate pronouns but before the respective prefixes.

#### **Assignment 1.**

Aje ikuru kêt	You are not devouring me
Ba mêtaku	We are devouring you <i>or</i> I am devouring you guys
Irêrê kêt	I am not swimming

#### **Assignment 2.**

You guys are not devouring us	Mê aje mêtaku kêt
We are not decorating you guys	Mê ije mêtaku anhêrê kêt
We are dancing	Ba mêtaku
I am devouring you	Ba aku

### **Problem No.2**

It is easy to see that each English title contains the word *threatens*. Therefore, all translations must have something in common. Indeed, every title says something about an undesirable possibility, expressed by different verbs in the translations. One should suppose that *threatens* is a verb acting as the predicate in every English title. The titles may be divided into two groups:

- 1) Sentences in which the object of the predicate indicates a desirable situation which is likely not to happen, which is bad (1, 2, 6, 8, 10)
- 2) Sentences in which the object of the predicate indicates an undesirable situation which is likely to happen, which is bad (3, 4, 5, 7, 9, 11)

So, the English verb apparently has two opposite meanings: "to endanger something" and "to be fraught with something". One can only tell which meaning is used in a given phrase by its context, but the titles have no context. Hence, one has to look for the translator's mistakes where it is unclear whether the situation expressed by the object is desirable or not. Apparently the situations «project funding» (1), «start of shipping season» (2), «peace process» (8) and «public security» (10) are normally desirable, while the situations «cholera outbreak» (3), «collapse of peace talks» (4), «mass piracy» (5) and «food shortages» (11) are undesirable. As for the situations of «tax reform», «arrival of reinforcements to besieged city» and «early elections», they may be either desirable or undesirable with a commensurate probability,

depending on the point of view. If one's point of view is opposite to that expressed by the translator, one can get the needed translations:

- |  |  |
|--|--|
| 6. Population Crisis in Lilliput Threatens Tax Reform.                         | 6. Population Crisis in Lilliput Fraught with Tax Reform.                      |
| 7. Sudden Weather Change Threatens Arrival of Reinforcements to Besieged City. | 7. Sudden Weather Change Endangers Arrival of Reinforcements to Besieged City. |
| 9. Unexpected Event in Country of Houyhnhnms Threatens Early Elections.        | 9. Unexpected Event in Country of Houyhnhnms Endangers Early Elections.        |

### Problem No.3

Consider the four English words: beard, widow, word, red, and the four corresponding Latin words: barba, vidua, verbum, rubrīca. Note that all of the English words contain the *d* sound. Since this sound is the only one occurring in all four words, and since it sounds closest to *dh*, it would be natural to assume that it is this very sound that replaced *dh* in the Latin words cognate to the English ones. At the same time, three of the four Latin words have *b* in that position, and only one of them has *d* there. As for the rest of the words, one of them contains a *b* (*glabra*), and four of them contain a *d* (*dīvidit*, *mandere*, *mordāx*, *mediocris*). Five words remain unexamined: *fūmus*, *fracēs*, *fovēre*, *falx* and *fingo*. If one notes that all these words begin with an *f*, and in all words with a *b* it is positioned either before or after an *r*, one can distribute the words into three groups with respect to different cases of the assumed transition of *dh* into other sounds:

- 1) At the beginning of a word, *dh* was replaced by *f*.
- 2) After or before *r*, *dh* was replaced by *b*.
- 3) In the remaining cases *dh* lost its aspiration and was replaced by *d*.

**Assignment 1.** The *dh* sound could not have occurred in *mordāx*: there is neither an *f* nor a *b* in this word, and the *d* cannot be the result of *dh* transition, since next to *r*, *dh* would have yielded *b*.

**Assignment 2.** The *dh* sound could not have been there in *brevis* (at the beginning of the word *dh* would have yielded *f* even before *r*, as in *fracēs*); in *gurdus* (after *r*, *dh* would have yielded *b*); and in *dēbeo* (at the beginning of the word *dh* would have yielded *f*, and in the middle, in the absence of *r*, it would have yielded *d*).

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### Problem No.4

In the Lakhota words that appear in the problem and the assignments there are pairs and triples of words differing in fricative consonants, which may be sibilants (*s*, *z*), hushes (*š*, *ž*), or velars (*x*, *γ*), with voiceless consonants corresponding to their voiceless variants, and voiced consonants corresponding to their voiced variants. These data may be summarized in a table:

words with sibilant fricatives	words with hushing fricatives	words with velar fricatives
kīza	Kīža	
'a single high-pitched tone sounds'	'a blending high-pitched tone sounds'	
	Žata	
	'it (e.g. a road) forks into two parts'	
suza	Šuža	xuya
	'it is badly bruised'	

zi	ži	γi
‘it is yellow’		‘it is brown’
	m'niža	m'niya
	‘it is curled but can be smoothed again’	‘it is shrunk permanently’
g <sup>c</sup> leza		g <sup>c</sup> leya
‘it is ruled:    ’		‘it is striped: ■■■’
		Nuya
		‘it is hard and immovable (e.g. a gnarl on a tree)’
	šli	
	‘thick liquid is being squeezed out’	
k'eza		k'eya
	p <sup>h</sup> ešniža	

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The words in each pair or triple are close in meaning but have the following property: as we proceed to the right in this table (and the farther from the fore-part of the mouth are pronounced the fricative consonants of the word), the higher in quantity or degree is some parameter: more sounds, darker colour, more serious damages, wider stripes.

