

IELTS Academic Reading Sample 169 - Alarming Rate of Loss of Tropical Rainforests

You should spend about 20 minutes on Questions 1–14 which are based on Reading Passage Sample 169 below:

Alarming Rate of Loss of Tropical Rainforests

Adults and children are frequently confronted with statements about the alarming rate of loss of tropical



rainforests. For example, one graphic illustration to which children might readily relate is the estimate that rainforests are being destroyed at a rate equivalent to one thousand football fields every forty minutes – about the duration of a normal classroom period. In the face of the frequent and often vivid media coverage, it is likely that children will have formed ideas about rainforests – what and where they are, why they are important, what endangers them – independent of any formal tuition. It is also possible that some of these ideas will be mistaken. Many studies have shown that children harbour misconceptions about ‘pure’, curriculum science. These misconceptions do not remain isolated but become incorporated into a multifaceted, but organised, conceptual framework, making it and the component ideas, some of which are erroneous, more robust but also accessible to modification. These ideas may be developed by children absorbing ideas through the popular media. Sometimes this information may be erroneous. It seems schools may not be providing an opportunity for children to re-express their ideas and so have them tested and refined by teachers and their peers.

Despite the extensive coverage in the popular media of the destruction of rainforests, little formal information is available about children’s ideas in this area. The aim of the present study is to start to provide such information, to help teachers design their educational strategies to build upon correct ideas and to displace misconceptions and to plan programmes in environmental studies in their schools.

The study surveys children’s scientific knowledge and attitudes to rainforests. Secondary school children were asked to complete a questionnaire containing five open-form questions. The most frequent responses to the first question were descriptions which are self-evident from the term ‘rainforest’. Some children described them as damp, wet or hot. The second question concerned the geographical location of rainforests. The commonest

responses were continents or countries: Africa (given by 43% of children), South America (30%), Brazil (25%). Some children also gave more general locations, such as being near the Equator.

Responses to question three concerned the importance of rainforests. The dominant idea, raised by 64% of the pupils, was that rainforests provide animals with habitats. Fewer students responded that rainforests provide plant habitats, and even fewer mentioned the indigenous populations of rainforests. More girls (70%) than boys (60%) raised the idea of rainforest as animal habitats.

Similarly, but at a lower level, more girls (13%) than boys (5%) said that rainforests provided human habitats. These observations are generally consistent with our previous studies of pupils' views about the use and conservation of rainforests, in which girls were shown to be more sympathetic to animals and expressed views which seem to place an intrinsic value on non-human animal life.

The fourth question concerned the causes of the destruction of rainforests. Perhaps encouragingly, more than half of the pupils (59%) identified that it is human activities which are destroying rainforests, some personalising the responsibility by the use of terms such as 'we are'. About 18% of the pupils referred specifically to logging activity.

One misconception, expressed by some 10% of the pupils, was that acid rain is responsible for rainforest destruction; a similar proportion said that pollution is destroying rainforests. Here, children are confusing rainforest destruction with damage to the forests of Western Europe by these factors. While two fifths of the students provided the information that the rainforests provide oxygen, in some cases this response also embraced the misconception that rainforest destruction would reduce atmospheric oxygen, making the atmosphere incompatible with human life on Earth.

In answer to the final question about the importance of rainforest conservation, the majority of children simply said that we need rainforests to survive. Only a few of the pupils (6%) mentioned that rainforest destruction may contribute to global warming. This is surprising considering the high level of media coverage on this issue. Some children expressed the idea that the conservation of rainforests is not important.

The results of this study suggest that certain ideas predominate in the thinking of children about rainforests. Pupils' responses indicate some misconceptions in basic scientific knowledge of rainforests' ecosystems such as their ideas about rainforests as habitats for animals, plants and humans and the relationship between climatic change and destruction of rainforests.

