# en(A)

# Thirteenth International Olympiad in Linguistics

## Blagoevgrad (Bulgaria), 20–24 July 2015

Individual Contest Solutions

**Problem 1.** Nahuatl:

- 1: *cë*, 2: *öme*, 3: *ëyi*, 4: *nähui*;
- 5: *mäcuïlli*, 10: *mahtlactli*, 15: *caxtölli*;
- $\alpha \times 20^\beta, 1 \le \alpha \le 5, 1 \le \beta \le 3$:

| $\alpha$ | |
|---|---|
| 1: | *ceM* |
| 2: | *öm* |
| 3: | *yë* |
| 4: | *näuh* |
| 5: | *mäcuïl* |

-

| $20^\beta$ | |
|---|---|
| 20: | *pöhualli* |
| 400: | *tzontli* |
| 8000: | *xiquipilli* |

;

- 7: *chicöme*;
- $\gamma + \delta$, $\left\{ \begin{array}{l} \gamma \in \{10, 15\}, 1 \le \delta \le 4 \\ \gamma = \alpha \times 20^\beta, 1 \le \delta < 20^\beta \end{array} \right\}$: $\boxed{\gamma}$-*oM*-$\boxed{\delta}$,

  $M = \left\{ \begin{array}{ll} m & \text{before } m, p, \text{ or a vowel;} \\ n & \text{otherwise.} \end{array} \right.$

Arammba:

- 1: ngámbi, 2: yànparo, 3: yenówe, 4: asàr, 5: tambaroy, 6: nimbo;
- $\alpha \times 6, 2 \le \alpha \le 5$: $\boxed{\alpha}$ tàxwo;
- $6^2 = 36$: fete, $6^3 = 216$: tarumba, $6^4 = 1296$: ndamno, $6^5 = 7776$: weremeke;
- $\alpha \times 6^\beta, 2 \le \beta$: $\boxed{\alpha}$ $\boxed{6^\beta}$;
- $\alpha \times 6^\beta + \delta, 0 < \delta < 6^\beta$: $\boxed{\alpha \times 6^\beta}$ $\boxed{\delta}$.

**(a)**

$$11^{10+1} \times 10 = 110^{5 \times 20 + 10} \quad (1)$$

$$20^{1 \times 20} \times 2 = 40^{2 \times 20} \quad (2)$$

$$67^{3 \times 20 + (5+2)} + 14^{10+4} = 81^{4 \times 20 + 1} \quad (3)$$

$$5 + 2 = 7 \quad (4)$$

$$13^{10+3} \times 3 = 39^{1 \times 20 + (15+4)} \quad (5)$$

$$5 \times 3 = 15 \quad (6)$$

$$1 + 1 = 1 \times 2 \quad (7)$$

$$1 + 4 = 5 \quad (8)$$

$$12^{2 \times 6} + 60^{36 + 4 \times 6} = 72^{2 \times 36} \quad (9)$$

$$3 \times 18^{3 \times 6} = 54^{36 + 3 \times 6} \quad (10)$$

$$6 \times 36 = 216 \quad (11)$$

$$6 + 12^{2 \times 6} = 18^{3 \times 6} \quad (12)$$

$$\overset{3\times400+4\times20+(15+1)}{1296} = 1296 \quad (13)$$

$$\overset{1\times400+1\times20+(10+2)}{432} = \overset{2\times216}{432} \quad (14)$$

$$\overset{1\times400}{400} = \overset{216+5\times36+4}{400} \quad (15)$$

$$\overset{1\times8000}{8000} = \overset{7776+216+6+2}{8000} \quad (16)$$

**(b)**
- $42 = 2\times20+2$: *öm-pöhualli-om-öme*;
- $494 = 1\times400+4\times20+10+4$: *cen-tzontli-on-näuh-pöhualli-om-mahtlactli-on-nähui*.

**(c)**
- $43 = 36+6+1$: fete nimbo ngámbi;
- $569 = 2\times216+3\times36+4\times6+5$: yànparo tarumba yenówe fete asàr tàxwo tambaroy.

**Problem 2.** Structure of the verb form:

I.
- **me-**: affirmative form, present, indicative mood,
- ROOT,
- **-pe** 'really', **-fe** 'pretend to', **-f** 'be able to', **-n** — infinitive.

In this part of the word:

1. C + -C > CəC (**de** + **-f** + **-n** > **de-f-ə-n**, **me-** + **bəb** + **-pe** > **me-bəb-ə-pe**).
2. The last syllable receives the stress if it is closed, otherwise the penultimate is stressed (**defən** > **defə́n**, **mešxepe** > **mešxépe**).
3. CéC(C)**e** > CáC(C)**e** (**méšxe** > **mášxe**, **mešxépe** > **mešxápe**).

