



Question 1 (12 marks)

Reference 2

The simulation shows a debate between Next Chapter Space Exploration and the United Nations Office for Outer Space Affairs (UNOOSA).

This media is interactive

Click on the headings to show the different parts of the debate.

Opening statement

Argument one

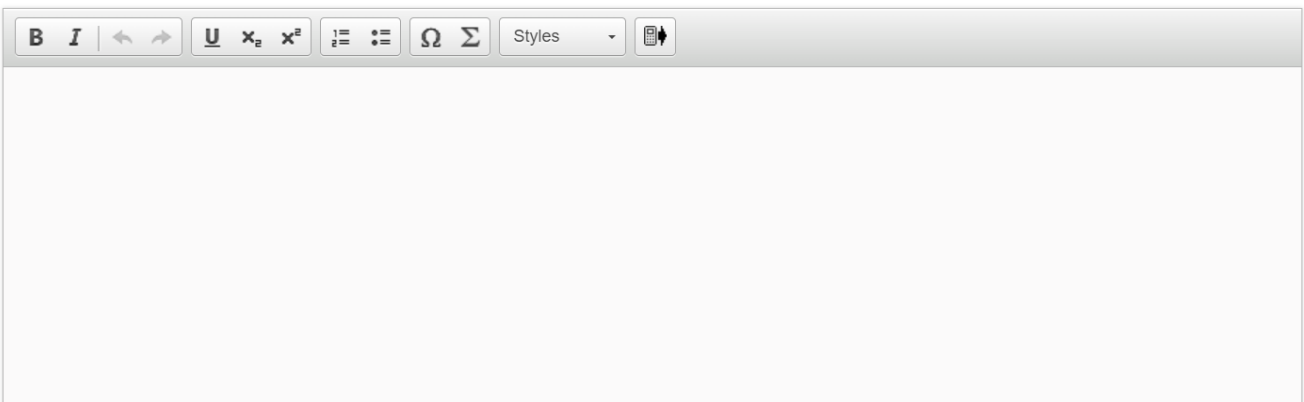
Argument two

Closing statement

Refer to **reference 2**, the debate between Next Chapter Space Exploration and the United Nations Office for Outer Space Affairs (UNOOSA).

Compare and contrast the synthesis of individuals and societies **and** sciences to formulate their arguments. In your answer you must:

- explain the similarities in the syntheses to formulate their arguments
- explain the differences in the syntheses to formulate their arguments
- explain which representative most effectively uses synthesis to formulate their arguments.



A rich text editor toolbar with the following icons from left to right: Bold (B), Italic (I), Undo (left arrow), Redo (right arrow), Underline (U), Subscript (x₂), Superscript (x²), Bulleted List (three horizontal lines with a dot), Numbered List (three horizontal lines with numbers), Link (Ω), Unlink (Σ), Styles (a dropdown menu labeled 'Styles'), and a mobile device icon.



Question 2 (12 marks)

Reference 5

[Reference 6](#)

Requirements to become an astronaut

This media is interactive

Click on the planet images to reveal the requirements.



Context

Activities

Qualifications

Challenges

Experience

Skill set

Mindset

Fitness

Scroll down to continue

Context

- Two to three years in space
- Regimented routines
- Living in microgravity



Context

Activities

Qualifications

Challenges

Activities

- Flight operation
- Maintaining and fixing equipment
- Scientific research
- Use of robotic controls and communications
- Spacewalks

Context

Activities

Qualifications

Challenges

Qualifications

The team should have at least one person with a qualification from each scientific area.