Pupils did not volunteer ideas that suggested that they appreciated the complexity of causes of rainforest

destruction. In other words, they gave no indication of an appreciation of either the range of ways in which rainforests are important or the complex social, economic and political factors which drive the activities which are destroying the rainforests. One encouragement is that the results of similar studies about other environmental issues suggest that older children seem to acquire the ability to appreciate, value and evaluate conflicting views. Environmental education offers an arena in which these skills can be developed, which is essential for these children as future decision-makers.

Questions 1–8

Do the following statements agree with the information given in Reading Sample 7?

In boxes 1–8 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 on this

- 1 The plight of the rainforests has largely been ignored by the media.
- 2 Children only accept opinions on rainforests that they encounter in their classrooms.
- 3 It has been suggested that children hold mistaken views about the 'pure' science that they study at school.
- 4 The fact that children's ideas about science form part of a larger framework of ideas means that it is easier to change them.
- 5 The study involved asking children a number of yes/no questions such as 'Are there any rainforests in Africa?'
- 6 Girls are more likely than boys to hold mistaken views about the rainforests' destruction.
- 7 The study reported here follows on from a series of studies that have looked at children's understanding of rainforests.
- 8 A second study has been planned to investigate primary school children's ideas about rainforests.

Questions 9–13

The box below gives a list of responses **A–P** to the questionnaire discussed in Reading sample 7.

Answer the following questions by choosing the correct responses **A–P**.

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

- 09 What was the children's most frequent response when asked where the rainforests were?
- 10 What was the most common response to the question about the importance of the rainforests?
- 11 What did most children give as the reason for the loss of the rainforests?
- 12 Why did most children think it important for the rainforests to be protected?
- 13 Which of the responses is cited as unexpectedly uncommon, given the amount of time spent on the issue by the newspapers and television?

- A There is a complicated combination of reasons for the loss of the rainforests.
- B The rainforests are being destroyed by the same things that are destroying the forests of Western Europe.
- C Rainforests are located near the Equator.
- D Brazil is home to the rainforests.
- E Without rainforests some animals would have nowhere to live.
- F Rainforests are important habitats for a lot of plants.
- G People are responsible for the loss of the rainforests.
- H The rainforests are a source of oxygen.
- I Rainforests are of consequence for a number of different reasons.
- J As the rainforests are destroyed, the world gets warmer.
- K Without rainforests there would not be enough oxygen in the air.
- L There are people for whom the rainforests are home.
- M Rainforests are found in Africa.
- N Rainforests are not really important to human life.
- O The destruction of the rainforests is the direct result of logging activity.
- P Humans depend on the rainforests for their continuing existence.

Question 14

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

Write your answer in box 14 on your answer sheet.

Which of the following is the most suitable title for Reading sample Passage 7?

- A** The development of a programme in environmental studies within a science curriculum
- B** Children's ideas about the rainforests and the implications for course design
- C** The extent to which children have been misled by the media concerning the rainforests
- D** How to collect, collate and describe the ideas of secondary school children
- E** The importance of the rainforests and the reasons for their destruction

Answer:

1. FALSE 2. FALSE 3. TRUE 4. TRUE 5. FALSE 6. NOT GIVEN 7. TRUE 8. NOT
GIVEN 9. M 10. E 11. G 12. P 13. J 14. B

IELTS Academic Reading Sample 170 - A Remarkable Beetle

You should spend about 20 minutes on Questions 1-13 which are based on Reading Passage 170 below.

A Remarkable Beetle

Some of the most remarkable beetles are the dung beetles, which spend almost their whole lives eating and breeding in dung'.



More than 4,000 species of these remarkable creatures have evolved and adapted to the world's different climates and the dung of its many animals. Australia's native dung beetles are scrub and woodland dwellers, specialising in coarse marsupial droppings and avoiding the soft cattle dung in which bush flies and buffalo flies breed.

