READING PASSAGE 3

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

Science and Filmmaking

Academics are now working more with filmmakers who are impressed by the results of their research in computer-generated imagery (CGI)

Every year the film academy in the USA celebrates the outstanding achievements of the year in a ceremony known as the Oscars. An increasingly important component of the ceremony is the presentation of the Scientific and Technical awards. In 2004 a notable event took place: the academic world met the cinematographic world when researchers from Stanford University in the USA were awarded an Oscar. These researchers, led by Steve Marschner, were from the field of Computer Graphics at Stanford. They were part of a growing cohort of computer scientists that has become fundamental to moviemaking.

Films have shown that it is possible to use CGI to make actors look younger, older, weaker or stronger than they actually are in a surprisingly realistic manner. At least, it is possible if the altered actors are not filmed too closely. This is because the difficulty of recreating the textures of both skin and fabric means that the effect is less convincing when seen close up. The work of Marschner and his colleagues has greatly improved the accurate and realistic modeling of both skin and fabric. They recognized that one of the difficulties of creating lifelike characters in the computer world is that, in CGI, the characters' skin is opaque (two-dimensional) whereas real skin is in fact translucent (three-dimensional), that is to say, it is semi-transparent.

Marschner and his colleagues received the Oscar for their work in successfully producing a CGI model that simulates translucency; this is when light penetrates skin and then scatters below the skin's surface before re-emerging. This is called subsurface scattering, and the mathematics for the model goes back many decades to the time when it was used in astrophysics. Because human skin is naturally translucent, it was necessary to be able to create this artificially in order to simulate the soft appearance of real skin. Previous CGI models, which assumed that skin was entirely opaque, resulted in characters with a plastic appearance. The scientists' new model of CGI was so important in bringing digital characters to life that, within two years of their original research paper, all the major special-effects studios had incorporated it into their digital rendering systems.

However, despite their award, the scientists, with admirable tenacity, continued their search for perfection, as they still did not feel that they had yet satisfactorily recreated the subtle ways light is reflected. To do this, they began to look in detail at the way skins and fabrics reflect light differently according to their make-up: the exact arrangement of fibers in fabric and the network of fibers in skin. Marschner and his team tried to do this by using computerized tomography, which is most familiar as a medical technique for examining people's internal organs. Like classical radiology, it uses X-rays, but because the image is constructed inside a computer using exposures taken from many different positions, rather than a single exposure on photographic film, it can capture fine details that are invisible in classical radiography.

Unfortunately, the scientists understood that at this point in time they could not use computerized tomography on skin, because a very high-intensity X-ray is needed to show the kind of detail they wanted and this would be very dangerous for human skin. They have, however, had some success with fabric. Using this new method of imaging, they are able to accurately record the three-dimensional structure of all the fibers in a number of small pieces of fabric. These same pieces of fabric, through the use of CGI, can then be patched together to form an entire garment inside a computer, in the same way that a small group of actors can be made to look like hundreds of people gathered together. A garment created through CGI is therefore made up of pieces of fabric whose internal structure has been pre-recorded. This means that the way light is reflected by the garment can be calculated far more realistically than if the scientists just made a computer model of what they thought the interior of the fabric looked like. Cinematography will benefit from this because, although it may take some years to be able to use computerized tomographic imaging of skin, for the moment the movement of a virtual cloak or the lifting of a computerized hat should look far more realistic.

In the meantime, according to Marschner's colleague Kavita Bala, the technology might have an application in online retailing. At the moment, people buying clothes over the internet have only a standard photograph to help them choose their purchases. It is hoped that if online shoppers can view items which have been presented through the use of computerized tomography graphics, they will have a much better understanding of what the material the item is made of is really like.

Marschner is now working on the way light is scattered from individual hairs. He says, 'I feel lucky to be working in this niche. I'm a visual person and to be able to spend my time scrutinizing the world around me, trying to understand why it looks the way it does, is very rewarding'.

Questions 27–32

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

Write the correct letter in boxes 27–32 on your answer sheet.

