READING PASSAGE 2

*You should spend about 20 minutes on **Questions 14-26**, which are based on Reading Passage 2 on the following pages.*

Questions 14–20

*Reading Passage 2 has seven paragraphs, **A–G**.*

Choose the correct heading for each paragraph from the list of headings below.

*Write the correct number, **i–x**, in boxes 14–20 on your answer sheet.*

List of Headings

i	Global resistance to lean manufacturing
ii	The historical context
iii	Procedures for controlling quality
iv	The pros and cons of different production systems
v	The impact on profits
vi	Procedures for controlling supply
vii	The origin of the term
viii	A crucial difference in levels of quality
ix	Working conditions
x	Interdependent strategies for controlling expenditure

14 Paragraph **A**

15 Paragraph **B**

16 Paragraph **C**

17 Paragraph **D**

18 Paragraph **E**

19 Paragraph **F**

20 Paragraph **G**

Lean Production Innovation – In Manufacturing Systems

A After the First World War, car makers Henry Ford and Arthur Sloan of General Motors moved world manufacturing from centuries of craft production into the age of mass production. Largely as a result of this, the United States soon dominated the world economy. After the Second World War, and approximately a hundred years after Japan opened up to the modern world, Eiji Toyoda and Taiichi Ohno pioneered the concept of lean production at the Toyota car company. And now, although superimposing the method on existing mass production systems causes pain and upheaval, manufacturers around the world are trying to embrace this innovative system.

B Perhaps the best way to describe lean production is to compare it with the two other major manufacturing systems: craft production and mass production. The craft producer uses highly skilled workers and simple but flexible tools to make exactly what the customer asks for – one item at a time. A present-day example of this method is the customised production of a few exotic sports cars. The concept of craft production remains very popular, but the problem with it is obvious. Goods produced by the craft method – as cars once exclusively were – cost too much for most of us to afford. So at the beginning of the twentieth century, mass production was developed as an alternative method. The mass producer uses narrowly skilled professionals to design products which are then made by unskilled or semi-skilled workers, using expensive, single-purpose machines. These churn out standardised products in very high volumes. Because the machinery costs so much, and is so intolerant of disruption, the mass producer keeps standard designs in production for as long as possible. The result is that the customer gets lower costs, but at the expense of variety, and by means of work methods which most employees find boring and dispiriting. By contrast, the lean production system combines the advantages of craft and mass production, while avoiding the high cost of the former and the rigidity of the latter. Towards this end, companies appoint teams of multi-skilled workers to all levels of the organisation, and use highly flexible and increasingly automated machines to produce goods in enormous volume and variety.

C Lean production is so called because, compared with mass production, it uses less of everything – half the human effort in the factory, half the manufacturing space, half the investment in tools, and half the engineering hours to develop the new product. It also results in far fewer defects.

D Perhaps the most striking contrast between mass and lean production systems lies in their production standards. Mass producers set a limited goal for themselves: ‘good enough’, which translates into an acceptable number of defects, a maximum acceptable number of inventories, and a narrow range of standardised products. Lean producers, on the other hand, are unwilling to compromise standards in any of these areas.

E Although cost reduction is the primary objective of the lean production system, it must meet three other intermediate objectives in order to achieve this: quantity control, quality assurance and respect for humanity. Firstly, the system must be able to adapt to daily and monthly fluctuations in demand. Secondly, each separate process must supply only good units to the subsequent process. Thirdly, in as far as the system uses human resources to attain its cost objectives, respect for human needs must be cultivated. It should be emphasised that none of these three objectives can be achieved separately.