In the early 1960s George Bornemissza, then a scientist at the Australian Government's premier research organisation, the Commonwealth Scientific and Industrial Research Organisation (CSIRO), suggested that dung beetles should be introduced to Australia to control dung-breeding flies. Between 1968 and 1982, the CSIRO imported insects from about 50 different species of dung beetle, from Asia, Europe and Africa, aiming to match them to different climatic zones in Australia. Of the 26 species that are known to have become successfully integrated into the local environment, only one, an African species released in northern Australia, has reached its natural boundary.

Introducing dung beetles into a pasture is a simple process: approximately 1,500 beetles are released; a handful at a time, into fresh cow pats in the cow pasture. The beetles immediately disappear beneath the pats digging and tunneling and, if they successfully adapt to their new environment, soon become a permanent, self-sustaining part of the local ecology. In time they multiply and within three or four years the benefits to the pasture are obvious.

Dung beetles work from the inside of the pat so they are sheltered from predators such as birds and foxes. Most species burrow into the soil and bury dung in tunnels directly underneath the pats, which are hollowed out from within. Some large species originating from France excavate tunnels to a depth of approximately 30 cm below the dung pat. These beetles make sausage-shaped brood chambers along the tunnels. The shallowest tunnels belong to a much smaller Spanish species that buries dung in chambers that hang like fruit from the branches of a pear tree. South African beetles dig narrow tunnels of approximately 20 cm below the surface of the pat. Some surface-dwelling beetles, including a South African species, cut perfectly-shaped balls from the pat, which are rolled away and attached to the bases of plants.

For maximum dung burial in spring, summer and autumn, farmers require a variety of species with overlapping periods of activity. In the cooler environments of the state of Victoria, the large French species (2.5 cms long) is matched with smaller (half this size), temperate-climate Spanish species. The former are slow to recover from the winter cold and produce only one or two generations of offspring from late spring until autumn. The latter, which multiply rapidly in early spring, produce two to five generations annually. The South African ball-rolling species, being a subtropical beetle, prefers the climate of northern and coastal New South Wales where it commonly works with the South African tunneling species. In warmer climates, many species are active for longer periods of the year.

Dung beetles were initially introduced in the late 1960s with a view to controlling buffalo flies by removing the dung within a day or two and so preventing flies from breeding. However, other benefits have become evident. Once the beetle larvae have finished pupation, the residue is a first-rate source of fertiliser. The tunnels abandoned by the beetles provide excellent aeration and water channels for root systems. In addition, when the new generation of beetles has left the nest the abandoned burrows are an attractive habitat for soil-enriching earthworms. The digested dung in these burrows is an excellent food supply for the earthworms, which decompose it further to provide essential soil nutrients. If it were not for the dung beetle, chemical fertiliser and dung would be washed by rain into streams and rivers before it could be absorbed into the hard earth, polluting water courses and causing blooms of blue-green algae. Without the beetles to dispose of the dung, cow pats would litter pastures making grass inedible to cattle and depriving the soil of sunlight. Australia's 30 million cattle each produce 10-12 cow pats a day. This amounts to 1.7 billion tones a year, enough to smother about 110,000 sq km of pasture, half the area of Victoria.

Dung beetles have become an integral part of the successful management of dairy farms in Australia over the past few decades. A number of species are available from the CSIRO or through a small number of private breeders, most of whom were entomologists with the CSIRO's dung beetle unit who have taken their specialised knowledge of the insect and opened small businesses in direct competition with their former employer.

Glossary

1. dung:- the droppings or excreta of animals
2. cow pats:- droppings of cows

Questions 1-5

Do the following statements reflect the claims of the writer in Reading Passage 6? In boxes 1-5 on your answer sheet write:

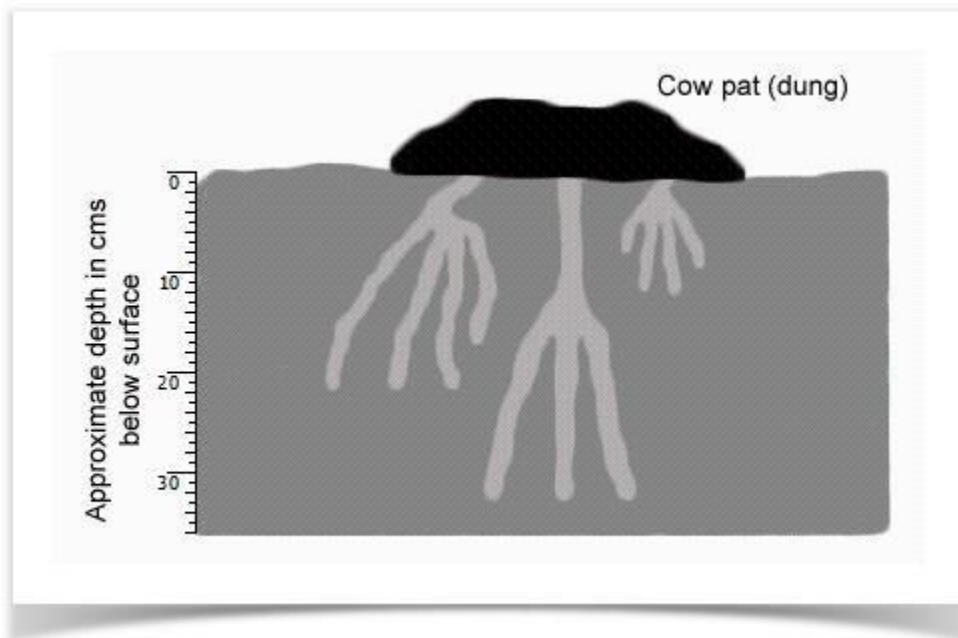
- YES** if the statement reflects the claims of the writer
NO if the statement contradicts the claims of the writer
NOT GIVEN if it is impossible to say what the writer thinks about this

- 1 Bush flies are easier to control than buffalo flies.
- 2 Four thousand species of dung beetle were initially brought to Australia by the CSIRO.
- 3 Dung beetles were brought to Australia by the CSIRO over a fourteen-year period.
- 4 At least twenty-six of the introduced species have become established in Australia.
- 5 The dung beetles cause an immediate improvement to the quality of a cow pasture.

Questions 6-8

Label the tunnels on the diagram below. Choose your labels from the box below the diagram. Write your answers in boxes 6-8 on your answer sheet.

Write your answers in boxes 6-8 on your answer sheet.



Dung Beetle Types

French Spanish
Mediterranean South African
Australian native South African ball roller.

Question 9-13

Complete the table below.

Choose **NO MORE THAN THREE WORDS OR A NUMBER** from Reading Passage 6 for each answer.

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

Species	Size	Preferred Climate	Complementary species	Start of active period	Number of generations per year
French	2.5 cm	Cool	Spanish	Late spring	1-2
Spanish	1.25 cm	9		10	1
South African ball roller		12	13		

Answer:

1. NOT GIVEN 2. NO 3. YES 4. YES 5. NO 6. South African 7. French 8. Spanish 9. temperate 10. early spring 11. two to five / 2-5 12. sub-tropical 13. South African tunneling/tunnelling

IELTS Academic Reading Sample 171 - The Risks of Cigarette Smoke

You should spend about 20 minutes on Questions 15-28 which are based on Reading Passage 171 below.

The Risks of Cigarette Smoke

Discovered in the early 1800s and named nicotianine, the oily essence now called nicotine is the main active ingredient of tobacco. Nicotine, however, is only a small component of cigarette smoke, which contains more than 4,700 chemical compounds, including 43 cancer-causing substances. In recent times, scientific research has been providing evidence that, years of cigarette smoking vastly increases the risk of developing fatal medical conditions.

In addition to being responsible for more than 85 per cent of lung cancers, smoking is associated with cancers of, amongst others, the mouth, stomach and kidneys, and is thought to cause about 14 per cent of leukemia and cervical cancers. In 1990, smoking caused more than 84,000 deaths, mainly resulting from such problems as pneumonia, bronchitis and influenza. Smoking, it is believed, is responsible for 30 per cent of all deaths from cancer and clearly represents the most important preventable cause of cancer in countries like the United States today.

