READING PASSAGE 1

*You should spend about 20 minutes on **Questions1–13**, which are based on Reading Passage 1 below.*

HYBRID SOLAR LIGHTING

—Light the Interiors of Buildings with Sunlight!

Hybrid solar lighting is a system that captures sunlight on a roof top and uses optical fibres to channel it directly into a building. The only power needed to operate it is a 9-volt battery and the energy cost reduction, worker productivity and health benefits are immense.

It was originally developed by the US Department of Energy at its Oak Ridge National Laboratory and licensed to a company called Sunlight Direct. It has already been installed in a large number and a wide range of buildings in the USA including higher education institutions, museums, department stores and other specialty stores. Initial reports declare that retail sales increase by as much as 40% when the switch is made from fluorescent lighting to hybrid solar. Furthermore, there is a major improvement in the attention spans and academic attainment of undergraduates in classrooms or lecture theatres lit by hybrid solar. It is to be hoped that the technology can soon be made financially feasible for households as well as commercial buildings.

It has been suggested that 30% of the electricity used in the USA is just for lighting and, for retailers, the estimate increases to 45%. Obviously, that figure could decrease significantly if sunlight could be brought inside. Hybrid solar lighting is predicted not only to save millions of dollars in energy costs but it is attractive for its quality which is almost identical to daylight.

A solar collector consisting of a 1.2 metre parabolic primary mirror concentrates the light toward a secondary mirror which has a special multi-layer coating that reflects only the visible wavelengths which effectively strips off the ultra-violet and infra-red wavelengths from the reflected light. This is important to reduce heat in the fibre optics which would otherwise melt. The visible light is focused from the secondary mirror towards a receiver module where it is homogenized to guarantee uniformity before it enters the fibre optic bundle which then passes into the building interior for lighting. The fibres are easily installed and replaced and unlike fluorescent lights that require energy, the hybrid solar system only needs one 9-volt battery to power the solar tracking system for a week.

The solar tracker mechanism consists of two motors that are controlled by a GPS (global positioning system) micro processor situated beneath it. This computes the exact position of the sun(based on the latitude, longitude, date and time) to within point one degree. The light collected shines brightly. Just two of these fibres emit enough light to be equivalent to a 60 Watt light bulb and there are 127 of fibres in one bundle. What if it is cloudy or rainy outside?

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That's where the hybrid comes in. The lighting fixtures combine the sunlight with the artificial light from fluorescent or incandescent lamps to create a hybrid luminaire. A photo sensor in the room monitors the intensity and automatic adjustments are made in order to keep a constant level of illumination.

A room lit entirely by fluorescence has an orange glow which is not very natural. If the lighting is changed to 80% solar and 20% fluorescent, it is far more aesthetically appealing. It is estimated that hybrid solar lighting could reduce their energy bill of most retailers by 60%; and retail stores have been some of the first adopters of the new technology because of the health benefits gained from natural lighting. Studies have shown that 20% of workers under artificial light suffer symptoms of depression from Seasonal Affective Disorder (SAD). In addition, retail stores with natural lighting sold 40% more merchandise than stores with artificial light. Research has shown that biological rhythms and circadian rhythms are the secret to having successful and productive employees. Bringing in the natural light helps regulate these biological processes.

The technology has made such an impression that other scientists are looking at alternative applications: utilizing the UV light energy for hot water heating, for example. There is one limitation to the technology, however: although the plastic optical fibres are very low cost, they also have very low transmittance and extend for only around 15 metres from the solar collector. This is why currently solar hybrid lighting is primarily focused on the top and main floors of a building.

Overall, the potential electricity savings and carbon dioxide reductions are enormous. The units are designed to last twenty years and, as volumes of sales increase, the price should come down considerably. It may be a while before individual households can enjoy hybrid solar lighting but, in the meantime, there is a substantial benefit in that it is making many work and study spaces as natural and comfortable for humans as possible.

Questions 1–3

Complete the summary below with words taken from Reading Passage 1.
*Use **NO MORE THAN TWO WORDS** for each answer.*
Write your answers in boxes 1–3 on your answer sheet.

A hybrid solar lighting system has been developed that uses **1** ..... to illuminate buildings. Numerous advantages have been described, such as a boost in **2** ..... and increased **3** ..... and educational achievement amongst students.

Questions 4–8

Complete the diagram below.
*Choose **NO MORE THAN TWO WORDS** from the passage for each answer.*
Write your answers in boxes 4–8 on your answer sheet.

