Planetarium Round: Procedure

You will have 30 minutes to read the questions and prepare, 30 minutes inside the planetarium and 30 minutes to process your observations and complete the answer sheet.

The preparation area is outside the planetarium. Go to the table matching the name of your team for the Group Competition. It will also be marked with the sector, row and seat number assigned to you inside the planetarium.

Open the envelope only when the supervisor gives the command to 'START'. You have 30 minutes, the supervisor will give the remaining time e.g. "10 minutes left", "2 minutes left". On the command 'STOP', stop working but do not leave your place until you are shown the 'GO NOW' sign. Take only your question papers, clipboard and pen/pencil (leave the atlas). Follow the directions into the planetarium keeping your distance from other participants and take your place. Do not talk to other participants.

During the tasks you may stand up to get a better view, but do not move around, change seats, talk to other participants, or shine your light at others or at the sky. **The light must be pointed down at all times.**

The round is in 3 parts of 10 minutes each. The first part is for task 1. The second part is for task 2. The third part is for task 3. At 5, 2 and 1 minute before the end a warning will appear briefly on the sky.

At the end of the round wait in your seat until shown the 'GO NOW' sign. Follow the directions to the processing area and find the table matching your team as before (leave the light). Keep your distance from other participants and do not talk to them. After everybody is seated you will have 30 minutes to process your observations and complete the answer sheet (there will be a calculator, geometrical instruments etc. and a clock displaying the remaining time). At the end of 30 minutes place your answer sheets in the envelope and wait at your desk until told to leave the area.

Planetarium Round 1: 'Knowledge of the sky'

The projector will display the sky as seen from near the equator (0°N, 19°E). The rotation of the sky will be stopped for about 2 minutes for part (a), then it will start to rotate for parts (b) and (c). The objects for parts (b) and (c) will be displayed simultaneously.

(Projection time 10 minutes)

(a) A meteor shower will be visible in the sky. Determine the constellation of the radiant and estimate its right ascension and declination coordinates.

Constellation	right ascension	declination

(3 points)

(b) Identify which of the following variable stars visible in the sky are in low (write 'DIM') or high (write 'BRIGHT') brightness states. The mean magnitude as shown in the atlas and the magnitude range are given for each star.

Name	atlas mag.	mag. range	DIM / BRIGHT
γ Cas (*Cih*)	2	1.6 — 3.0	
δ Cep	4	3.5 — 4.4	
μ Cep (*Erakis*)	4	3.4 — 5.1	
β Per (*Algol*)	2	2.2 — 3.4	
o Cet (*Mira*)	3.5	2.0 - 10.1	
χ Cyg	4.5	3.3 - 14.1	
L^2 Pup	4.5	2.6 — 6	
δ Sco (*Dschubba*)	2	1.6 — 2.3	

(8 points)

(c) Identify the constellations whose borders are marked and give their IAU abbreviations.

(9 points)

(Total: 20 points)

Solution

(a) 1 point for each field (total 3)

Constellation	right ascension	declination
Aqr	22:30 ± 0.5h	$-15^\circ \pm 8^\circ$

(b) 1 point for each correct DIM/BRIGHT (total 8)

Name	atlas mag.	mag. range	DIM / BRIGHT
γ Cas (*Cih*)	2	1.6 — 3.0	DIM
δ Cep	4	3.5 — 4.4	DIM
μ Cep (*Erakis*)	4	3.4 — 5.1	DIM
β Per (*Algol*)	2	2.2 — 3.4	DIM
o Cet (*Mira*)	3.5	2.0 - 10.1	BRIGHT
χ Cyg	4.5	3.3 - 14.1	BRIGHT
L^2 Pup	4.5	2.6 — 6	BRIGHT
δ Sco (*Dschubba*)	2	1.6 — 2.3	BRIGHT

(c) Cet (1pt), Cae (1pt), Pup (1pt), Crt (1pt), Mus (1pt), Ser (2pt), CrA (1pt), Equ (1pt). (total 9)