II. **-xe** — plural, **-t** — past, **-me** — conditional mood, **-ġəm** — negative form.

Answers:

**(a)**

| | |
|---|---|
| **ʒeġén** | *to bite* |
| **medéf** | *(he/she) is able to sew* |
| **medáfe** | *(he/she) is pretending to sew* |
| **səfə́n** | *to be able to burn* |
| **megʷəš'ə́ʔe** | *(he/she) is speaking* |
| **mebə́b** | *(he/she) is flying* |

**(b)**

| | |
|---|---|
| **ẹcentχʷéfme** | *if (he/she) is able to slide* |
| **šxáfexeġəm** | *(they) aren't pretending to eat* |
| **bəbə́ft** | *(he/she) was able to fly* |
| **šxet** | *(he/she) was eating* |
| **ṭəgʷərəgʷə́peme** | *if (he/she) really is trembling* |

**(c)**

| | |
|---|---|
| **mádexe** | *(they) are sewing* |
| **mebəbə́fexe** | *(they) are pretending to fly* |
| **sə́pet** | *(he/she) really was burning* |
| **šxéfɋəm** | *(he/she) isn't able to eat* |
| **gʷəš'ə́ʔexeme** | *if (they) are speaking* |
| **meʒáɋexe** | *(they) are biting* |

**Problem 3.**

**(a)**

1. Leave the first letter in place.
2. Delete *h* and *w*.
3. Replace all consonant letters with digits (letters whose most common sounds are similar are grouped together):

| *bpv (f)* | *cgjkqs (xz)* | *dt* | *l* | *mn* | *r* |
|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 |

4. Reduce any sequence of two or more identical digits to a single digit.
5. Delete all vowels (*a*, *e*, *i*, *o*, *u*, *y*).
6. Leave only the first three digits or add zeroes on the right to make the code one letter and three digits long.

**(b)** *Allaway*: A400, *Anderson*: A536, *Ashcombe*: A251, *Buckingham*: B252, *Chapman*: C155, *Colquhoun*: C425, *Evans*: E152, *Fairwright*: F623, *Kingscott*: K523, *Lewis*: L200, *Littlejohns*: L342, *Stanmore*: S356, *Stubbs*: S312, *Tocher*: T260, *Tonks*: T520, *Whytehead*: W330.

**(c)** *Ferguson*: F622, *Fitzgerald*: F326, *Hamnett*: H530, *Keefe*: K100, *Maxwell*: M240, *Razey*: R200, *Shaw*: S000, *Upfield*: U143.

**Problem 4.** Rules:

- Word order: V P (S/O); S/O P V Poss, V P Poss; S Poss.
- V = verb (past → future: ***-bi*** → ***-ba***, ∅ → ***-jba***).
- S = subject (noun). The subject of a transitive verb gets the ending ***-ni***.
- O = object (noun).
- P = pronouns (subject + object) + tense:
  - subject:
    - 1st ***ngV-***,
    - 2nd ***nyV-***,
    - 3rd
      - intransitive verb: ***gV-***
      - transitive verb:
        - masculine ***gVnV-***
        - feminine ***ngVyV-;***
  - object: 1st ***-ngV***, 2nd ***-nyV***, 3rd -∅;

– ***V*** are vowels (past: ***i, …, i, a***; future: ***u, …, u***).

- Poss = possessed: { ‘ + ’: ***-ngu*** ; ‘ − ’: ***-wa*** } { possessor: masculine: ***-ji*** ; feminine: ***-nya*** }

**(a)**

1. ***Alayulujba nguyunyu bungmanyani.*** The old woman will find you (sg.).
2. ***Yagu gininya.*** He left you (sg.).
3. ***Janji darrangguwaji.*** The dog doesn’t have a stick.
4. ***Ngirra nya alanga.*** You (sg.) stole the girl.
5. ***Daguma nyinga.*** You (sg.) struck me.
6. ***Dirragbi ga balamurrungunya.*** She jumped with the spear.

**(b)**

7. You (sg.) will leave me. ***Yagujba nyungu.***
8. The doctor slept. ***Gulugbi ga ngunybulugi.***
9. The man will run (away) with the money. ***Juwa gu bardba gijilulunguji.***
10. He will steal the dog. ***Ngirrajba gunu janji.***
11. The girl saw you (sg.). ***Ngajbi ngiyinya alangani.***

**Problem 5.**

**(a)** $(\circ)\frac{\circ\circ}{\circledcirc}\frac{\circ\circ}{\circledcirc} \circ \frac{\circ\circ}{\circledcirc}\frac{\circ\circ}{\circledcirc}$,

$\circ$ = V (**a**, **e**, **i**, **o**, **u**)
$\circledcirc$ = VV (**aa**, **ee**, **ii**, **oo**, **uu**)

**(b)**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 36. | **war** | **is—maa—ciil** | | | **daa-** | **rood** | × |
| 37. | | **dir mi-** | **yaad** | **wa-** | **daag-** | **taan** | √ |
| 38. | | **laba-** | **daad** | **ka** | **duu-** | **diye** | √ |
| 39. | | **ka jan-** | **na-daad** | | **daa-** | **hiye** | × |
| 40. | | **adi-** | **ga i-** | **yo** | **deris-** | **kaa** | √ |
| 41. | | **diga-** | **xaar-** | **ka** | **mari-** | **yoo** | √ |
| 42. | **ciid i-** | | **yo doo-** | | **lo di-** | **raac** | × |
| 43. | | **noo-** | **ma kee-** | | **neen** | **darka** | × |
| 44. | **ka-** | **la de-** | **yaa-** | **yaa mi-** | | **yaan** | × |
| 45. | **wu-** | **xuun** | **kaa** | **dan-** | **qaa-** | **baan** | √ |