



Planetarium Round

Good Luck and Clear Skies!

General Instructions

1. The **Planetarium Round** consists of 1 task on naked eye observations.
2. After you take your seat inside the planetarium dome, the planetarium round will start. The total duration for this round is **75 minutes**. The time budget is as follows:
 - **15 minutes:** Read instructions and questions. Plan your observations.
 - **5 minutes:** Dark adaptation / Familiarize with the sky.
 - **20 minutes:** Start of Question 1. Projection of Sky 1.
 - **20 minutes:** Projection of Sky 2.
 - **15 minutes:** End of simulation. Process observations.

The invigilator will inform you of the time every 5 minutes. You are advised to pay attention.

3. At any time during the examination, you may stand up at your place or turn around. However, moving out of your place is strictly forbidden. Please maintain silence throughout the examination.
4. **DO NOT** shine your torch at the dome or towards other contestants.
5. Write your answers in the designated box, and observations/calculations in the empty space provided. This sheet is to be submitted after the completion of the Planetarium Round.
6. The mark distribution is as follows:

Question	Marks Acquired	Marks
1a		3
1b		20
1c		6
1d		6
1e		5
1f		10
Total		50

Name and IC Number

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1. Planetary Conjunction

At some time in the past 20 years, a planetary conjunction of several planets could be seen at the same time just an hour before sunrise! The planetarium will show you two of these nights (Sky 1 and Sky 2). The specific date and location are unbeknownst to you. You do know, however, that the dates are less than 6 months apart, and both skies are at the same local time (~ 1 hour before sunrise).

- (a) Determine the **latitude** of the observation site. Give your answer to the accuracy of 1 degree.

Answer:

- (b) In the duration between Sky 1 and 2, Saturn has been undergoing retrograde motion. Identify the names of the planets visible, and the constellations they are located at in Sky 1 and Sky 2.

Answer:

- (c) Determine the **months** of Sky 1 and Sky 2.

Answer:

- (d) Rigel (β Ori) has an apparent magnitude of 0.13. Name all the stars visible in Sky 2 that are brighter than Rigel.

Answer:

- (e) In Sky 2, determine the azimuth of Rigel.

Answer:

- (f) Determine the planet of highest altitude in Sky 2 (excluding Saturn). Determine the constellation in which the next retrograde event would occur in. You may assume all planetary orbits are circular.

Answer:

1 Planetary Data

Planet	Orbital Radius (a.u.)
Mercury	0.4
Venus	0.7
Earth	1.0
Mars	1.5
Jupiter	5.2
Saturn	9.5
Uranus	19.2
Neptune	30.1

You may record observations / perform calculations here.

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