

# STEP準1級 解答解説資料

(2008 年度第 3 回出題)

## Space Junkyard

① According to NASA, there are hundreds of thousands of **man-made objects** circling our planet, **most of which** have already served their purpose. Though **much of this debris** burns up when it reenters the atmosphere, a monitoring system has recorded a net increase of items in orbit. **Many objects, at least those above 700 kilometers, will remain there for centuries.**

② **The problem is likely to get even worse.** Increased levels of carbon dioxide (CO2) pollution, which is blamed for global warming, actually have the reverse effect hundreds of kilometers above the earth. According to researchers from Britain's University of Southampton, **higher CO2 levels have a cooling effect at orbits** between 700 and 2,000 kilometers, which **extends the life span** of space **garbage**. **This leads to a greater danger of collisions with satellites or spacecraft in orbit**, where even an object smaller than a tennis ball can have devastating consequences. **It could be like "exploding several sticks of dynamite in your spacecraft,"** says Southampton's Dr. Hugh Lewis.

③ NASA expects **an increasing number of collisions** will result in **a need for shields on all satellites in the future**—just like the armor on the International Space Station (ISS)—**which will significantly raise costs for aerospace manufacturers.** On the other hand, David Wade, a space insurance expert at Lloyd's Insurance, notes that many communications satellites orbit at about 36,000 kilometers above the earth, far above the area where most **debris** is found. **"This problem is not really going to affect the satellites that beam TV pictures around the world; they are fine,"** Wade said.

④ For operators of the ISS and other spacecraft, **however, space was always already a threat.** In May 2003, the U.S. military alerted NASA to the danger of large pieces of **debris** passing within less than 1.6 kilometers of the ISS. Also, after its one flight, the space shuttle Discovery showed signs of 64 impacts, 10 of which were caused by **man-made objects**. Such small collisions require NASA to replace the panes of at least two windows after every shuttle mission, and orbiting satellites must be repositioned regularly to avoid **debris**. **What is most worrying, though, is NASA's estimate of the probability of the ISS or a shuttle experiencing a fatal debris collision: a surprisingly high 1 in 200 chance.**

⑤ **What should be done about the junk in the heavens?** Half a century since the first man-made satellite—the Soviet Union's Sputnik I—was sent into space, there is still no international treaty on orbital debris. **However,** an international committee whose aim is to coordinate efforts to deal with this issue has been established. As Nicholas Johnson, manager of NASA's orbital **debris** program, warns, **"If you wait until you start seeing negative consequences, then the environment is pretty far gone already, and cleaning it up can be very, very difficult."** **Governments, aerospace firms, and satellite operators would do well to prevent the unnecessary creation of new orbital debris.**

(38) What is **one reason** that **the problem of space debris** will **probably become more serious**?

② 段落

- 1 The number of satellites and spacecraft releasing debris into space is growing rapidly.
- 2 The space-debris monitoring system shows that debris is now traveling faster, so it will cause more damage.
- 3 The debris within 700 kilometers of the earth will remain in orbit for centuries before breaking up.
- 4 **The low atmospheric temperature lengthens the life of debris,** thereby **increasing the chance of it hitting other objects.**

(39) A **problem** facing **aerospace manufacturers** is that

③ 段落

- 1 the increase in debris threatens the entire global communications satellite network.
- 2 **more collisions with debris will make expensive modifications to satellites necessary.**
- 3 the government will force them to make major adjustments to projects currently under development.
- 4 increasing insurance costs will mean there is little money left to develop protective measures.

(40) According to NASA, what is **the biggest concern** regarding the **threat of space debris**?

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- 1 **The possibility of a deadly accident caused by a collision with debris is actually quite high.**
- 2 The frequency of space-shuttle encounters with such debris has caused NASA to go over budget because of repairs.
- 3 The increased number of military space stations will lead to more frequent positional adjustments of satellites to avoid accidents.
- 4 The danger to the ISS is growing as its protective shield has been weakened by large impacts with debris.

(41) **What** does **the author recommend be done** to deal with **the orbital debris problem**?

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- 1 The actual environmental effects of the debris need to be investigated so that appropriate action can be taken.
- 2 The current treaty on acceptable levels of debris needs to be reevaluated if cleanup efforts are to succeed on an international scale.
- 3 **Nations and companies must act quickly to avoid an additional buildup of debris before the problem becomes unmanageable.**
- 4 Aerospace companies would be better off focusing on getting rid of current debris rather than worrying about future debris.