F The continuous flow of lean manufacturing production relies on two practical mechanisms: just-in-time and autonomation. Just-in-time means, for example, that in the process of assembling the parts to build a car, components from the preceding process should arrive at the next part of the line at exactly the right time and in the correct quantities. If just-in-time is fully realised throughout the company, then superfluous inventories are completely eliminated from the factory, making stores or warehouses unnecessary. However, relying solely on a central planning approach to control schedules for all stages of the production process simultaneously is very difficult in the case of cars, which consist of thousands of parts. So the lean system looks at the production flow in reverse; in other words, employees go to the preceding process to withdraw the necessary quantity of units at the appropriate time. The preceding process must produce only sufficient quantities of units to replace those that have been withdrawn, and in turn withdraws the requisite number of components from the process that precedes it.

G Autonomation is the automatic checking for abnormalities in the production process. In order to realise just-in-time perfectly, only units which are in perfect condition must be allowed to flow to the next process, and this flow must be regular and uninterrupted. In other words, quality control must coexist with just-in-time procedures throughout the system. Autonomation involves building in a mechanism to prevent the multiplication of defects in machines or product lines. For example, in Toyota factories almost all the machines have been fitted with stopping devices, and the concept of autonomation has been extended to manual production lines. If something abnormal happens there, the worker pushes a button to stop the whole line, and lights, which are hung so high in the factory that they are visible to everyone, indicate the position of the problem.

Questions 21–26

Complete the sentences below.

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

Write your answers in boxes 24–26 on your answer sheet.

21 A small number of unusual cars are still produced by the _____ method.

22 Lean production requires staff who are _____.

23 Lean production employs fewer people, and uses less _____, equipment and time.

24 Storage facilities are not needed if a procedure known as _____ is implemented in the lean production method.

25 Autonomation is a procedure for spotting any _____ in the products on a production line.

26 At Toyota factories, _____ are suspended above manual production lines in order to show where production has to be halted.

Questions 14–20（配对标题）

题号	段落	答案	标题（英）	标题（中）	精确定位（英文）	定位译文	解释
14	A	**ii**	The historical context	历史背景	“After the First World War… After the Second World War… Eiji Toyoda and Taiichi Ohno pioneered the concept of lean production…”	“第一次世界大战之后……第二次世界大战之后……丰田英二与大野耐一开创了精益生产理念……”	全段按时间线讲从手工业→大生产→精益生产的演进，是典型的历史背景铺垫。
15	B	**iv**	The pros and cons of different production systems	不同生产体系的优缺点	“The craft producer… cost too much… mass producer… boring and dispiriting. By contrast, the lean production system combines the advantages of craft and mass…”	“手工业生产……成本过高；大规模生产……让员工感到乏味沮丧。相比之下，精益生产结合两者优点……”	本段系统对比手工业、流水化大生产与精益的长短处，故选 iv。
16	C	**vii**	The origin of the term	术语来源	“**Lean** production is so called because, compared with mass production, it uses less of everything—…”	“之所以称为**‘精益’**，是因为与大生产相比，它在各方面都用得更少……”	直接解释 “lean” 名称的由来。
17	D	**viii**	A crucial difference in levels of quality	质量水平的关键差异	“Mass producers set a limited goal for themselves: ‘good enough’… Lean producers… are unwilling to compromise standards…”	“大生产把目标限定为 ‘够用即可’……而精益生产不愿在这些方面降低标准……”	核心对比是质量/标准上的差异，故选 viii。
18	E	**x**	Interdependent strategies for controlling expenditure	控制成本的相互依赖策略	“Although cost reduction is the primary objective… it must meet three other intermediate objectives… It should be emphasised that none of these three objectives can be achieved separately.”	“虽然降成本是首要目标……必须同时实现三个中间目标……而且三者**不能彼此割裂**。”	讲为降成本而设的三项互相依赖的目标（量的调节、质量保证、尊重人性），与 x 完全对应。
19	F	**vi**	Procedures for controlling supply	供应控制流程	“The continuous flow… relies on… **just-in-time**… employees go to the preceding process to withdraw the necessary quantity… The preceding process must produce only sufficient quantities…”	“连续流依赖**准时化**……后工序按需从前工序取料；前工序只补足被取走的数量……”	全段是 JIT 的拉动式补给与库存消除，属于 “供应控制流程”。
20	G	**iii**	Procedures for controlling quality	质量控制流程	“**Autonomation** is the automatic checking for abnormalities… quality control must coexist with just-in-time… machines have been fitted with stopping devices… worker pushes a button to stop the whole line…”	“**自働化 / 自働化质控**即自动检出异常……质量控制与 JIT 并行……设备带停机装置；工人可一键停线……”	讲 “自働化（Autonomation）” 的质控机制与停线系统，故为质量控制流程。

