



# 3<sup>rd</sup> International Olympiad of Astronomy and Astrophysics

## Observational Competition

### Personal Information

Name:	Country:
Student Code:	

**Please read these instructions carefully:**

- 1.** All participants will receive a problem set, a writing board, a pen, a ruler and a headlight by the organizers.
- 2.** This competition consists of two parts:
  - i) Two questions on “Naked Eye observation”. You Have 12 minutes to answer these two questions.
  - ii) One question on “Using a telescope”. Each part of this question has a specific time, which is mentioned in your question sheet.
- 3.** All participants will be guided by assistants to the observing site until returning to the waiting hall. Assistants will collect the answer and problem sheets.
- 4.** **Do not forget** to fill out the boxes at the top of each answer sheet with your country name and your student code.
- 5.** You have 2 minutes to familiarize yourself with Observing ground and darkness of your environment, just before starting the exam time in observing ground.
- 6.** Examiner’s alarm will indicate the beginning and the end of each part of your exam.
- 7.** Each problem has a specific guideline which helps you during the exam.



# 3<sup>rd</sup> International Olympiad of Astronomy and Astrophysics

## Observational Competition

## Naked Eye Observations

**Time: 12 Minutes**

**You Have 12 minutes to answer the questions of the Naked Eye  
Observations (Question 1 and Question 2)**

## **Question 1**

**1.1:** Figure 1 (frame size  $\cong 100^\circ \times 70^\circ$ ) shows a part of the sky, for 22 October 2009 at 21:00 local time. Four bright stars in Perseus and Andromeda constellations are missing in this chart. Find these missing stars by looking at the sky. Then, draw a cross on the location of each missing bright star in these two constellations on the chart (i.e. figure 1). Use numbers in table 1-1 to indicate these crosses.

**Note : Polaris is indicated by “N” symbol in figure 1.**

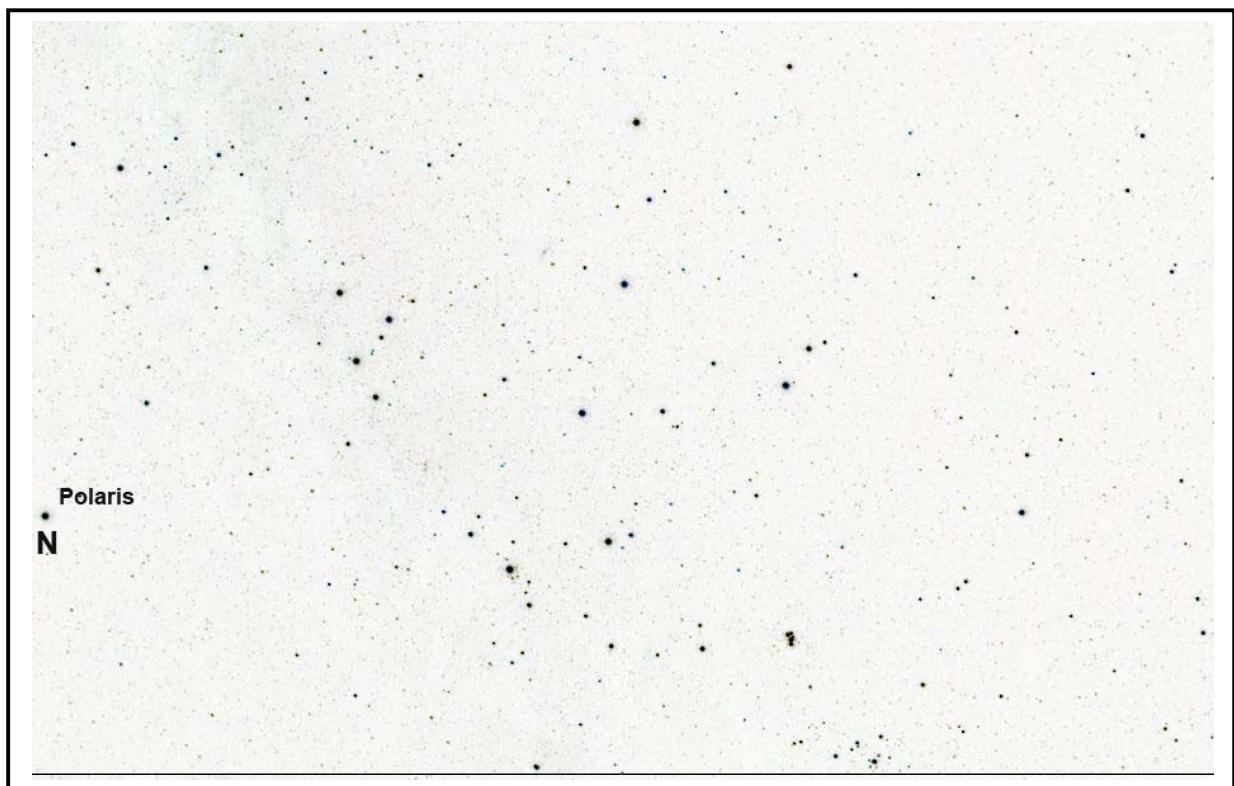
**(40 Points)**

**Table 1-1**

<b>Number</b>	<b>Common Name</b>	<b>Bayer Names</b>
<b>1</b>	Mirfak	Alpha Persei
<b>2</b>	Alpheratz	Alpha Andromeda
<b>3</b>	-	Epsilon Persei
<b>4</b>	Menkib	Xi Persei
<b>5</b>	-	Gamma Persei
<b>6</b>	Algol	Beta Persei
<b>7</b>	Almach	Gamma Andromeda
<b>8</b>	-	Delta Andromeda
<b>9</b>	-	51 Andromeda
<b>10</b>	Mirach	Beta Andromeda
<b>11</b>	Atik	Zeta Persei