27 What is the writer's main point in the first paragraph?

- **A** Computer scientists are rarely represented at the Oscars.
- **B** Film-industry awards hold little interest for computer scientists.
- **C** The USA rewards film actors more than computer scientists.
- **D** Computer scientists are becoming a vital part of the film industry.

28 When describing the way computer-generated imagery changes actors' appearance, what does the writer suggest?

- **A** CGI looks best from a distance.
- **B** CGI interferes with actors' facial expressions.
- **C** Audiences expect too much of CGI.
- **D** The scientists had hoped for more convincing results.

29 What does the writer suggest about the scientists' attitude to their work in the fourth paragraph?

- **A** They were motivated to get as near to reality as possible.
- **B** They were interested in gaining recognition for their work.
- **C** They thought it could have medical applications.
- **D** They hoped to receive further funding for their research.

30 What are we told about computerised tomography?

- **A** It has only recently been used by doctors.
- **B** It is similar to X-rays in the way it works.
- **C** Filmmakers have used it for many years for special lighting effects.
- **D** It can be administered using traditional radiography machines.

31 Which of these advantages does the writer attribute to the current use of computerised tomography?

- **A** It is most effective when used to create images of skin.
- **B** It can make a few people seem like a crowd.
- **C** It allows clothes designers to create new designs.
- **D** It is practical because of the time it takes.

32 The writer mentions Kavita Bala in order to

- **A** comment on the success of CGI in commercial contexts.
- **B** highlight the link between CGI and photography.
- **C** show that Marschner's team are uncertain about the future of CGI.
- **D** demonstrate a use for CGI outside the film industry.

Questions 33–36

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

In boxes 33–36 on your answer sheet, write

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

33 It used to be unusual for university researchers to receive a cinematography award.

34 CGI is popular among ageing actors.

35 The scientists' success in generating images of complete CGI garments has won them many awards.

36 It will be a long time before computerised tomographic *imaging of fabric* is used by filmmakers.

Questions 37–40

*Complete the summary using the list of words, **A–I**, below.*

*Write the correct letter, **A–I**, in boxes 37–40 on your answer sheet.*

The work of Marschner and his colleagues

For many years, CGI characters did not appear entirely lifelike as their skin appeared plastic. Marschner and his colleagues were the first to apply an understanding of how **37** _____ interacts with human skin. Their CGI model is based on a novel application of principles of **38** _____, which had previously been applied in other scientific research. The importance of CGI to the film industry has led to the **39** _____ of Marschner's model by special-effects studios. Marschner's model has led to the **40** _____ of cinematography.

A light	**B** transparency	**C** age
D use	**E** astrophysics	**F** mathematics
G improvement	**H** colour	**I** translucency

选择题（27–32）

题号	答案	题干翻译	精准定位（段落与原文关键句）	详细解释（含排除项）
27	**D**	作者在**第一段**主要表达了什么观点？	**第 1 段**末句："*They were part of a growing cohort of computer scientists that has become **fundamental to moviemaking**.*"	这句直接说"计算机科学家已成为电影制作的**关键**部分"，对应 D。A"很少出现在奥斯卡"与文意相反；B"对电影奖没兴趣"文中未提；C"美国更奖励演员"亦未述及。
28	**A**	描述 CGI 改变演员外貌时，作者暗示了什么？	**第 2 段**："*…it is possible **if the altered actors are not filmed too closely**… the effect is **less convincing when seen close up**.*"	只有**远景/不近拍**时更逼真 → "CGI looks best from a distance"，选 A。B"影响表情"未提；C"观众期望太高"无据；D"科学家希望更逼真"不是在谈"外貌效果的观看距离"。
29	**A**	作者在**第四段**暗示这些科学家对待工作的态度是什么？	**第 4 段**首句："*…with admirable tenacity, **continued their search for perfection**, as they still did not feel that they had yet satisfactorily recreated the subtle ways light is reflected.*"	"执着追求**尽可能贴近真实/完美**"，对应 A。B"想要名声"、D"想要经费"皆无文据；C"医学应用"只是介绍 CT 的来源，并非他们的动机。
30	**B**	文中关于**计算机断层扫描（CT）**告诉了我们什么？	**第 4 段**："*Like classical radiology, **it uses X-rays** …*"	直接对应 B"在工作原理上类似 X 光"。A"刚被医生使用"错误；C"被电影人多年用于打光效果"无据；D"可用传统放射设备施行"文中恰恰强调其不同——由多角度曝光在计算机内合成。
31	**B**	下列哪一项优势被作者归因于**当前 CT 的使用**？	**第 5 段**："*These same pieces of fabric… can then be patched together to form an entire garment inside a computer, **in the same way that a small group of actors can be made to look like hundreds of people** gathered together.*"	这里把用**少量布片**合成整件衣服，类比为**"少数人看起来像人群"**的效果 ⇒ 选 B。A"最适合做皮肤"与第 5 段"现阶段不能对皮肤用 CT"相矛盾；C"帮助服装设计新款式"未提；D"因耗时而更实用"相反，皮肤成像"需多年"才可能实现。
32	**D**	作者提到 **Kavita Bala** 是为了——	**第 6 段**："*…the technology might have an application in **online retailing** … if online shoppers can view items… they will have a much better understanding of the material …*"	这是把技术**应用到电影业之外（网络零售）**，选 D。A"商业成功评价"并非重点；B"与摄影的联系"不是主旨；C"表达团队对未来不确定"亦无文据。

