READING PASSAGE 3

You should spend about 20 minutes on Questions 27–40, which are based on Reading Passage 3 below.

Life on Mars?

Terraforming may sound like something out of science fiction, but some believe it is possible to turn that fiction into fact.

As plans are slowly being drawn up for the first manned mission to Mars, many space-travel sceptics are asking one vital question: why go there? Mars is a barren, desolate planet, and with its thin atmosphere and bitterly cold climate, it would appear to be completely unsuitable for human life. Above all, it is a very distant place, and getting there would be an enormous challenge. However, the planet might just hold the key to long-term human survival. With the Earth's population currently at more than seven billion and climbing, we may eventually be forced to look elsewhere in the solar system for somewhere to live. It is just possible that, contrary to photographic evidence, Mars may be more promising than it appears.

Today, Mars is a viciously cold, dry place. However, it does have some things in common with our own planet. For example, it has a daily rotation rate of 24 hours 37 minutes, compared with 23 hours 56 minutes on Earth. It also has an axial tilt of 24 degrees, which is just half a degree more than Earth's, and a gravitational pull one third of Earth's. Furthermore, it holds many of the elements that are required to support life, including carbon and oxygen (in the form of carbon dioxide), nitrogen, and frozen water at its polar ice caps. In fact, if you were to travel back in time several billion years, you would notice some remarkable parallels between the atmosphere on Earth then and Mars today. Back then, Earth was also a lifeless planet; until photosynthetic bacteria developed and began to produce enough oxygen to allow for the development of animal and plant life, our atmosphere also consisted entirely of carbon dioxide and nitrogen.

It comes as no surprise to learn, therefore, that some scientists believe the same process which turned Earth's atmosphere from mostly carbon dioxide into breathable air could be repeated on Mars, but by using technology rather than by letting nature and evolution take its natural course. Terraforming, as this process is known, would initially create a greenhouse effect that would heat the planet, which in turn would create other conditions necessary to provide a suitable living environment for plants and animals. However, it would be a highly challenging undertaking, and the process of terraforming the entire planet into an Earth-like habitat could still take many thousands of years.

Three terraforming methods have been suggested, with the first already under development, albeit for a different purpose. At present, the American space agency NASA is working on a system that will use large mirrors to capture the Sun's radiation. This radiation will be used to propel spacecraft through space, removing the need for heavy and expensive rocket fuel. With a few changes, it might be possible to use similar mirrors to reflect the Sun's radiation and heat the surface of Mars. Aimed at the planet from a distance of two hundred thousand miles, these enormous mirrors would raise the surface temperature by a few degrees. If they were concentrated on the polar ice caps, they would provide enough heat to melt the polar ice caps and release the carbon dioxide that is believed to be trapped there. Gradually, as the temperature rose, greenhouse gases would be released, and this would create a form of Martian global warming, the first stage in making the planet sustainable for life.

The second method would be to set up greenhouse-gas 'factories' in order to raise the temperature of the planet. It is generally accepted that greenhouse gases produced by heavy industry are raising the Earth's temperature. Therefore, by building hundreds of greenhouse-gas-emitting factories on Mars, a similar effect could be achieved. Carbon dioxide, methane and other greenhouse gases would be pumped into the Martian atmosphere. The same factories would then produce oxygen by mimicking the natural process of plant photosynthesis: they would inhale the carbon dioxide they produce, and then emit oxygen. The process could be accelerated by 'sowing the planet's surface with photosynthetic bacteria', which would increase the rate at which oxygen is produced. Eventually, there would be enough oxygen on the planet for humans to breathe using only special apparatus similar to that used by mountain climbers.