Passive smoking, the breathing in of the side-stream smoke from the burning of tobacco between puffs or of the smoke exhaled by a smoker, also causes a serious health risk. A report published in 1992 by the US Environmental Protection Agency (EPA) emphasized the health dangers, especially from side-stream smoke. This type of smoke contains more, smaller particles and is therefore more likely to be deposited deep in the lungs. On the basis of this report, the EPA has classified environmental tobacco smoke in the highest risk category for causing cancer.

As an illustration of the health risks, in the case of a married couple where one partner is a smoker and one a non-smoker, the latter is believed to have a 30 per cent higher risk of death from heart disease because of passive smoking. The risk of lung cancer also increases over the years of exposure and the figure jumps to 80 per cent if the spouse has been smoking four packs a day for 20 years. It has been calculated that 17 per cent of cases of lung cancer can be attributed to high levels of exposure to second-hand tobacco smoke during childhood and adolescence.

A more recent study by researchers at the University of California at San Francisco (UCSF) has shown that second-hand cigarette smoke does more harm to non-smokers than to smokers. Leaving aside the

philosophical question of whether anyone should have to breathe someone else's cigarette smoke, the report suggests that the smoke experienced by many people in their daily lives is enough to produce substantial adverse effects on a person's heart and lungs.

The report, published in the Journal of the American Medical Association (AMA), was based on the researchers' own earlier research but also includes a review of studies over the past few years. The American Medical Association represents about half of all US doctors and is a strong opponent of smoking. The study suggests that people who smoke cigarettes are continually damaging their cardiovascular system, which adapts in order to compensate for the effects of smoking. It further states that people who do not smoke do not have the benefit of their system adapting to the smoke inhalation. Consequently, the effects of passive smoking are far greater on non-smokers than on smokers.

This report emphasizes that cancer is not caused by a single element in cigarette smoke; harmful effects to health are caused by many components. Carbon monoxide, for example, competes with oxygen in red blood cells and interferes with the blood's ability to deliver life-giving oxygen to the heart. Nicotine and other toxins in cigarette smoke activate small blood cells called platelets, which increases the likelihood of blood clots, thereby affecting blood circulation throughout the body.

The researchers criticize the practice of some scientific consultants who work with the tobacco industry for assuming that cigarette smoke has the same impact on smokers as it does on non-smokers. They argue that those scientists are underestimating the damage done by passive smoking and, in support of their recent findings, cite some previous research which points to passive smoking as the cause for between 30,000 and 60,000 deaths from heart attacks each year in the United States. This means that passive smoking is the third most preventable cause of death after active smoking and alcohol-related diseases.

The study argues that the type of action needed against passive smoking should be similar to that being taken against illegal drugs and AIDS (SIDA). The UCSF researchers maintain that the simplest and most cost-effective action is to establish smoke-free work places, schools and public places.

Questions 15-17

Choose the appropriate letters **A - D** and write them in boxes **15 -17** on your answer sheet.

15 According to information in the text, leukaemia and pneumonia

- A are responsible for 84,000 deaths each year.
- B are strongly linked to cigarette smoking.
- C are strongly linked to lung cancer.
- D result in 30 per cent of deaths per year.

16 According to information in the text, intake of carbon monoxide

- A inhibits the flow of oxygen to the heart.
- B increases absorption of other smoke particles.
- C inhibits red blood cell formation.
- D promotes nicotine absorption.

17 According to information in the text, intake of nicotine encourages

- A blood circulation through the body.
- B activity of other toxins in the blood.
- C formation of blood clots.
- D an increase of platelets in the blood.