判断题（33–36）

题号	答案	题干翻译	精准定位	解释
33	**YES**	过去大学研究人员获得电影摄影类奖项并不常见。	**第 1 段**："*In 2004 **a notable event** took place: the academic world met the cinematographic world when researchers from Stanford… were awarded an Oscar.*"	"notable event（引人注目的事件）"表明这类事在当时**罕见**，与题干一致，所以 **YES**。
34	**NOT GIVEN**	CGI 在年长演员中很受欢迎。	—	文中只说 CGI 能让演员看起来"更年轻/更年老/更强壮/更虚弱"（第 2 段），但**未讨论受欢迎程度**或"在年长演员中是否流行"，故 **NG**。
35	**NOT GIVEN**	科学家因生成完整 CGI 服装图像的成功而获得了许多奖项。	**第 3 段**仅提他们因皮肤**半透明模型**获奥斯卡；**第 5 段**谈服装/织物的技术进展，未提任何奖项。	题干把"多项大奖"与"完整服装成像"联系起来，文中没有信息支撑，也没有相反信息，故 **NG**。
36	**NO**	电影人采用**织物**的 CT 成像还需要很长时间。	**第 5 段**："*…although it may take some years to be able to use computerized tomographic imaging of **skin, for the moment** the movement of a virtual cloak… **should look far more realistic**.*"	"需要数年"指的是**皮肤**而非**织物**；织物部分"此刻就能更逼真"。题干把"长时间"套在"织物"上，与原文**矛盾** ⇒ **NO**。

摘要填空（37–40）

> 题干简译见各空右侧；答案从词汇表 **A–I** 中选择。

空格	答案	题干翻译（对应空所在小句）	精准定位	解释
37	**A (light)**	对**____**如何与人体皮肤相互作用的理解	**第 3 段**："*…this is when **light** penetrates skin and then scatters…*"	讲的是"光"进入并在皮下散射（次表面散射），故选 **light**。
38	**E (astrophysics)**	其模型基于把**____**的原理作了新的应用	**第 3 段**："*…the mathematics for the model goes back many decades to the time when it was used in **astrophysics**.*"	这些数学原理原本用于**天体物理**，此处被"新用途"地应用到 CGI。
39	**D (use)**	CGI 的重要性导致特效公司对该模型的**____**	**第 3 段**末句："*…within two years… all the major special-effects studios had **incorporated it** into their digital rendering systems.*"	"纳入/采用/使用"即 **use**。
40	**G (improvement)**	该模型促成了电影摄影的**____**	**第 3 段**与全文：新的皮肤模型让数字角色"栩栩如生"，让运动与质感更逼真	效果显著提升了成片画质与真实感，语义对应 **improvement**。