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 14–19

*Reading Passage 2 has six paragraphs, **A–F**.*

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

*Write the correct number, **i–vii**, in boxes 14–19 on your answer sheet.*

List of Headings

i	The effect of man-made imitations on insects
ii	The need to instruct additional insect guides
iii	Signals used by certain insects to indicate a discovery
iv	How urgency can affect the process of finding a new home
v	The use of trained insects in testing scientific theories
vi	The use of virtual scenarios in the study of insect behaviour
vii	How the number of decision-makers affects the decision

14 Paragraph **A**

15 Paragraph **B**

16 Paragraph **C**

17 Paragraph **D**

18 Paragraph **E**

19 Paragraph **F**

Insect Decision-Making

A It has long been held that decisions made collectively by large groups of people are more likely to turn out to be accurate than decisions made by individuals. The idea goes back to the 'jury theorem' of Nicolas de Condorcet, an 18th-century French philosopher who was one of the first to apply mathematics to the social sciences. Condorcet's theory describes collective decisions, outlining how democratic decisions tend to outperform dictatorial ones. If, for example, each member of a jury has only partial information, the majority decision is more likely to be correct than a decision arrived at by a single juror. Moreover, the probability of a correct decision increases with the size of the jury.

B Now it is becoming clear that group decisions are also extremely valuable for the success of social animals, such as ants, bees, birds and dolphins. Bees make collective decisions, and they do it rather well, according to Christian List of the London School of Economics, who has studied group decision-making in humans and animals. Researchers led by Dr List looked at colonies once the original colony reached a certain size. The queen goes off with about two-thirds of the worker bees to live in a new home or nest, leaving a daughter queen in the old nest with the remaining workers. Among the bees that depart are some that have searched for and found some new nest sites, and reported back using a characteristic body movement known as a 'waggle dance' to indicate to the other bees the suitable places they have located. The longer the dance, the better the site. After a while, other bees start to visit the sites signalled by their companions to see for themselves and, on their return, also perform more waggle dances. The process eventually leads to a consensus on the best site and the breakaway swarm migrates. The decision is remarkably reliable, with the bees choosing the best site even when there are only small differences between alternative sites.

C But exactly how do bees reach such a robust consensus? To find out, Dr List and his colleagues used a computer-generated model of the decision-making process. By experimenting with it, they found that, when bees in the model were very good at finding nesting sites but did not share their information, this dramatically slowed down the migration, leaving the swarm homeless and vulnerable. Conversely, bees in the model blindly followed the waggle dances of others without first checking. The researchers concluded that the ability of bees to identify successfully and quickly the best site depends on both the bees' interdependence in communicating the whereabouts of the best site, and their independence in confirming this information for themselves.

D Another situation in which collective decisions are taken occurs when animals are either isolated from crucial sources of information or dominated by other members of the group. Jose Halloy of the Free University of Brussels in Belgium used robotic cockroaches to subvert the behaviour of living cockroaches and control their decision-making process. In his experiment, the artificial bugs were introduced to the live ones and soon became sufficiently socially integrated that they were perceived by the real cockroaches as equals. By manipulating the robots, which were in the minority, Halloy was able to persuade the living cockroaches to choose an inappropriate shelter—even one which they had rejected before being infiltrated by the robots.

E The way insects put into effect collective decisions can be complex and as important as the decisions themselves. At the University of Bristol, in the UK, Nigel Franks and his colleagues studied how a species of ant establishes a new nest. Franks and his associates reported how the insects reduce the problems associated with making a necessarily swift choice. If the ants' existing nest becomes suddenly threatened, the insects choose certain ants to act as scouts to find a new nest. How quickly they accomplish the transfer to a new home depends not only on how soon the best available site is found, but also on how quickly the migration there can be achieved.

F Once the suitable new nest is identified, the chosen ants begin to lead others, which have made it to the new site or which may simply be in the vicinity, back to the original threatened nest. In this way, those ants which are familiar with the route can help transport, for example, the queen and young ants to the new site, and simultaneously show the way to those ants which have been left behind to guard the old nest. In this way, moving processes are accomplished faster and more efficiently. Thus the dynamics of collective decision-making are closely related to the efficient implementation of those decisions. How this might apply to choices that humans make is, as yet, unclear. But it does suggest, even for humans, the importance of recruiting dynamic leaders to a cause, because the most important thing about collective decision-making, as shown by these insect experiments, is to get others to follow.

Questions 20–23

Look at the following findings (Questions 20–23) and the list of academics below.

Match each finding with the correct academic, ***A–D****.*

Write the correct letter, ***A–D****, in boxes 20–23 on your answer sheet.*

NB *You may use any letter more than once.*

20 Certain members can influence the rest of the group to alter a previous decision.

21 Individual verification of a proposed choice is important for **a** successful decision outcome.

22 The more individuals taking part in a decision, the better the decision will be.

23 The decision-making process of certain insects produces excellent results even when fine distinctions are required.

List of Academics

A	Nicolas de Condorcet
B	Christian List and colleagues
C	José Halloy
D	Nigel Franks and colleagues

Questions 24–26

Complete the summary below.

*Choose **ONE WORD ONLY** from the passage for each answer.*

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

A Study of Insect Decision-making

A Bristol University study looked at how insects make decisions when their home has been **24** _____. The ants in the experiment relied on the use of individuals called **25** _____ to find a new nest and efficiently direct the others to go there. The study concluded that the effective implementation of the ants' decision meant that the insects could change homes quickly. The study emphasized the necessity, for people as well as insects, of having active **26** _____ in order to execute decisions successfully.

