Question 1

(18 points) Using the Star Chart shown in Figure 1 draw a circumference with a radius of 8^{o} around α Corvi. You are given that the angular distance between the stars Kraz (β Corvi) and Spica (α Vir) is 17.2^{o} . Draw a circle around the stars with apparent magnitudes between 4 and 6 ($4 \leq m \leq 6$) that are within the circumference. Do not include α Corvi. You will be penalised for each star you incorrectly identify or miss in the requested magnitude range.

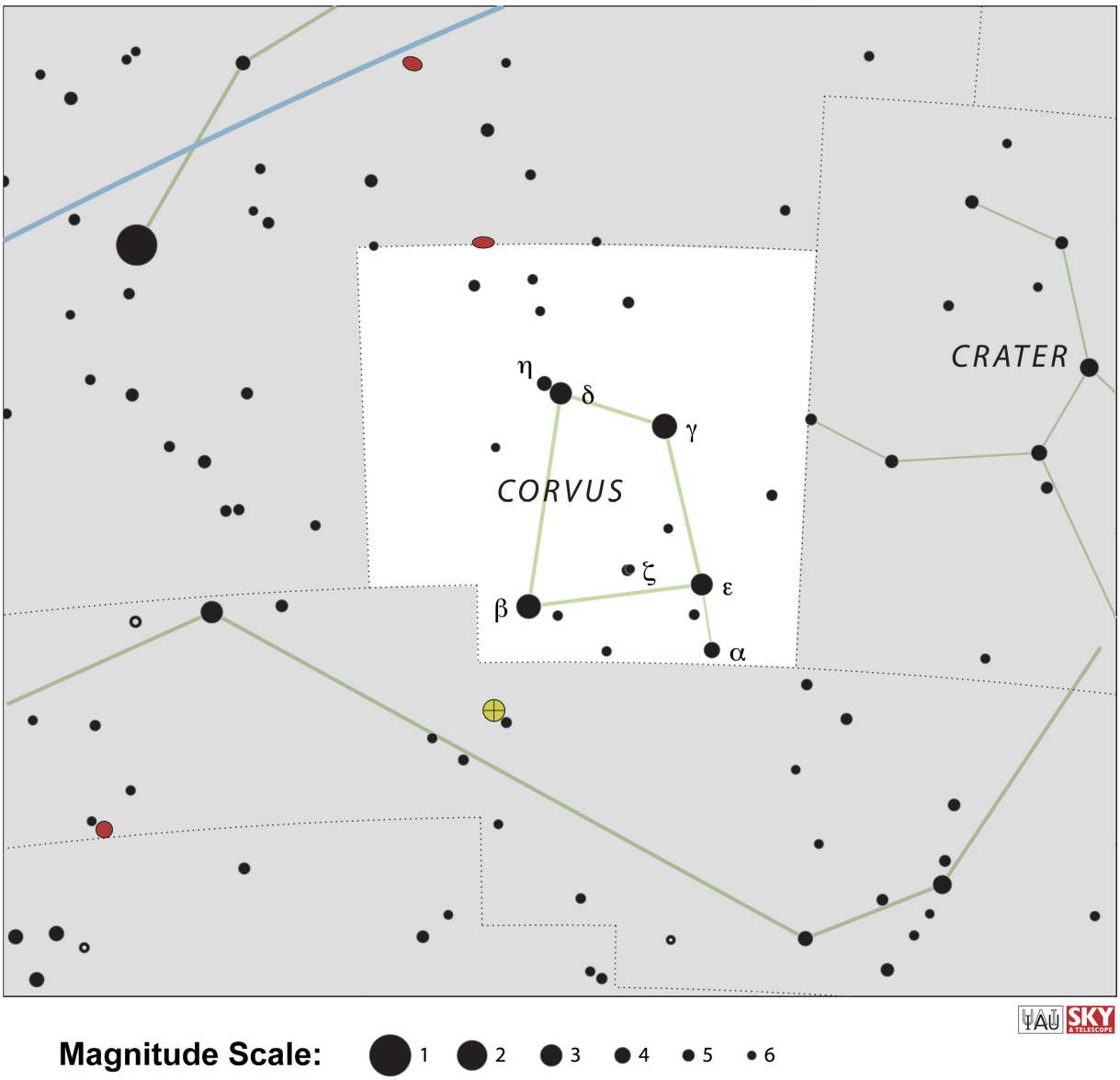


Figure 1

Question 2

Figure 2 shows an alt-azimuthal projection of the sky, with the zenith at the centre.

Figure 2

2.1) (4 points) On the Star Chart (Figure 2), identify and mark the Cardinal Points **N**, **E, S**, and **W**.

2.2) (6 points) Draw the Celestial Equator, the Local Meridian, and the Ecliptic.

2.3) (6 points) On the list below, mark an X next to the stars that are present on the Star Chart shown in Figure 2.