Questions 18-21

Do the following statements reflect the claims of the writer in Reading Passage 5? In boxes 18-21 on your answer sheet write:

- YES** if the statement reflects the claims of the writer
- NO** if the statement contradicts the claims of the writer
- NOT GIVEN** if it is impossible to say what the writer thinks about this

18 Thirty per cent of deaths in the United States are caused by smoking-related diseases.

19 If one partner in a marriage smokes, the other is likely to take up smoking.

20 Teenagers whose parents smoke are at risk of getting lung cancer at some time during their lives.

21 Opponents of smoking financed the UCSF study.

Questions 22-24

Choose ONE phrase from the list of phrases **A - J** below to complete each of the following sentences (Questions **22-24**).

Write the appropriate letters in boxes **22 - 24** on your answer sheet.

22 Passive smoking

23 Compared with a non-smoker, a smoker

24 The American Medical Association

- A** includes reviews of studies in its reports.
- B** argues for stronger action against smoking in public places.
- C** is one of the two most preventable causes of death.
- D** is more likely to be at risk from passive smoking diseases.
- E** is more harmful to non-smokers than to smokers.
- F** is less likely to be at risk of contracting lung cancer.
- G** is more likely to be at risk of contracting various cancers.
- H** opposes smoking and publishes research on the subject.
- I** is just as harmful to smokers as it is to non-smokers.
- J** reduces the quantity of blood flowing around the body.

Questions 25-28

Classify the following statements as being

- A** a finding of the UCSF study
- B** an opinion of the UCSF study
- C** a finding of the EPA report
- D** an assumption of consultants to the tobacco industry

Write the appropriate letters **A—D** in boxes **25—28** on your answer sheet.

NB You may use any letter more than once.

- 25 Smokers' cardiovascular systems adapt to the intake of environmental smoke.
- 26 There is a philosophical question as to whether people should have to inhale others' smoke.
- 27 Smoke-free public places offer the best solution.
- 28 The intake of side-stream smoke is more harmful than smoke exhaled by a smoker.

Answer:

15. B 16. A 17. C 18. NO 19. NOT GIVEN 20. YES 21. NOT GIVEN 22. E 23. G 24. H 25. A 26. B 27. B 28. C

IELTS Academic Reading Sample 172 - A Workaholic Economy

You should spend about 20 minutes on Questions **27-38** which are based on Reading Passage 172 below.

A Workaholic Economy

For the first century or so of the industrial revolution, increased productivity led to decreases in working hours. Employees who had been putting in 12-hour days, six days a week, found their time on the job shrinking to 10 hours daily, then finally to eight hours, five days a week. Only a generation ago social planners worried about what people would do with all this new-found free time. In the US, at least it seems they need not have bothered.

Although the output per hour of work has more than doubled since 1945, leisure seems reserved largely for the unemployed and underemployed. Those who work full-time spend as much time on the job as they did at the end of World War II. In fact, working hours have increased noticeably since 1970 — perhaps because real wages have stagnated since that year. Bookstores now abound with manuals describing how to manage time and cope with stress.

There are several reasons for lost leisure. Since 1979, companies have responded to improvements in the business climate by having employees work overtime rather than by hiring extra personnel, says economist Juliet B. Schor of Harvard University. Indeed, the current economic recovery has gained a certain amount of notoriety for its “jobless” nature: increased production has been almost entirely decoupled from employment. Some firms are even downsizing as their profits climb. “All things being equal, we’d be better off spreading around the work,” observes labour economist Ronald G. Ehrenberg of Cornell University.

Yet a host of factors pushes employers to hire fewer workers for more hours and at the same time compels workers to spend more time on the job. Most of those incentives involve what Ehrenberg calls the structure of compensation: quirks in the way salaries and benefits are organised that make it more profitable to ask 40 employees to labour an extra hour each than to hire one more worker to do the same 40-hour job.

Professional and managerial employees supply the most obvious lesson along these lines. Once people are on salary, their cost to a firm is the same whether they spend 35 hours a week in the office or 70. Diminishing returns may eventually set in as overworked employees lose efficiency or leave for more arable pastures. But in the short run, the employer’s incentive is clear. Even hourly employees receive benefits - such as pension contributions and medical insurance - that are not tied to the number of hours they work. Therefore, it is more profitable for employers to work their existing employees harder.