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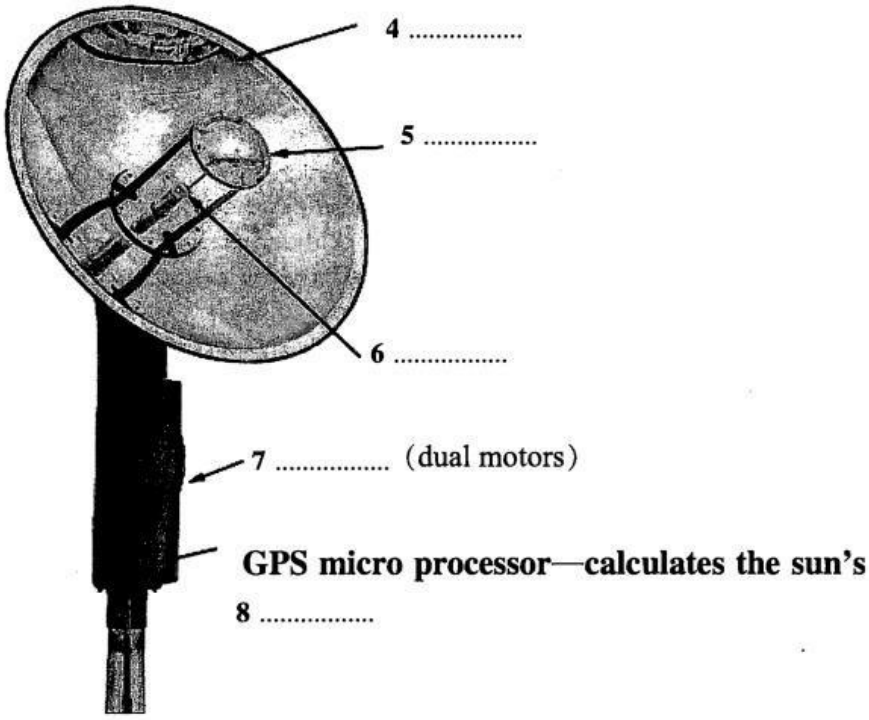

Questions 9–13

Complete the notes below.

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

Write your answers in boxes 9–13 on your answer sheet.

- 127 fibres = 1 bundle
- 2 fibres = 60 Watt bulb
- A **9** ..... measures amount of light & a **10** ..... mixes light from different sources to keep levels constant
- Higher % of natural light, more attractive and biologically advantageous—fluorescence contributes to feelings of **11** ..... whereas natural or hybrid light gives rise to more productivity (& the sale of more **12** ..... in shops) because it helps workers (& shoppers) feel good and maintain biological rhythms.
- Plastic fibres are cheap but length from the **13** ..... is a limiting factor.

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 sections **A–F**.

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

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

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List of Headings	
i	Uncertain future for academic freedom
ii	Low pay causes problems
iii	Tough life, worse prospects
iv	A safety net for intellectual risk-takers
v	The necessity for economic reform
vi	Educational standards decline
vii	Adverse effects on health of adjuncts
viii	Academic life: perception versus reality
ix	Exploitation of a stop-gap system

14 Section **A**
15 Section **B**
16 Section **C**
17 Section **D**
18 Section **E**
19 Section **F**

The Rise of Adjuncts

A Academia is often thought of as an occupation with immense job security. The traditional image is one of a middle-aged professor with his own office, his own car park, and a cosy job with a middle-class salary that remains unaffected by upturns and downturns in the 'real' business economy. But in the United States today only a minority of professors have anything resembling this lifestyle. For the vast majority, the actual conditions of their employment are very different. They scrape by with low pay, short-term contracts and few or no employee benefits. Many even qualify for food stamps. This shift in employment conditions has far-reaching consequences not only for academics, but also for students and the quality of education they receive, and for academic freedom more generally.

B Originally, almost all professors were in full-time positions and employed under a system known as 'life tenure'. Tenure all but guarantees professors a well-paid job until retirement; their position can only be terminated with 'just cause'. Proving just cause is a lengthy, difficult process that happens rarely — only around 50 of 280,000 tenured professors lose their status every year. The purpose of tenure is to provide shelter for researchers who dissent from dominant opinions, disagree with the authorities of universities, donors or political authorities, or choose to research topics that may have social importance but seem unimportant or unnecessary to others. In this way it seeks to keep intellectual pursuits 'pure' rather than at the whim of external interests. Without tenure, professors might prefer uncontroversial research on popular topics, and draw dishonest conclusions in a bid to please authorities and keep their jobs.

C In an era of perpetual cost-cutting and budget-tightening, however, guaranteeing large numbers of academics lifetime employment with related benefits is increasing untenable. The proportion of university teachers with tenure has slid from 75 percent in 1960 to just 27 percent today. Rising in their place are 'professor adjuncts'. Adjuncts are temporary, part-time employees who were initially brought in only occasionally as special guest lecturers or to provide cover for tenured professors on parental or research leave. Adjuncts teach individual classes and have no research or administrative responsibilities, and their contracts

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typically run for a single semester, after which they might be renewed. Over the last few decades their use has been extended beyond these temporary exigencies, and adjuncts have become a permanent, institutionalised aspect of academic employment.