( ) Procyon (α CMi)

( ) Denebola (β Leo)

( ) Izar (ϵ Boo)

( ) Atria (α TrA)

( ) Tarf (β Cnc)

Question 3

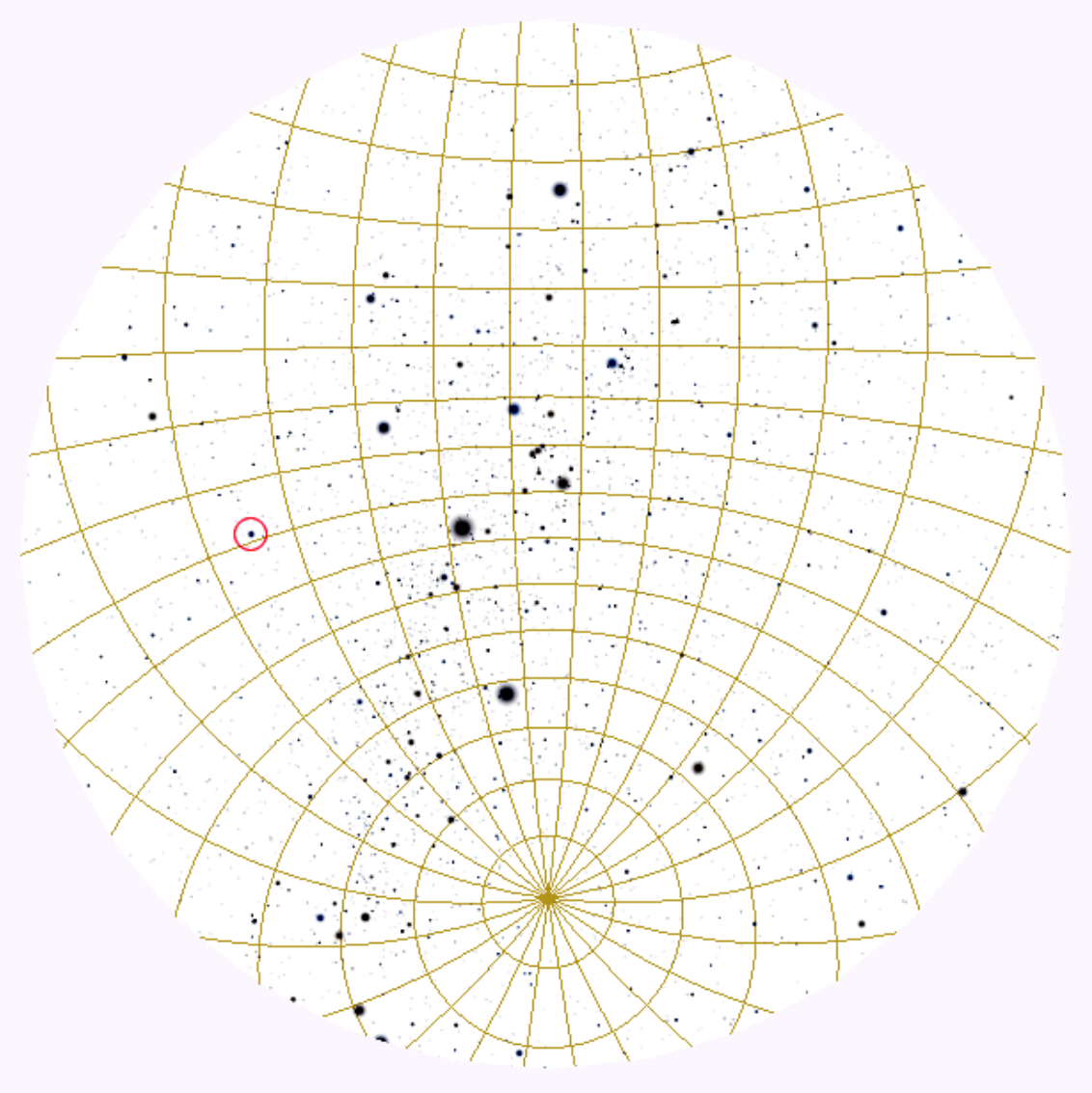


Figure 3

3.1) (7 points) Identify the star circled on the map shown in Figure 3 (use its Bayer designation) and evaluate the time when the star crosses the local meridian, knowing that this map corresponds to 23:00 local time.

3.2) (4 points) Evaluate at what time β Crucis will set below the horizon.

Observational test

This test is divided into 2 stages: Pointing & Measuring and Calculation & Identification.

Initial instructions. Read very carefully!