#### Assignment 1.

- ‘it has a slight bruise’ and ‘it is fractured’ are similar to ‘it is badly bruised’ (šuža), but the damage is less serious in the former and more serious in the latter (suza and xuya, respectively).
- ‘surface is in a scratched condition’ and ‘the surface is in a scraped condition’ make a pair (k'eza and k'eya, respectively).
- ‘it sparks’ is translated by process of elimination (p<sup>h</sup>ešniža).

**Assignment 2.** ‘a thin liquid is being squeezed out’ is sli; ‘it is soft and movable (e.g. an enlarged gland under the skin)’ and ‘it is semi-hard and movable (e.g. a cartilage)’ are nuza and nuža, respectively; ‘it is red hot’ is p<sup>h</sup>exniya, ‘it is branching into several directions’ is γata (there is more branching than if something forks into two parts).

**Assignment 3.** ‘it is brown and yellow (dark yellow, tawny)’.

#### Problem No.5

It is easy to note that the left column lists only intransitive verbs and the right column only transitive ones. If a verb in the left column means ‘X’, its counterpart in the right column means ‘to cause X’ (i.e. it expresses a so-called causative meaning). Apparently, the Chuvash verbs in each pair have the same root, but one cannot determine which of the two verbs is primary and which is derived from the primary verb using a suffix: in some pairs, the intransitive verb is shorter, and in others the other way round. If one admitted truncations, one would have to formulate rules with exceptions. Consider e.g. the verbs čühen and věren, which have the same structure, but different behaviour: one is truncated to form the transitive verb (čühe), the other is constructed using a suffix (verent).

One may assume that the given pairs of verbs are different: in some cases, the intransitive verb is formed from the corresponding transitive one (e.g. čühen from čühe), in others, the reverse is true: the transitive verb is formed from the corresponding intransitive one (e.g. verent from věren). Let us determine which suffixes are used in both cases:

- 1) When the intransitive verb is formed from the transitive one, the *-ăń/-ěń* suffix is used if the initial verb ends with a consonant, and the *-n* suffix is used if the initial verb ends with a vowel.
- 2) When the transitive verb is formed from the intransitive one, the *-ar/-er* suffix is used if the initial verb ends with an obstruent consonant (*ç, t, k*), or *-t* suffix if the initial verb ends with a resonant consonant (*n, r*) or a vowel (so-called dissimilation of consonants).

The choice of the vowel in the suffixes depends on the vowels of the root. If the root has back vowels (*a, ā, u, y*), then the suffix also has a back vowel (*a, ā*); if the root has front vowels (*e, ē, ü, i*), then the suffix also has a front vowel (*e, ē*). This is the so-called vowel harmony.

Finally, we have to determine when the intransitive verb is initial and the transitive verb is derived, and when the reverse is true.. However, no dependence either on the sounds of the word or on its meaning can be found. Hence, in some cases one cannot fill in the gaps univocally: e.g. *pytar* may be a form of a verb *pyt* as well as an initial verb, from which a transitive verb *pytarăń* is derived.

**Assignment.** In cases when it is impossible to re-establish the Chuvash form univocally using the material of the problem alone, both options are given, and the first one is always the real form existing in the language.

Aman	to be crippled	amant	to cripple
Aptra	to suffer	<b>aptrat</b>	to torment
Avăń	to be flexible	av	to bend
Çet	to get lost	çeter	to lose
Çit	to reach	<b>çiter</b>	to lead
čühen	<b>to be rinsed</b>	čühe	to rinse
hupăń	<b>to be closed</b>	<b>hup / hupăńt</b>	to close
hurăń	to lie (e.g. on the table)	hur	to lay (e.g. something on the table)
kaç	to move (e.g. from one flat to another)	<b>kaçar</b>	to transport
kăvakar	to become blue	kăvakart	to make blue
kuç	to migrate	kuçar	to resettle
puçtarăń	to get together	puçtar	to gather
shăń	<b>to be frozen</b>	shănt	to put on ice
taptan	to be trampled	tapta	to trample down
tupăń	to be found	tup	to find
uçăń	to be revealed	uç	to reveal
ük	<b>to fall</b>	üker	to drop
vacka	to be in a hurry	vackat	to precipitate
varalan	to be smirched	varala	to besmirch
vĕre	to be boiling	vĕret	to boil (e.g. water)
vĕren	to learn	verent	to teach
vităń	to be covered	vit	to cover

<b>kěr / kěrten</b>	to enter	kěrt	<b>to introduce</b>
<b>pytaran / pytar</b>	to hide oneself	pytar	to hide ( <i>something</i> )