D This has created several problems for adjunct professors, who are considered by some to make up a growing 'academic underclass'. Firstly, because contracts are always temporary, adjuncts rarely qualify for insurance and health benefits, such as time off with remuneration for illness, in the same way as tenured professors. Secondly, recompense for adjuncts is often very low. In order to make a living from their work, adjuncts typically need to win contracts with multiple universities. As a consequence of this high teaching workload—and the lack of paid research opportunities—adjuncts tend to find it hard to publish articles and win research grants, therefore making promotion increasingly unlikely with every year that passes (academic promotion is governed by what is known as a 'publish or perish' culture).

E The culture of using adjuncts also has flow-on effects for the quality of teaching that students receive. Because adjuncts come in only for classes, they do not have offices or office hours on campus, and usually do not have the time to meet up with students in small groups or for one-on-one sessions. The disengagement between students and teachers can make it difficult for struggling students to find guidance outside of lectures. Adjuncts are also less 'tied' to the universities they teach at and fail to accumulate reputations over time in the same way as full-time professors. As such, they are not as personally invested in the quality and outcome of their teaching. Finally, it has been reported that many adjuncts practice grade inflation—raising grades higher than deserved—in order to maintain their job security by keeping students pleased. These outcomes are not because adjuncts are malfeasant or incompetent professors, but rather because of the structural pressures this type of work involves—precisely what the tenure system sought to overcome.

F The rising use of adjunct professors also has implications for the research and pedagogical autonomy of teachers. Because adjuncts do not have tenure, they can be fired with the simplest of explanations. Furthermore, administrators who do not want to give any reason at all can choose to simply not renew an adjunct's contract after the semester finishes. As such, there is immense pressure on adjuncts to teach in ways that please those who employ them. While only 50 tenured professors lose their jobs in the USA every year, reports emerge every day about adjuncts who have been fired or not had contracts renewed after disputes with faculty or administrators over course design, teaching, or employment issues. As the pool of growing numbers of adjuncts compete desperately for the shrinking amount of tenure-track positions, intellectual conformity can grow as candidates position themselves as safe, mainstream choices. As theoretical physicist Lee Smolin has written, "...it is practically career suicide for young theoretical physicists not to join the field of string theory..."

The rising use of adjunct professors is mainly rooted in a need for cost efficiency in education, but it has more diffuse effects on the wellbeing of academic professionals and students, the quality of the education they receive, and academic freedom in general. Everyone who is concerned about more than the fiscal 'bottom line' needs to follow this trend carefully.

Questions 20–22

*Choose the correct letter, **A**, **B**, **C** or **D**.*
Write your answers in boxes 20–22 on your answer sheet.

20 What was the motivation behind the tenure system?

A To allow professors to pursue their research without outside influence.

B To prevent academic positions from being used for research that is not useful.

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C To discipline professors who make claims that are not true.

D To provide professors with a secure income so that they can focus on research.

21 Which of the following is NOT a feature of adjunct employment?

A Contracts that expire after a limited period

B Paid sick leave

C Lecturing responsibilities

D Difficulty securing funding for research

22 Why do adjuncts have low prospects for improving their academic position?

A They are unable to receive medical care.

B They do not have enough time for writing articles.

C They work at more than one institution.

D They are under-qualified.

Questions 23–26

Complete the sentences below with words taken from Reading Passage 2.

*Use **NO MORE THAN TWO WORDS** for each answer.*

Write your answers in boxes 23–26 on your answer sheet.

23 Because adjuncts are paid only to teach, they cannot always provide support for ..... .

24 Adjuncts do not have the same bonds with one particular institution as permanent staff do so they do not ..... in the same way.

25 Giving better marks than warranted enhances adjuncts' ..... .

26 Adjuncts do not deliver quality education, not because they are bad lecturers but as a result of ..... .

READING PASSAGE 3

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

Good Parenting

— *it's up for discussion* —

Raising a baby may, at first, appear to be a highly personal, intimate affair between child and caregiver. In fact, there are often very public battles over every facet of child care, however: Breastfeeding or bottle-feeding? Breastfeeding in public? Toilet training — when and how? Nothing escapes judgment or scrutiny. Restlessness and crying at bedtimes are no different, and three different schools of thought have emerged around how parents should respond to this problem. These have been called extinction, attachment parenting and graduated extinction.