Questions 21–26（完成句子）

> 说明：表中 “题干译” 为该题句子的中文翻译；答案必须取自原文且不超过三个词。

题号	标准答案	题干译	精确定位（英文）	定位译文	解释
21	**craft production**	“少量不寻常的汽车仍采用 _____ 方法生产。”	“A present-day example of **this method** is the customised production of a few exotic sports cars.”（B 段）	“这一方法在当代的例子是：少量**异域跑车**的定制化生产。”	“this method” 指代上文的 **craft production（手工业生产）**。故填 *craft production*。
22	**multi-skilled**	“精益生产要求员工具备 _____ 的素质。”	“companies appoint teams of **multi-skilled** workers to all levels of the organisation”（B 段）	“公司在各层级都配备**多技能**员工团队。”	空格主语是 “staff who are …”，与原文形容词 **multi-skilled** 完全对应。
23	**manufacturing space**	“精益生产雇用更少的人，并使用更少的 _____、设备和时间。”	“uses less of everything—… half the **manufacturing space**, half the investment in tools, and half the engineering hours…”（C 段）	“在各方面用得更少——……**制造空间**减半，工具投入减半，工程工时减半……”	句中 “equipment and time” 分别对应原文 “tools（设备）/ engineering hours（时间）”，故缺项应为 **manufacturing space**。
24	**just-in-time**	“如果实施一种称为 _____ 的流程，便不需要仓储设施。”	“If **just-in-time** is fully realised… superfluous inventories are completely eliminated… making stores or warehouses unnecessary.”（F 段）	“若**准时化**完全实现……多余库存被彻底消除，从而**不再需要仓库**。”	直接对应原文；连字符计为一个词，满足 “≤3 个单词”。
25	**defects**	“‘自働化（Autonomation）’是一种用于发现生产线上产品任何 _____ 的流程。”	“Autonomation is the automatic checking for abnormalities… [and] prevent the multiplication of **defects** in machines or product lines.”（G 段）	“自働化即自动检出异常……并防止机器或产线**缺陷**的扩散。”	题干限定 “in the products on a production line”，与原文 “defects… in… product lines” 搭配最自然，故填 **defects**（而非 “abnormalities”）。
26	**lights**	“在丰田工厂，为了显示必须停产的位置，手工产线上方悬挂着 _____。”	“the worker pushes a button to stop the whole line, and **lights**, which are hung so high… indicate the position of the problem.”（G 段）	“工人按键可停线；悬挂在高处的灯指示问题位置。”	直接对应原文 **lights**。

25 题可能有争议（abnormalities vs. deflects），分析见下页

1. 原文两处关键表达

- “Autonomation is the automatic checking for **abnormalities in the production process**.”
  这里的 *abnormalities* 指的是**流程/设备运行的异常**（如停顿、错位、卡机、节拍被打乱等），修饰对象是 *production process*。
- “Autonomation… to prevent the multiplication of **defects** in machines or **product**ion lines.”
  这里的 *defects* 指**产品或工位/生产线上的缺陷**（尺寸不合格、划伤、漏装等），语义落在“产品质量问题”。

2. 题干的限定
“spotting any _____ **in the products on a production line**”
→ 明确限定“**在生产线上的产品**中的问题”。和“产品”天然最恰当的搭配是 **defects in the products**（产品缺陷）。而 *abnormalities* 在文中搭配的是 **process**（流程），不直接指向“产品”。