Name:	Country:
Student Code:	

### Question 1 - Figure 1



## Question 2

**2.1:** Figure 2 shows a part of the sky which contains **Cephei constellation**, for 22 October 2009 at 22:00 local time. Five bright stars in Cephei constellation are identified by numbers (1, 2, ... , 5) and common names. Estimate the angular distances (in units of degrees) between two pairs of stars shown in table 2-1 and complete this table with your answers. **(40 Points)**

Tables 2-1

Angular Distance	
Pairs of stars	Angular Distance (degrees)
1 (Errai ) and 2 (Alfirk )	
1 (Errai ) and 3 (Alderamin)	

**2.2:** Use table 2-2 and figure 2, then Estimate the “apparent visual magnitude” of stars 2 (Alfirak ) and 3 (Alderamin) and complete Table 2-3. **(40 Points)**

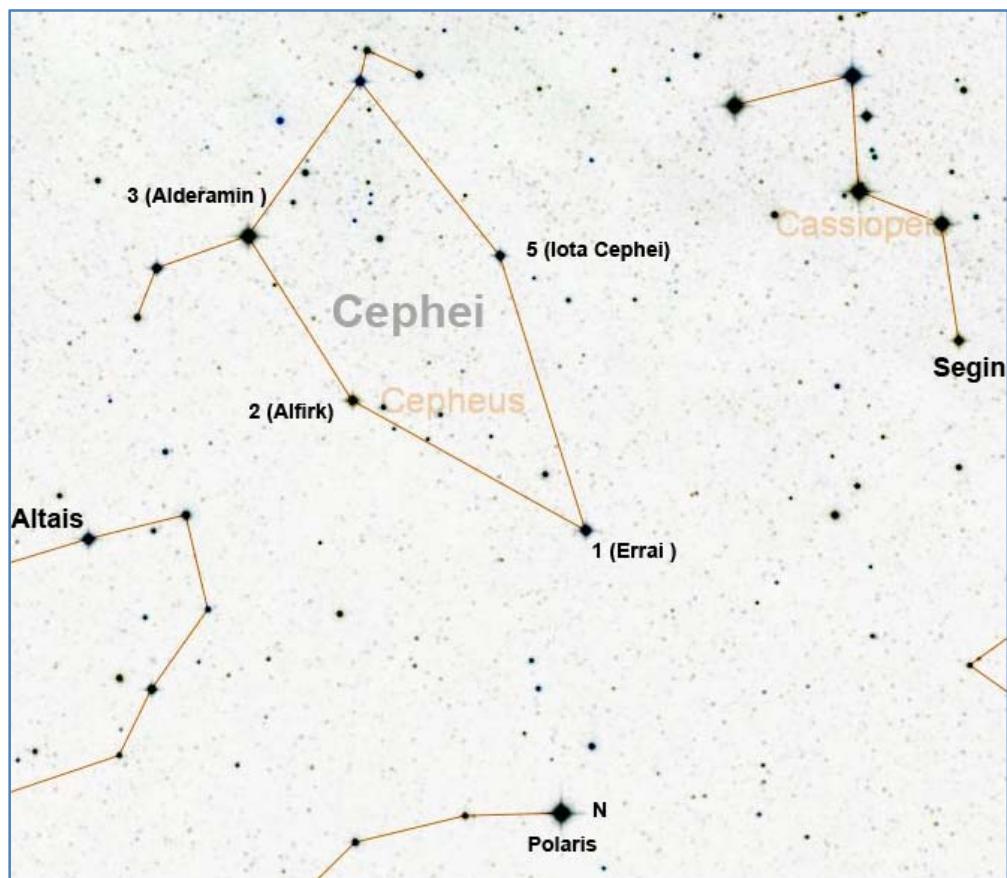
Table 2-2

Star Name	Apparent Visual Magnitude
Polaris	1.95
Altair	3.05
Regulus	3.34
<b>All of these stars, are marked in the figure 2</b>	

Table 2-3

Magnitude Estimation		
Star Number	Star Name	Apparent Visual Magnitude
2	Alfirk	
3	Alderamin	

## Question 2 - Figure 2





# 3<sup>rd</sup> International Olympiad of Astronomy and Astrophysics

## Observational Competition

## Telescopic Observations

**Time: 13 Minutes**

**Note: You have only 13 Minutes to answer all parts of this Question.**

Name:	Country:
Student Code:	Examiner Code:

### Question 3

**Before starting this part, please note:**

**The telescope is pointed by the examiner towards Caph ( $\alpha$  Cas). Please note the readings on the grade circles before moving the telescope (to be used in 3.2).**

#### 3.1:

Choose one of the 4 recommended stars listed below; write down the name of the selected star in table 3-1 and point the telescope to that star. Then, notify the examiner to check it. **(40 Points)**

- 1- Deneb (Alpha Cygni)
- 2- Alfirk (Beta Cephei)
- 3- Algol (Beta Persei)
- 4- Capella (Alpha Aurigae)

**(You have 6 Minutes to answer 3.1)**

**Table 3-1**

Name of selected star

Name:	Country:
Student Code:	

**3.2: The Telescope was parked to Caph in Cassiopeia constellation (RA: 0h:9.7m ; Dec: 59°:12'). Using the clock beside the telescope write down the local time (with the format of HH:MM:SS) in the appropriate field in Table B. Then, by using the graded circle on the telescope mount, estimate the "declination" and the "hour angle" of the target measured from South, which you chose in part one of this question. Then, complete Table 3-2. (40 Points)**

**(You have 7 Minutes to answer 3.2)**

**Table 3-2**

Name and Coordinates of the Selected Star			Local Time :
Name of Selected Star	Hour Angle (hh:mm)	Declination (°:')	