Questions 42-52 are based on the following passages.

Passage 1 is adapted from Michael Slezak, "Space Mining: the Next Gold Rush?" ©2013 by New Scientist. Passage 2 is from the editors of *New Scientist*, "Taming the Final Frontier." ©2013 by New Scientist.

Passage 1

Follow the money and you will end up in space. That's the message from a first-of-its-kind forum on mining beyond Earth.

Convened in Sydney by the Australian Centre for Space Engineering Research, the event brought together mining companies, robotics experts, lunar scientists, and government agencies that are all working to make space mining a reality.

The forum comes hot on the heels of the 2012 unveiling of two private asteroid-mining firms. Planetary Resources of Washington says it will launch its first prospecting telescopes in two years, while Deep Space Industries of Virginia hopes to be harvesting metals from asteroids by 2020. Another commercial venture that sprung up in 2012, Golden Spike of Colorado, will be offering trips to the moon, including to potential lunar miners.

Within a few decades, these firms may be meeting earthly demands for precious metals, such as platinum and gold, and the rare earth elements vital for personal electronics, such as yttrium and lanthanum. But like the gold rush pioneers who transformed the western United States, the first space miners won't just enrich themselves. They also hope to build an off-planet economy free of any bonds with Earth, in which the materials extracted and processed from the moon and asteroids are delivered for space-based projects.

In this scenario, water mined from other worlds could become the most desired commodity. "In the desert, what's worth more: a kilogram of gold or a kilogram of water?" asks Kris Zacny of HoneyBee Robotics in New York. "Gold is useless. Water will let you live."

Water ice from the moon's poles could be sent to astronauts on the International Space Station for drinking or as a radiation shield. Splitting water into oxygen and hydrogen makes spacecraft fuel, so ice-rich asteroids could become interplanetary refuelling stations.

Companies are eyeing the iron, silicon, and aluminium in lunar soil and asteroids, which could be used in 3D printers to make spare parts or machinery. Others want to turn space dirt into concrete for landing pads, shelters, and roads.

Passage 2

The motivation for deep-space travel is shifting from discovery to economics. The past year has seen a flurry of proposals aimed at bringing celestial riches down to Earth. No doubt this will make a few billionaires even wealthier, but we all stand to gain: the mineral bounty and spin-off technologies could enrich us all.

But before the miners start firing up their rockets, we should pause for thought. At first glance, space mining seems to sidestep most environmental concerns: there is (probably!) no life on asteroids, and thus no habitats to trash. But its consequences —both here on Earth and in space—merit careful consideration.

Part of this is about principles. Some will argue that space's "magnificent desolation" is not ours to despoil, just as they argue that our own planet's poles should remain pristine. Others will suggest that glutting ourselves on space's riches is not an acceptable alternative to developing more sustainable ways of earthly life.

History suggests that those will be hard lines to hold, and it may be difficult to persuade the public that such barren environments are worth preserving. After all, they exist in vast abundance, and even fewer people will experience them than have walked through Antarctica's icy landscapes.

There's also the emerging off-world economy to consider. The resources that are valuable in orbit and beyond may be very different to those we prize on Earth. Questions of their stewardship have barely been broached—and the relevant legal and regulatory framework is fragmentary, to put it mildly.

Space miners, like their earthly counterparts, are often reluctant to engage with such questions. One speaker at last week's space-mining forum in Sydney, Australia, concluded with a plea that regulation should be avoided. But miners have much to gain from a broad agreement on the for-profit exploitation of space. Without consensus, claims will be disputed, investments risky, and the gains made insecure. It is in all of our long-term interests to seek one out.

CONTINUE

42

In lines 9-17, the author of Passage 1 mentions several companies primarily to

A) note the technological advances that make space mining possible.

B) provide evidence of the growing interest in space mining.

C) emphasize the large profits to be made from space mining.

D) highlight the diverse ways to carry out space mining operations.

43

The author of Passage 1 indicates that space mining could have which positive effect?

A) It could yield materials important to Earth's economy.

B) It could raise the value of some precious metals on Earth.

C) It could create unanticipated technological innovations.

D) It could change scientists' understanding of space resources.

44

Which choice provides the best evidence for the answer to the previous question?

A) Lines 18-22 ("Within . . . lanthanum")

B) Lines 24-28 ("They . . . projects")

C) Lines 29-30 ("In this . . . commodity")

D) Lines 41-44 ("Companies . . . machinery")

45

As used in line 19, "demands" most nearly means

A) offers.

B) claims.

C) inquiries.

D) desires.

46

What function does the discussion of water in lines 35-40 serve in Passage 1?

A) It continues an extended comparison that begins in the previous paragraph.

B) It provides an unexpected answer to a question raised in the previous paragraph.

C) It offers hypothetical examples supporting a claim made in the previous paragraph.

D) It examines possible outcomes of a proposal put forth in the previous paragraph.

47

The central claim of Passage 2 is that space mining has positive potential but

A) it will end up encouraging humanity's reckless treatment of the environment.

B) its effects should be thoughtfully considered before it becomes a reality.

C) such potential may not include replenishing key resources that are disappearing on Earth.

D) experts disagree about the commercial viability of the discoveries it could yield.

48

As used in line 68, "hold" most nearly means

A) maintain.

B) grip.

C) restrain.

D) withstand.

CONTINUE

49

Which statement best describes the relationship between the passages?

A) Passage 2 refutes the central claim advanced in Passage 1.

B) Passage 2 illustrates the phenomenon described in more general terms in Passage 1.

C) Passage 2 argues against the practicality of the proposals put forth in Passage 1.

D) Passage 2 expresses reservations about developments discussed in Passage 1.

50

The author of Passage 2 would most likely respond to the discussion of the future of space mining in lines 18-28, Passage 1, by claiming that such a future

A) is inconsistent with the sustainable use of space resources.

B) will be difficult to bring about in the absence of regulations.

C) cannot be attained without technologies that do not yet exist.

D) seems certain to affect Earth's economy in a negative way.

51

Which choice provides the best evidence for the answer to the previous question?

A) Lines 60-63 ("Some . . . pristine")

B) Lines 74-76 ("The resources . . . Earth")

C) Lines 81-83 ("One . . . avoided")

D) Lines 85-87 ("Without . . . insecure")

52

Which point about the resources that will be highly valued in space is implicit in Passage 1 and explicit in Passage 2?

A) They may be different resources from those that are valuable on Earth.

B) They will be valuable only if they can be harvested cheaply.

C) They are likely to be primarily precious metals and rare earth elements.

D) They may increase in value as those same resources become rare on Earth.

STOP

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Do not turn to any other section.