Medicine

Preferred: doctor
Minimum requirement: other healthcare experience
eg paramedic, nurse

Materials

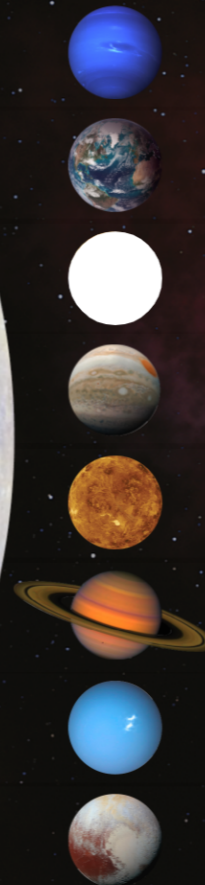
Preferred: engineer
Minimum requirement: mechanic

Life sciences

Preferred: biochemist
Minimum requirement: botanist

Computing

Preferred: computer scientist
Minimum requirement: coder



Context

Activities

Qualifications


Challenges

Experience

Skill set

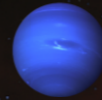
Mindset

Fitness



Challenges

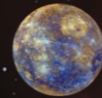
- High-stress situation
- Punishing environment
- Living in a confined space
- Resource limitations
- Communication delays with Earth
- Loneliness



Context



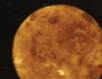
Activities



Qualifications



Challenges



Experience

Experience

At least three years' work experience in a relevant field
or
military experience
or
1000 hours pilot-in-command time on an aircraft



Context

Activities

Qualifications

Challenges

Experience

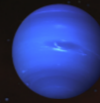
Skill set

Mindset

Skill set



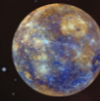
1. Organize and depict information logically
2. Manage and resolve conflict and work collaboratively in teams
3. Collect and analyse data to identify solutions and make informed decisions
4. Manage time and tasks effectively
5. Analyse and evaluate issues and ideas
6. Generate novel ideas and consider new perspectives



Context



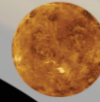
Activities



Qualifications



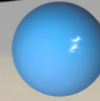
Challenges



Experience



Skill set



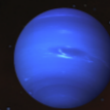
Mindset



Fitness

Mindset

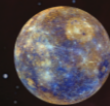
- Inquirer
- Knowledgeable
- Risk-taker
- Balanced
- Caring
- Open-minded
- Communicator
- Thinker
- Reflective
- Principled



Context



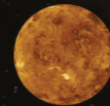
Activities



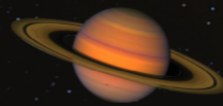
Qualification



Challenges



Experience



Skill set



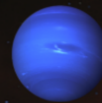
Mindset



Fitness

Fitness

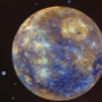
Fit and healthy: pass the NASA long-duration flight astronaut physical test
Age: 30-55



Context



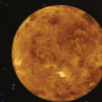
Activities



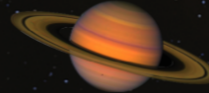
Qualifications



Challenges



Experience



Skill set



Mindset



Fitness

Scroll down to continue

PAST**FUTURE****INVENTIONS****We imagined****We invented****We created a
fairer society****Computer
science**Cameras small
enough to fit on
spacecraft

Camera phones

Instant dissemination
of news and disasters**Medicine**Diamond-hard
coatings for
aerospace systemsScratch resistant
lenses

Better eye health

MedicinePrecision digital
imagesCAT scanners and
radiographyBetter health diagnosis
technology**Biology**

Plant growth in space

Red LEDs

Development of
medical devices**Chemistry**Ability to safely
dispose of surplus
rocket fuelThiokol propulsion
.....Safe destruction of
landmines without
detonation**Engineering**Lightweight insulation
to protect spacecraft
and people in spaceFoil blankets for
extreme temperaturesEmergency safety
supplies for accidents
and disasters

Scroll down to continue

Biology	Plant growth in space	Red LEDs	Development of medical devices
Chemistry	Ability to safely dispose of surplus rocket fuel	Thiokol propulsion	Safe destruction of landmines without detonation
Engineering	Lightweight insulation to protect spacecraft and people in space	Foil blankets for extreme temperatures	Emergency safety supplies for accidents and disasters
Biology	Water purification system for drinking water in space	Electrolytic silver ionizer	Kills bacteria in hospital water systems to prevent legionella
Engineering	Lightweight technology to collect samples from the moon	Hand held vacuum cleaner	Cleaner, healthier homes
Chemistry	Food system for astronauts	Freeze dried food	Food supplies for disasters
Computer science	Monitoring an area from space	Satellites	Provision of data on climate change and pollution

PAST

FUTURE

INVENTIONS

We could innovate

We will create a fairer society

Medicine

New drugs
Compounds with a vastly improved shelf life. Pure protein crystallization that will enable better drug delivery methods.