For all that employees complain about long hours, they too have reasons not to trade money for leisure. "People who work reduced hours pay a huge penalty in career terms," Schor maintains. "It's taken as a negative signal' about their commitment to the firm.' [Lotte] Bailyn [of Massachusetts Institute of Technology] adds that many corporate managers find it difficult to measure the contribution of their underlings to a firm's well-being, so they use the number of hours worked as a proxy for output. "Employees know this," she says, and they adjust their behavior accordingly.

"Although the image of the good worker is the one whose life belongs to the company," Bailyn says, "it doesn't fit the facts.' She cites both quantitative and qualitative studies that show increased productivity for part-time workers: they make better use of the time they have and they are less likely to succumb to fatigue in stressful jobs. Companies that employ more workers for less time also gain from the resulting redundancy, she asserts. "The extra people can cover the contingencies that you know are going to happen, such as when crises take people away from the workplace." Positive experiences with reduced hours have begun to change the more-is-better culture at some companies, Schor reports.

Larger firms, in particular, appear to be more willing to experiment with flexible working arrangements...

It may take even more than changes in the financial and cultural structures of employment for workers successfully to trade increased productivity and money for leisure time, Schor contends. She says the U.S. market for goods has become skewed by the assumption of full-time, two-career households. Automobile makers no longer manufacture cheap models, and developers do not build the tiny bungalows that served the first postwar generation of home buyers. Not even the humblest household object is made without a microprocessor. As Schor notes, the situation is a curious inversion of the "appropriate technology" vision that designers have had for developing countries: U.S. goods are appropriate only for high incomes and long hours.----- **Paul Walluh**

Questions 27-32

Do the following statements agree with the views of the writer in reading passage 4? In boxes 27-32 on your answer sheet write:

YES if the statement agrees with the writer

NO if the statement contradicts the writer

NOT GIVEN if it is impossible to say what the writer thinks about this

Example	Answer
During the industrial revolution people worked harder	NOT GIVEN

27 Today, employees are facing a reduction in working hours.

28 Social planners have been consulted about US employment figures.

- 29 Salaries have not risen significantly since the 1970s.
- 30 The economic recovery created more jobs.
- 31 Bailyn's research shows that part-time employees work more efficiently.
- 32 Increased leisure time would benefit two-career households.

Questions 33-34

Choose the appropriate letters **A-D** and write them in boxes **33** and **34** on your answer sheet.

33 Bailyn argues that it is better for a company to employ more workers because

- A it is easy to make excess staff redundant.
- B crises occur if you are under-staffed.
- C people are available to substitute for absent staff.
- D they can project a positive image at work.

34 Schor thinks it will be difficult for workers in the US to reduce their working hours because

- A they would not be able to afford cars or homes.
- B employers are offering high incomes for long hours.
- C the future is dependent on technological advances.
- D they do not wish to return to the humble post-war era.

Questions 35-38

The writer mentions a number of factors that have resulted, in employees working longer hours.

Which **FOUR** of the following factors are mentioned? Write your answers (**A-H**) in boxes **35-38** on your answer sheet.

List of Factors

- A Books are available to help employees cope with stress.
- B Extra work is offered to existing employees.
- C Increased production has led to joblessness.
- D Benefits and hours spent on the job are not linked.
- E Overworked employees require longer to do their work.
- F Longer hours indicate greater commitment to the firm.
- G Managers estimate staff productivity in terms of hours worked.
- H Employees value a career more than a family.

Answer:

27. No 28. Not Given 29. Yes 30. No 31. Yes 32. Not Given 33. C 34. A 35. B. Extra work is offered to existing employees. 36. D. Benefits and hours spent on the job are not linked 37. F. Longer hours indicate greater commitment to the firm. 38. G. Managers estimate staff productivity in terms of hours worked.