The third, and by far the most extreme, method has been proposed by space scientists Robert Zubrin and Christopher McKay. They believe that it would be possible to produce greenhouse gases and water by firing large, ammonia-bearing asteroids at the planet. Each asteroid would weigh about ten billion tons, and would be powered by huge rocket engines which would move it towards Mars at over 10,000 miles per hour. At this speed, it would take each asteroid about ten years to reach its destination. The energy produced by one asteroid slamming into Mars' surface, say Zubrin and McKay, would raise the temperature of the planet by three degrees Celsius and melt about one thousand billion tons of ice at the polar caps. They believe it would take many of these asteroids, and at least fifty years, in order to create a temperate climate and enough water to cover a quarter of the planet's surface.

Terraforming Mars, if it is ever attempted, will be neither cheap nor easy. And it certainly won't be quick: although optimists like Zubrin and McKay say it could be achieved in five or six decades, the reality is that terraforming is more likely to take hundreds or even thousands of years. Furthermore, it will stretch human ingenuity to its limits, and will require levels of will and commitment that have rarely been seen before. The challenge of developing a habitable environment and bringing life to the cold, dry world of Mars is fraught with challenges, but it might just be one that saves the human race.

Questions 27–31

Do the following statements agree with the views of the writer in the Reading passage 3?

In boxes 27-31 on your answer sheet, write

YES	*if the statement agrees with the writer's view*
NO	*if the statement contradicts the writer's view*
NOT GIVEN	*if it is impossible to say what the writer thinks about this*

27 Pictures of Mars suggest it might make a good place for people to settle.

28 Modern Mars and ancient Earth looked remarkably similar.

29 One method of terraforming could involve adapting technology that is already under development.

30 Greenhouse-gas factories would provide enough oxygen for people to breathe without special equipment.

31 Terraforming Mars would be an extreme test of human skill and intelligence.

Questions 32–35

*Choose the correct letter, **A**, **B**, **C** or **D**.*

Write the correct letter in boxes 32-36 on your answer sheet.

32 Which one of these factors suggests that Mars might be a good place for people to settle?

A It is not too far from Earth.
B It has no other life forms living there.
C It has a cool, dry climate.
D It has some similarities with Earth.

33 The first step in terraforming Mars would be to

A make the planet warmer.
B create a breathable atmosphere.
C find a suitable source of water.
D create a habitat for living organisms.

34 Special factories on Mars could be used to

A control the level of greenhouse gases.
B absorb excess levels of carbon dioxide.
C produce oxygen in a manner similar to plants.
D help grow essential bacteria.

35 What is the writer's main purpose in the passage?

A To explain why we need to terraform Mars.
B To illustrate the three processes required to terraform a planet like Mars.
C To consider how and why Mars might be terraformed.
D To demonstrate how straightforward it would be to terraform a planet.

Questions 36–40

*Complete the summary using a word **A–I** from the box.*

*Write the correct letter, **A-I,** in boxes 36-40 on your answer sheet.*

One method of terraforming Mars would be to **36** _____ asteroids at the planet. Rockets attached to an enormous asteroid would propel it towards Mars, taking ten years to **37** _____ the enormous distances required. The asteroid would **38** _____ the planet with incredible force and **39** _____ enough energy to **40** _____ the planet's temperature. The result would be a temperate climate and lots of water from melting ice caps.

A	cover	**B**	create	**C**	hit
D	increase	**E**	land	**F**	drive
G	power	**H**	rise	**I**	shoot