- In the restaurant there will be a table with the names, the order in which they will be called, and the number of the respective observation tables.
- Students will be called in groups.
- Please stand near the exit of the restaurant just before your group is called.
- When your group is called, proceed silently to your assigned observation table.
- You will only be able to open your envelope when you are at your assigned observation table.
- A signal will sound indicating the start of the first part of the test, and another signal will sound indicating the end of the first part of the test.
- Write down your values on the test sheet and at the end of the first part, stop whatever you are doing and wait for your turn to proceed to the next part. Your test sheet should be placed back into the envelope.
- Follow the instructor silently to the Examination Hall.
- Sit at your assigned table and take the second part of the test. You will be handed the envelope with the second part of the examination.
- You will be notified of the start and end of the second part.
- At the end of the second part, stop whatever you are doing and wait for instructions to leave the Examination Hall.
- Leave your papers on the table and take only your belongings with you.
- You will be guided to the waiting area and will remain there until everyone has taken the test.

First stage: Pointing & Measurement

(15 points)

- When you get to your desk, open the envelope and take out the sheet to write down your measurements.
- You will find the Galileoscope pointing to a default direction and out of focus. Consider that the telescope is already orientated with the azimuth origin at true North.
- Do not move the table or the base of the telescope on the table, nor remove the eyepiece of the telescope.
- Point the Galileoscope at the target designated by the instructor.
- Write down the altitude and azimuth data of the target.
- You will have 10 minutes to complete the task.
- Put your answer sheet inside the envelope and deliver it to the instructors at the Examination Hall.

1) Write down your measurements:

Target Altitude (h)	
Target Azimuth (A)	

Second stage: Calculation and Identification

(15 points)

- Using the Horizontal Coordinates h and A, Geographical Coordinates of the telescope λ and ϕ and the Local Sideral Time LST given below, calculate the right ascension and declination of the star in question.

  $\phi = 30^o01'$ S

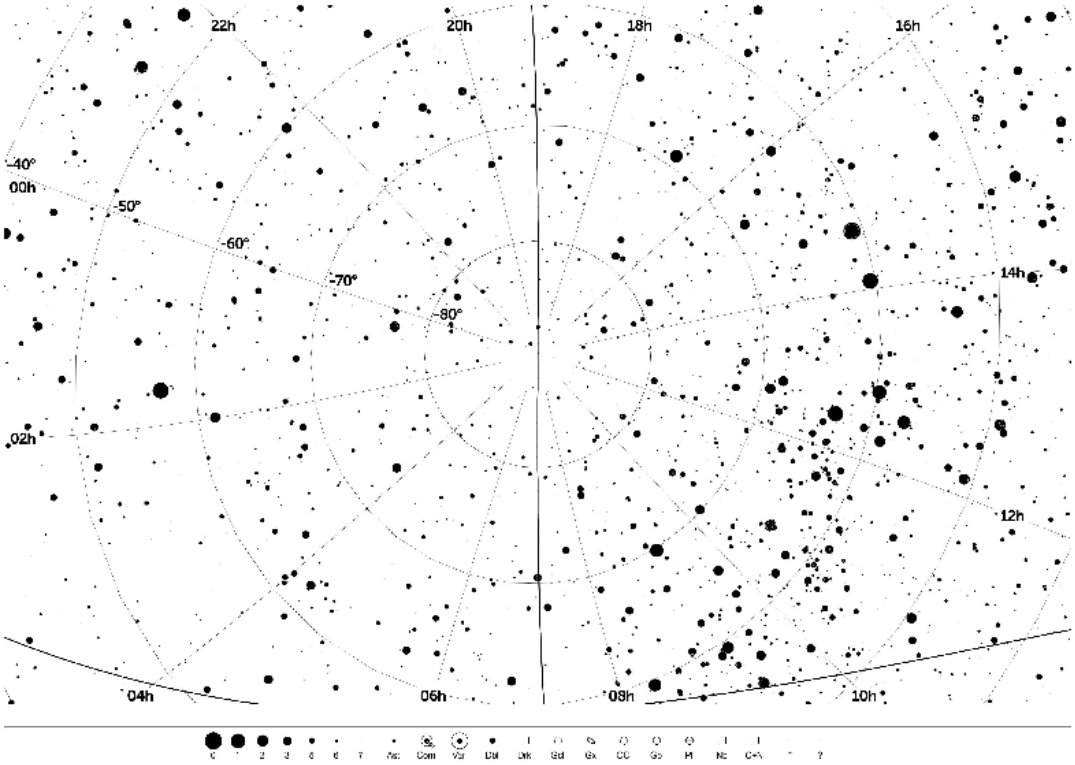
  $\lambda\ = 51^o10'$ W

  $h = 17^\circ$

  $A = 152.299^\circ$

  $LST = 18^h34^m52^s$

- Find and circle the target star on the Star Chart provided.
- Write the name of the star or its Bayer designation, as well as the constellation name.
- You will have 30 minutes to complete the task.



Useful Formulae	**Where :**
$\sin\delta = \cos z \sin\phi + \sin z \cos\phi \cos A$ $\sin H = -(\sin z \sin A)/\cos\delta$ $\cos H = (\cos z \cos\phi - \sin z \sin\phi \cos A)/\cos\delta$	• z : Zenith distance • A: Azimuth • H : Hour angle • δ : Declination