READING PASSAGE 1

*You should spend about 20 minutes on **Questions 1–13**, which are based on Reading Passage 1 below.*

The Development of Plastics

The first plastics were developed as a substitute for natural rubber. Chemically, rubber is a polymer—a compound containing large molecules that are formed by the bonding of many smaller, simpler units, repeated over and over again. The same bonding principle—polymerization—is the basis of the creation of a huge range of plastics by the chemical industry.

The first plastic was developed as a result of a competition in the USA. In the 1860s, $10,000 was offered to anybody who could replace ivory—supplies of which were declining—with something equally good as a material for making billiard balls. The prize was won by John Wesley Hyatt, with a material called celluloid. Celluloid was made by dissolving cellulose, a carbohydrate obtained from plants, in a solution of camphor dissolved in ethanol. This new material rapidly found other applications in the manufacture of everyday products such as knife handles and detachable collars and cuffs. But perhaps the best-known celluloid product was photographic film, without which the film industry could never have taken off at the end of the 19th century.

Celluloid can be repeatedly softened and reshaped by heat, and is known as a thermoplastic. In 1907, Leo Baekeland (1863–1944), a Belgian chemist working in the USA, invented a different kind of plastic by causing phenol and formaldehyde to react together. Baekeland called it Bakelite, and it was the first of the thermosets—plastics that can be cast and moulded while hot, but cannot be softened by heat and reshaped once they have set. Bakelite was a good insulator, and was resistant to water and acid. With these properties it was soon being used in the manufacture of electrical switches as well as a variety of domestic items.

As the century went on, the range of newly developed plastics increased. Chemists began looking for other small molecules that could be strung together to make polymers. In the 1930s, chemists in Britain discovered that the gas ethylene would polymerize under heat and pressure to form a thermoplastic they called polythene. Polypropylene followed in the 1950s. Both are used to make bottles, pipes and plastic bags. A small change in the starting material—replacing a hydrogen atom in ethylene with a chlorine atom—produced rigid PVC (polyvinyl chloride), a fireproof plastic suitable for drains and gutters. By adding certain chemicals, a soft form of PVC can be produced, suitable as a substitute for rubber in items such as waterproof clothing. A closely related plastic is Teflon or PTFE (polytetrafluoroethylene). It produces very little friction, making it ideal for products such as non-stick frying pans.

Polystyrene, a hard, clear material like glass, was developed during the 1930s in Germany, and its applications included food containers and toys. Expanded polystyrene is rigid and is widely used in packaging and insulation. Polyurethane, developed in the same country, was commonly produced as a foam, which was very useful in the production of insulating materials.

In the 1930s, the first of the man-made fibres was created—nylon. Its inventor was a chemist called Wallace Carothers (1896–1937), who worked for the Du Pont company in the USA. He found that under the right conditions two particular chemicals would form a polymer that could be pumped out through holes and then stretched to form long glossy threads that could be woven like silk. Its first use was to make parachutes for the US armed forces in World War II. In the postwar years, it completely replaced silk in the manufacture of stockings.

Many other synthetic fibres joined nylon, including Orlon, Acrilan, and Terylene. Today most garments are made of a blend of natural fibres, such as cotton and wool, and man-made fibres that make fabrics easier to look after.

Despite its enormous usefulness, plastic has its drawbacks. In fact, one of its great strengths—its indestructibility—is its greatest disadvantage. Beaches all over the world, even on the remotest island, are littered with plastic bottles that nothing can destroy. Nor is it very easy to recycle plastics, as different types of plastic are often found in the same items and call for different treatments.

Plastics can be made biodegradable by incorporating into their structure a material such as starch, which is attacked by bacteria and causes the plastic to fall apart. Other materials can be incorporated that gradually decay in sunlight—although bottles made of such materials have to be stored in the dark, to ensure they do not disintegrate before they have been used.

Questions 1–7

Complete the table below.

*Choose **NO MORE THAN THREE WORDS** from the passage for each answer.*

Write your answers in boxes 1–7 on your answer sheet.

Early types of plastic				
Name	**Date**	**Country of origin**	**Properties**	**Common uses**
Celluloid	1860s	USA	can be soften and reshaped by heat	• billiard balls (original use) • cutlery • clothing • **1** _____
2 _____	1907	USA	can't be softened after setting; good insulator; resistant to water and acid	• **3** _____ • household object
Polythene	1930s	**4** _____	can be softened and reshaped by heat	• bottles • pipes • plastic bags
Polypropylene	1950s			• bottles • pipes • plastic bags
Rigid PVC			is **5** _____	• external piping
Soft PVC				• outdoor clothing
Polystyrene	1930s	Germany	resembles **6** _____	• food containers • toy
Polyurethane		Germany	usually manufactured as a **7** _____	• insulation

Questions 8–13

Do the following statements agree with the information in Reading Passage 1?