Drugs that are both cheaper and more stable in extreme temperatures for delivery in the developing world.

Engineering

New material
Manufacturing opportunities for novel alloys and superalloys in microgravity are almost limitless.

New types of fire-resistant material to protect firefighters, electrical workers and military.

Computer science

New technology
Putting next-generation microchips in orbit will allow the development of super materials that are a magnitude more efficient and powerful than anything that we have seen before.

We will be able to connect faster, supporting individuals from all over the world to better collaborate and do business together.

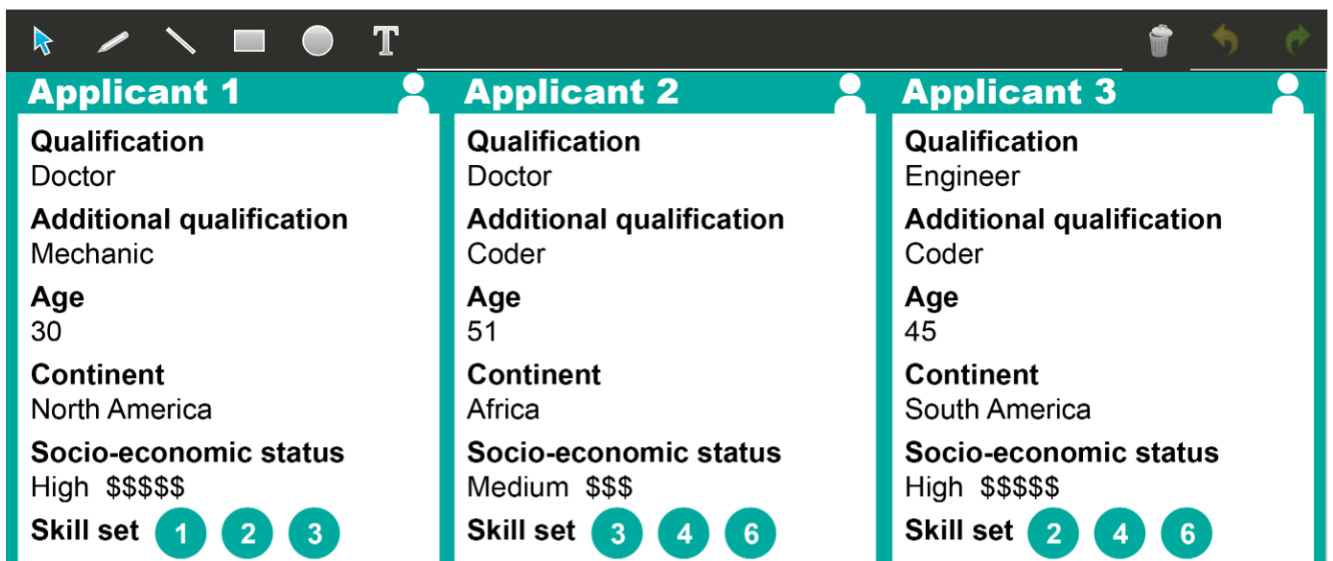
Scroll down to continue

<p>Computer science</p>	<p>New technology Putting next-generation microchips in orbit will allow the development of super materials that are a magnitude more efficient and powerful than anything that we have seen before.</p>	<p>We will be able to connect faster, supporting individuals from all over the world to better collaborate and do business together.</p>
<p>Chemistry</p>	<p>New chemical reactions Potential reactions that could remove unwanted compounds and produce wanted compounds.</p>	<p>Help us recycle carbon dioxide and reduce greenhouse gas emission on Earth.</p>
<p>Biology</p>	<p>New treatments Gravity (or lack of gravity) affects biological and physical processes.</p>	<p>Improve treatment for cardiovascular disease.</p>

Space IB has been tasked with forming a space exploration team. The profiles below show information about six applicants for the team.