判断题（Q27–31）

题号	答案	精确定位句（第X段）	解释（同义改写 & 选项判定）
27	**NO**	第1段末句："*It is just possible that,* ***contrary to photographic evidence****, Mars may be more promising than it appears.*"	题干：*Pictures of Mars suggest it might make a good place…*（图片"暗示很好"）。原文说"**与照片所显示的相反**，火星可能比看上去更有前景"，即图片并不让它看起来适合居住 → 与题干相反，故 **NO**。
28	**NOT GIVEN**	第2段中部："*you would notice some* ***remarkable parallels between the atmosphere*** *on Earth then and Mars today.*"	原文只说"**大气层存在显著相似**(parallels)"，并未说"**现代火星与远古地球整体外观 looked remarkably similar**"。题干把"相似"泛化为整体"外貌/外观"，信息超出原文 → **NG**。
29	**YES**	第4段开头："*At present, NASA is working on a system that will use large mirrors… With a few changes, it might be possible to use* ***similar mirrors*** *to reflect the Sun's radiation and heat the surface of Mars.*"	题干：*involve adapting technology that is already under development*。原文：NASA 正在开发的大镜面推进系统，稍作改动即可用于加热火星 → "**改造既有在研技术**"成立 → **YES**。
30	**NO**	第5段末句："*Eventually, there would be enough oxygen on the planet for humans to breathe* ***using only special apparatus similar to that used by mountain climbers****.*"	题干说"无需特殊设备"。原文明确仍需"**类似登山者用的专门装置**"，与题干相反 → **NO**。
31	**YES**	第7段中部："*it will* ***stretch human ingenuity to its limits****, and will require levels of will and commitment …*"	题干"极端考验人类技能与智慧"。原文"把人类**创造力推到极限**"=极端考验 → **YES**。

选择题（Q32–35）

题号	正确选项	精确定位句（第X段）	解析（为何正确 & 其它项为何不对）
32	**D**	第2段开头："*However, it* ***does have some things in common*** *with our own planet…*"（后举自转周期、轴倾角、元素等）	题问"哪一因素暗示火星可能适合定居？"原文以"**与地球的相似性**"作为积极信号 → **D**。A"距离不远"未提；B"没有其他生命"未提；C"寒冷干燥"是负面特征。
33	**A**	第3段："*Terraforming… would* ***initially create a greenhouse effect that would heat the planet****, which in turn would create other conditions…*"	首步是"**让行星更暖**"以产生温室效应 → **A**。B"直接造可呼吸大气"是后续；C"先找水源"未作首步；D"创造生存栖息地"也属后续结果。
34	**C**	第5段中部："*The same factories would* ***produce oxygen by mimicking*** *the natural process of plant photosynthesis…*"	"工厂以**类似植物的方式产生氧气**" → **C**。A"控制温室气体水平"非该段重点；B"吸收过量CO_2"未言"过量"，且核心是"产氧"；D"帮助细菌生长"对应的是"播种光合细菌"但主体作用仍是"产氧"，题干问"工厂可用于做什么"，以 **C** 更精确。
35	**C**	通读全篇，尤以第1–3、7段	文章既谈"为什么或许需要"（人口、长期生存），也谈"怎么做"（三法），评估难度与代价 → "**思考如何以及为何可能对火星进行地球化**"最贴合 → **C**。A只谈"为何需要"过窄；B"阐明三步骤"不准确（并非三"步骤"，而是三"方法"）；D"证明很容易"与第7段相反。

摘要填空（Q36–40）

词库：A cover ｜ B create ｜ C hit ｜ D increase ｜ E land ｜ F drive ｜ G power ｜ H rise ｜ I shoot

题号	正确字母	正确词	精确定位句（第X段）	解析
36	**I**	shoot	第6段开头："*by* ***firing*** *large, ammonia-bearing* ***asteroids at the planet****.*"	firing = **shoot**（向行星发射小行星）。
37	**A**	cover	第6段中部："*…would move it towards Mars at over 10,000 mph. At this speed, it would take each asteroid about ten years to* ***reach its destination****.*"	概述句中"to ___ the enormous distances required"常规搭配 **cover the distance**。
38	**C**	hit	第6段："*The energy produced by one asteroid* ***slamming into*** *Mars' surface …*"	slam into = **hit**（撞击）。
39	**B**	create	第6段："*The energy produced …* ***would raise the temperature*** *… and melt…*"	撞击**产生/造成 (create)** 能量。
40	**D**	increase	同上句	"raise the temperature" = **increase** the planet's temperature。