In boxes 8–13 on your answer sheet, write:

TRUE	*if the statement agrees with the information*
FALSE	*if the statement contradicts the information*
NOT GIVEN	*if there is no information about this*

8 The chemical structure of rubber is very different from that of plastics.

9 John Wesley Hyatt was an industrial chemist.

10 Celluloid and Bakelite react in the same way to heat.

11 If an object is made of several plastics, these prove hard to break down and reuse.

12 Adding starch to plastic makes it more durable.

13 Containers which are designed to decompose need particular storage conditions.

一、表格题 1–7

题号	答案	题干翻译	定位句（英文）	定位句翻译	解释
1	**photographic film**	（Celluloid 的常见用途之一）填空	“*But perhaps the best-known celluloid product was **photographic film** …*” （第 2 段）	“或许最著名的赛璐珞制品是**胶片**。”	题干的 “Common uses” 要求从文中选用，胶片正是列举用途之一；2 词，合规。
2	**Bakelite**	（1907 年、美国，塑料名称）填空	“*In 1907 … invented a different kind of plastic … **Baekeland called it Bakelite**.*” （第 3 段）	“1907 年……贝克兰德将其称为**胶木（Bakelite）**。”	问的是该行 “Name”；唯一对应名称为 Bakelite。
3	**electrical switches**	（Bakelite 的常见用途之一）填空	“*With these properties it was soon being used in the manufacture of **electrical switches** as well as a variety of domestic items.*” （第 3 段）	“由于这些性能，它很快被用于制造**电气开关**，也用于多种家用器具。”	表格该行 “Common uses” 的第一条即是这一用途；2 词，原文同形。
4	**Britain**	（Polythene 的原产国）填空	“*In the 1930s, chemists **in Britain** discovered … polythene.*” （第 4 段）	“20 世纪 30 年代，**英国**的化学家发现……并将其称为聚乙烯。”	要求国家名称；原文明确给出 “in Britain”。
5	**fireproof**	（Rigid PVC 的性质：is ___）	“*… produced rigid PVC … **a fireproof** plastic suitable for drains and gutters.*” （第 4 段）	“……制得刚性 PVC——一种**耐火**的塑料，适合做排水沟、檐槽。”	表格写法 “is 5 ____”，应填 “fireproof”（性质词）。1 词，来自原文。
6	**glass**	（Polystyrene 的外观：resembles ___）	“*Polystyrene, a hard, clear material **like glass** …*” （第 5 段）	“聚苯乙烯是一种坚硬、透明、**像玻璃**一样的材料……”	题干关键词 “resembles” 与原文 “like” 同义，填 “glass” 最贴切。
7	**foam**	（Polyurethane 的常见形态：manufactured as a ___）	“*Polyurethane … was commonly produced as a **foam** …*” （第 5 段）	“聚氨酯通常以**泡沫**形式生产……”	表格给出 “usually manufactured as a 7 ___”，原文对应 “commonly produced as a foam”。

二、判断题 8–13（TRUE / FALSE / NOT GIVEN）

题号	答案	题干翻译	精确定位（英文）	定位翻译	解释
8	**FALSE**	橡胶的化学结构与塑料**非常不同**。	“*Chemically, rubber is a **polymer** … The same bonding principle—**polymerization**—is the basis of … plastics.*” （第 1 段）	“从化学上看，橡胶是**高分子**……同样的键合原理——**聚合**——也是塑料产生的基础。”	文中说明橡胶与塑料都基于 “聚合”，本质一致，而不是 “非常不同”，故为 FALSE。
9	**NOT GIVEN**	约翰 · 韦斯利 · 海厄特是**工业化学家**。	第 2 段仅述：“*The prize was won by John Wesley Hyatt…*”	“奖金由**约翰 · 韦斯利 · 海厄特**获得……”	文章未提及其职业身份（发明家/化学家等），信息缺失，判 NOT GIVEN。
10	**FALSE**	赛璐珞与胶木在受热时反应**相同**。	“*Celluloid … is known as a **thermoplastic** … / “Bakelite … the first of the **thermosets** … cannot be softened by heat…*” （第 3 段）	“赛璐珞……称为**热塑性**材料…… / 胶木是第一种**热固性**塑料……**不能**被加热软化重新成型。”	一者受热可软化重塑（热塑性），一者固化后受热不能软化（热固性），性质相反，故 FALSE。
11	**TRUE**	如果一个物体含有多种塑料，这些塑料很难被分解再利用。	“*Nor is it very easy to **recycle plastics**, as different types of plastic are often found in the same items and **call for different treatments**.*” （第 8 段）	“回收塑料也**并不容易**，因为同一件物品中**常含多种**塑料，**且需要不同的处理方法**。”	多种塑料混在同一物品 → 处理方式不同 → 难以回收再利用，与题意一致，TRUE。
12	**FALSE**	向塑料中加入淀粉会使其**更耐用**。	“*Plastics can be made **biodegradable** by incorporating … **starch**, which is attacked by bacteria and **causes the plastic to fall apart**.*” （第 9 段）	“在结构中加入**淀粉**可使塑料**可生物降解**；淀粉会被细菌分解，**导致塑料碎裂**。”	加淀粉会让塑料更易降解、更不耐用；与题干 “更耐用” 相反，故 FALSE。
13	**TRUE**	设计成可分解的容器需要特殊的储存条件。	“*… materials … decay in sunlight—**although bottles** made of such materials **have to be stored in the dark**, to ensure they do not disintegrate before use.*” （第 9 段）	“……某些材料在阳光下会逐渐降解——**由此类材料制成的瓶子**必须**避光储存**，以免在使用前就解体。”	明确要求 “存放在黑暗处”，即需要特定储存条件，TRUE。