Profiles of applicants

The profiles below can be annotated



The image shows a digital workspace with three applicant profiles. At the top, there is a toolbar with icons for a mouse cursor, a pencil, an eraser, a selection tool, a circle tool, a text tool, a trash can, and navigation arrows. The profiles are as follows:

Applicant 1	Applicant 2	Applicant 3
Qualification Doctor	Qualification Doctor	Qualification Engineer
Additional qualification Mechanic	Additional qualification Coder	Additional qualification Coder
Age 30	Age 51	Age 45
Continent North America	Continent Africa	Continent South America
Socio-economic status High \$\$\$\$\$	Socio-economic status Medium \$\$\$	Socio-economic status High \$\$\$\$\$
Skill set 1 2 3	Skill set 3 4 6	Skill set 2 4 6

Applicant 4	Applicant 5	Applicant 6
<p>Qualification Engineer</p> <p>Additional qualification Biochemist</p> <p>Age 42</p> <p>Continent Europe</p> <p>Socio-economic status Low \$</p> <p>Skill set 3 5</p>	<p>Qualification Biochemist</p> <p>Additional qualification Nurse</p> <p>Age 36</p> <p>Continent Asia</p> <p>Socio-economic status Medium \$\$\$</p> <p>Skill set 1 2 6</p>	<p>Qualification Biochemist</p> <p>Additional qualification Computer scientist</p> <p>Age 46</p> <p>Continent South America</p> <p>Socio-economic status Low \$</p> <p>Skill set 4 5</p>

- Skill sets:**
- 1 Organize and depict information logically
 - 2 Manage and resolve conflict and work collaboratively in teams
 - 3 Collect and analyze data to identify solutions and make informed decisions
 - 4 Manage time and tasks effectively
 - 5 Analyze and evaluate issues and ideas
 - 6 Generate novel ideas and consider new perspectives

Purpose: To create a diverse team with relevant expertise that can work well together

Essential requirements:

- Age range of at least 15 years
- Three different continents
- Three different socio-economic statuses
- Four different scientific qualifications

Desirable requirements:

- Organize and depict information logically
- Manage and resolve conflict and work collaboratively in teams
- Collect and analyse data to identify solutions and make informed decisions
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Additional information:

The requirements above are flexible with sufficient justification.

As a member of the selection team, you must recommend **three** applicants.

Justify the selection of **three** applicants. In your justification you must:

- explain how the team is diverse
- explain how the team has relevant expertise
- explain how the team can work well together
- justify any requirements not met.

The profiles provided above can be annotated to help with your selection.

Choice 1:

Choice 2:

Choice 3:


Justify the selection of **three** applicants. In your justification you must:

- explain how the team is diverse
- explain how the team has relevant expertise
- explain how the team can work well together
- justify any requirements not met.

The profiles provided above can be annotated to help with your selection.

Choice 1:

- Applicant 1
- Applicant 2
- Applicant 3
- Applicant 4
- Applicant 5
- Applicant 6



A rich text editor toolbar with the following icons from left to right: Bold (B), Italic (I), Undo (left arrow), Redo (right arrow), Underline (U), Subscript (x₂), Superscript (x²), Bulleted List (three horizontal lines with a dot), Numbered List (three horizontal lines with numbers), Link (Ω), Unlink (Σ), a dropdown menu labeled 'Styles', and a mobile device icon.



Question 3 (12 marks)

Using your new interdisciplinary understanding, **discuss** the value of considering **fairness and development** in future decisions about space exploration. In your answer you must:

- explain the value of considering **fairness and development** in future decisions
- explain the negative impacts of considering **fairness and development** in future decisions
- include evidence from the pre-release material.

B **I** | ← → | x_2 x^2 | $\frac{1}{2}$ $\frac{3}{4}$ | Ω Σ | Styles - |