题型一：List of Headings（14–19）

题号	答案	题干翻译	精确定位句（原文 → 译文）	解析
14（A）	**vii**	“为第 A 段选择合适标题：决策者人数如何影响决策”	“*Moreover, the probability of a correct decision increases with the size of the jury.*” → “此外，**陪审团人数越多**，作出**正确决定的概率越高**。”	A 段讲康多塞“陪审团定理”，核心就是**人数↑ → 正确率↑**，与 vii 完全同义替换。其余标题均涉“昆虫/虚拟/紧迫性”等，不符本段“人类群体决策”主题。
15（B）	**iii**	“为第 B 段选择合适标题：某些昆虫用来表示发现的信号”	“*…reported back using a characteristic body movement known as a ‘waggle dance’ to indicate to the other bees the suitable places they have located. The longer the dance, the better the site.*” → “……**用一种称为‘摆尾舞’的典型体态**向同伴**指示**它们找到的合适地点。**舞越长，地点越好**。”	关键词**signal/indicate**在文中体现为“waggle dance 指示发现”，与 iii 精确匹配。
16（C）	**vi**	“为第 C 段选择合适标题：用**虚拟情境**研究昆虫行为”	“*Dr List and his colleagues used a **computer generated model** of the decision-making process.*” → “李斯特博士团队使用**计算机生成模型**来模拟决策过程。”	**computer-generated model=虚拟场景/仿真模型**，正对标题 vi。
17（D）	**i**	“为第 D 段选择合适标题：**人造模仿物**对昆虫的影响”	“*José Halloy … used **robotic cockroaches** to subvert the behaviour of living cockroaches… Halloy was able to persuade the living cockroaches to choose an inappropriate shelter — even one which they had rejected before …*” → “哈洛伊用**机器人蟑螂**干预真蟑螂……甚至让它们**改选**先前**拒绝**的栖身处。”	**robotic（人造）个体作为模仿/仿效者**改变群体选择，对应“man-made imitations”的效果。
18（E）	**iv**	“为第 E 段选择合适标题：**紧迫性**如何影响寻找新家的过程”	“*If the ants’ existing nest **becomes suddenly threatened**, the insects choose certain ants to act as scouts to find a new nest. How quickly they accomplish the transfer … depends … on how quickly the **migration** … can be achieved.*” → “若旧巢突然**受威胁**，便选出**侦察兵**找新巢；迁徙**多快完成**直接影响整体转移速度。”	本段反复强调**受威胁（紧迫）→ 侦察 → 迁移速度**，正是“紧迫性影响过程”。
19（F）	**ii**	“为第 F 段选择合适标题：需要**指引/带路**的额外个体”	“*Once the suitable new nest is identified, the **chosen ants begin to lead others** … show the way … In this way, moving processes are accomplished **faster** … It … suggests … the importance of recruiting **dynamic leaders** … to get others to follow.*” → “一旦确认新巢，**被挑选的蚂蚁开始带领**其他个体……因此**迁移更快**；这也提示人类要**招募有行动力的领头者**，使他人跟随。”	**lead/show the way/leaders** = “充当向导”，与“instruct additional insect guides”对应。F 段强调**让更多个体跟上**是执行集体决策的关键。

题型二：Matching（20–23）

题号	答案	题干翻译	精确定位句（原文→译文）	解析
20	**C（José Halloy）**	“某些成员能影响其余群体**改变先前决定**。”	“*Halloy was able to persuade the living cockroaches to choose an **inappropriate shelter — even one which they had rejected before** …*” → “哈洛伊让活蟑螂选择**不合适的栖身处——甚至是它们之前拒绝过的**。”	“被少数机器人**说服**”=少数成员影响多数并**推翻旧选择**，与题干完全对应。
21	**B（Christian List and colleagues）**	“对拟议选择进行**个体核验**对成功很重要。”	“*the ability … depends on both the bees’ **interdependence** in communicating … and their **independence in confirming** this information for themselves.*”（第C段末）→ “成功既依赖**相互依存的沟通**，也依赖**各自独立的确认**。”	“independence in confirming=个体核验”，明确对应题意。该发现出自**List团队**的模型实验。
22	**A（Nicolas de Condorcet）**	“参与决策的个体越多，决策越好。”	“*the probability of a correct decision **increases with the size of the jury**.*”（第A段）→ “**陪审团越大**，正确率**越高**。”	康多塞定理的直接表述=题干同义改写。
23	**B（Christian List and colleagues）**	“在需要**细微区分**时，某些昆虫的决策过程仍表现优异。”	“*The decision is remarkably reliable, with the bees choosing the best site **even when there are only small differences** between alternative sites.*”（第B段）→ “即便多个地点**差别很小**，蜜蜂仍能**可靠**选出最佳。”	“small differences=细微区分”，与题干高度同义；结论来自**List团队**的蜜蜂研究。

题型三：Summary Completion（24–26，ONE WORD ONLY）

答案：24. threatened　25. scouts　26. leaders

空格	答案	题干翻译	精确定位句（原文→译文）	解析
24	**threatened**	“当它们的家已被____时”	“*If the ants’ existing nest **becomes suddenly threatened** …*”（第E段）→ “如果旧巢**突然受到威胁**……”	与题干“home has been …”时态搭配；文中无“destroyed/damaged”等更强词，故以**threatened**为准。
25	**scouts**	“这些被称为____的个体”	“*the insects choose certain ants to act as **scouts** to find a new nest.*”（第E段）→ “选择一些蚂蚁充当**侦察兵**寻找新巢。”	直接同形词填空；唯一恰当名词。
26	**leaders**	“需要有活跃的____来成功执行决策”	“*the importance of recruiting **dynamic leaders** … the most important thing … is to **get others to follow**.*”（第F段）→ “强调**招募充满活力的领袖**的重要性……关键是让他人**跟随**。”	“dynamic leaders”与题干“active ___”精准同义；语义与执行/动员相契合。