Attachment parenting, a term coined by paediatrician William Sears, suggests that children form powerful emotional bonds with caregivers during early childhood that have implications for their development through life. The basis for this theory was generated within the field of developmental psychology during the 1950s, when researcher John Bowlby proposed that maternal deprivation during infancy could decrease a person's ability to form healthy adult relationships years later. Attachment parenting seeks to avoid this tendency by placing great importance on childhood bonding through the caregiver's holding and cuddling her baby when

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he is upset. Attachment parenting also suggests that babies' ability to communicate their requirements is limited to crying, and that parents need to learn to understand what different types of crying signal. No crying is considered superfluous — even if the baby merely wants to be comforted rather than fall asleep — caregivers are encouraged to affirm these desires.

The extinction method proposes that, so long as a baby has had adequate calorie intake during the day, he or she can reasonably be expected to maintain nocturnal somnolence. The core postulates of this approach were laid down by Emmett Holt but they have been extrapolated upon by authors such as Warwick Reilly and further adapted recently by Melinda Collins to form the extinction method of today. Caregivers are encouraged to develop a gentle evening routine that involves feeding 45 minutes before bed, bathing, dressing and laying the baby in his sleeping sack, walking out and closing the door and remaining out of the child's presence until dawn even if he cries for extensive periods of time. It is expected that sooner or later children will realise that crying is ineffective, and that they must learn to comfort themselves into a slumber.

Graduated extinction is a modulated version of the extinction method. It postulates that a process of learning needs to be undertaken in order for children to sleep through the night. Richard Ferber, the doctor who popularised this method in the 1980s, emphasised the progressive withdrawal of the caregiver's company with the child in bed as a way to solve infant sleep problems. At first, for example, the caregiver is encouraged to hold and caress the baby until he or she is asleep. Once this routine is established, the caregiver should lie down next to the baby but touch it less and less until the baby can sleep without contact. Eventually the caregiver can sit on a chair nearby, and finally it is hoped that he or she can retreat from the room altogether. The key to this approach is that the caregiver must never capitulate to a child's demands for comfort if he starts to become restless or vocal as the method unfolds over time. Doing so is said to let the baby know that he does not need to learn to sleep through the night without comfort or interaction, and also to lessen the chances that the caregiver will complete the programme, knowing that a 'quick fix' is available. Ferber has since altered his stance to acknowledge the acceptability of co-sleeping and suggests that there is no single method or golden rule for overcoming sleep difficulties.

Each of these systems has its critics. Attachment parenting, for example, is often held accused of being exceedingly strenuous and demanding for caregivers because they must be at the beck and call of their baby's every demand. In doing so it is likely to create tensions between partners who are raising a child together, and between caregivers and their friends or co-workers, none of which is helpful for the overall development of the household. Critics also point out the absence of conclusive research behind the efficacy of attachment parenting.

Many disapprove of the extinction method because, while it may allow a quiet night's sleep for baby and caregiver and anyone else in the household, it is not because the baby has become settled and comfortable but rather for the reason that he has become detached and apathetic. This, it is suggested, can lead to various emotional problems in early adulthood among which might be depression and insecurity. At the mid-point on the spectrum is graduated extinction, which has, therefore, dodged any vociferous attacks. Advocates of attachment argue that there is no need to teach babies to live without soothing affirmation, however, and advocates of extinction suggest that it is better to use a method of going cold turkey—that is, to withdraw soothing affirmation swiftly rather than as a drawn out process.

Questions 27–30

Complete the sentences below with words taken from Reading Passage 3.
*Use **NO MORE THAN TWO WORDS** for each answer.*
Write your answers in boxes 27–30 on your answer sheet.

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27 The phrase 'attachment parenting' was invented by a ..... .

28 The principles of attachment parenting are derived from the discipline of ..... .

29 The key points of the 'extinction' school of thought originated from the work of ..... .

30 Dr Ferber initially thought the parent should not spend the night with the child but now thinks ..... is all right.

Questions 31–35

Look at the following statements (Questions 31–35) and the methods in the box below.
*Match each statement with the correct parenting method **A–C**.*
*Write the appropriate letter **A–C** in boxes 31–35 on your answer sheet.*
***NB** You may use any letter more than once.*

31 After a strict bedtime schedule, the child is unattended till morning.

32 All crying is a vocalisation of important needs.

33 Caregiver presence as the child drifts to sleep should decrease over time.

34 The emphasis is on physical closeness between baby and caregiver at any time.

35 Well-fed babies should sleep through the night.

List of Parenting Methods	
A	attachment parenting
B	extinction
C	graduated extinction

Questions 36–40

Complete the notes below.
*Choose **NO MORE THAN TWO WORDS** from the passage for each answer.*
Write your answers in boxes 36–40 on your answer sheet.

Critique:

Attachment Parenting

- very stressful as parents have to give in to **36** ..... of the baby but not yet any **37** ..... to show that it works

Extinction Method

- a good night's sleep is attained by family members because baby is **38** ..... and ....., but can lead to **39** ..... such as despair & unhappiness later in life

Graduated Extinction

- a central position so **40** ..... have been avoided

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