

READING

READING PASSAGE 1

You should spend about 20 minutes on **Questions 1-14** which are based on Reading Passage 1 on the following pages.

Questions 1-4

Reading Passage 1 has six paragraphs **A-F**.

Choose the most suitable headings for paragraphs **B-E** from the list of headings below.

Write the appropriate numbers **i-ix** in boxes 1–4 on your answer sheet.

List of Headings	
i	How the reaction principle works
ii	The impact of the reaction principle
iii	Writers' theories of the reaction principle
iv	Undeveloped for centuries
v	The first rockets
vi	The first use of steam
vii	Rockets for military use
viii	Developments of fire
ix	What's next?

<i>Example</i> Paragraph A	Answer ii
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- 1 Paragraph B
- 2 Paragraph C
- 3 Paragraph D
- 4 Paragraph E

<i>Example</i> Paragraph F	Answer ix
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THE ROCKET - FROM EAST TO WEST

- A** The concept of the rocket, or rather the mechanism behind the idea of propelling an object into the air, has been around for well over two thousand years. However, it wasn't until the discovery of the reaction principle, which was the key to space travel and so represents one of the great milestones in the history of scientific thought, that rocket technology was able to develop. Not only did it solve a problem that had intrigued man for ages, but, more importantly, it literally opened the door to exploration of the universe.
- B** An intellectual breakthrough, brilliant though it may be, does not automatically ensure that the transition is made from theory to practice. Despite the fact that rockets had been used sporadically for several hundred years, they remained a relatively minor artefact of civilisation until the twentieth century. Prodigious efforts, accelerated during two world wars, were required before the technology of primitive rocketry could be translated into the reality of sophisticated astronauts. It is strange that the rocket was generally ignored by writers of fiction to transport their heroes to mysterious realms beyond the Earth, even though it had been commonly used in fireworks displays in China since the thirteenth century. The reason is that nobody associated the reaction principle with the idea of travelling through space to a neighbouring world.
- C** A simple analogy can help us to understand how a rocket operates. It is much like a machine gun mounted on the rear of a boat. In reaction to the backward discharge of bullets, the gun, and hence the boat, move forwards. A rocket motor's 'bullets' are minute, high-speed particles produced by burning propellants in a suitable chamber. The reaction to the ejection of these small particles causes the rocket to move forwards. There is evidence that the reaction principle was applied practically well before the rocket was invented. In his *Noctes Atticae* or *Greek Nights*, Aulus Gellius describes 'the pigeon of Archytas', an invention dating back to about 360 BC. Cylindrical in shape, made of wood, and hanging from string, it was moved to and fro by steam blowing out from small exhaust ports at either end. The reaction to the discharging steam provided the bird with motive power.
- D** The invention of rockets is linked inextricably with the invention of 'black powder'. Most historians of technology credit the Chinese with its discovery. They base their belief on studies of Chinese writings or on the notebooks of early Europeans who settled in or made long visits to China to study its history and civilisation. It is probable that, some time in the tenth century, black powder was first compounded from its basic ingredients of saltpetre, charcoal and sulphur. But this does not mean that it was immediately used to propel rockets. By the thirteenth century, powder-propelled fire arrows had become rather common. The Chinese relied on this type of technological development to produce incendiary projectiles of many sorts,

explosive grenades and possibly cannons to repel their enemies. One such weapon was the 'basket of fire' or, as directly translated from Chinese, the 'arrows like flying leopards'. The 0.7 metre-long arrows, each with a long tube of gunpowder attached near the point of each arrow, could be fired from a long, octagonal-shaped basket at the same time and had a range of 400 paces. Another weapon was the 'arrow as a flying sabre', which could be fired from crossbows. The rocket, placed in a similar position to other rocket-propelled arrows, was designed to increase the range. A small iron weight was attached to the 1.5m bamboo shaft, just below the feathers, to increase the arrow's stability by moving the centre of gravity to a position below the rocket. At a similar time, the Arabs had developed the 'egg which moves and burns'. This 'egg' was apparently full of gunpowder and stabilised by a 1.5m tail. It was fired using two rockets attached to either side of this tail.

- E It was not until the eighteenth century that Europe became seriously interested in the possibilities of using the rocket itself as a weapon of war and not just to propel other weapons. Prior to this, rockets were used only in pyrotechnic displays. The incentive for the more aggressive use of rockets came not from within the European continent but from far-away India, whose leaders had built up a corps of rocketeers and used rockets successfully against the British in the late eighteenth century. The Indian rockets used against the British were described by a British Captain serving in India as 'an iron envelope about 200 millimetres long and 40 millimetres in diameter with sharp points at the top and a 3m-long bamboo guiding stick'. In the early nineteenth century the British began to experiment with incendiary barrage rockets. The British rocket differed from the Indian version in that it was completely encased in a stout, iron cylinder, terminating in a conical head, measuring one metre in diameter and having a stick almost five metres long and constructed in such a way that it could be firmly attached to the body of the rocket. The Americans developed a rocket, complete with its own launcher, to use against the Mexicans in the mid-nineteenth century. A long cylindrical tube was propped up by two sticks and fastened to the top of the launcher, thereby allowing the rockets to be inserted and lit from the other end. However, the results were sometimes not that impressive as the behaviour of the rockets in flight was less than predictable.
- F Since then, there have been huge developments in rocket technology, often with devastating results in the form of war. Nevertheless, the modern day space programs owe their success to the humble beginnings of those in previous centuries who developed the foundations of the reaction principle. Who knows what it will be like in the future?

Questions 5 and 6

Choose the appropriate letters **A-D** and write them in boxes 5 and 6 on your answer sheet.

- 5 The greatest outcome of the discovery of the reaction principle was that
A rockets could be propelled into the air.
B space travel became a reality.
C a major problem had been solved.
D bigger rockets were able to be built.
- 6 According to the text, the greatest progress in rocket technology was made
A from the tenth to the thirteenth centuries.
B from the seventeenth to the nineteenth centuries.
C from the early nineteenth to the late nineteenth century.
D from the late nineteenth century to the present day.

Questions 7-10

From the information in the text, indicate who **FIRST** invented or used the items in the list below.

Write the appropriate letters **A-E** in boxes 7-10 on your answer sheet.

NB You may use any letter more than once.

<i>Example</i>	Answer
rockets for displays	A

- 7 black powder
- 8 rocket-propelled arrows for fighting
- 9 rockets as war weapons
- 10 the rocket launcher

FIRST invented or used by
A the Chinese
B the Indians
C the British
D the Arabs
E the Americans

Test 1

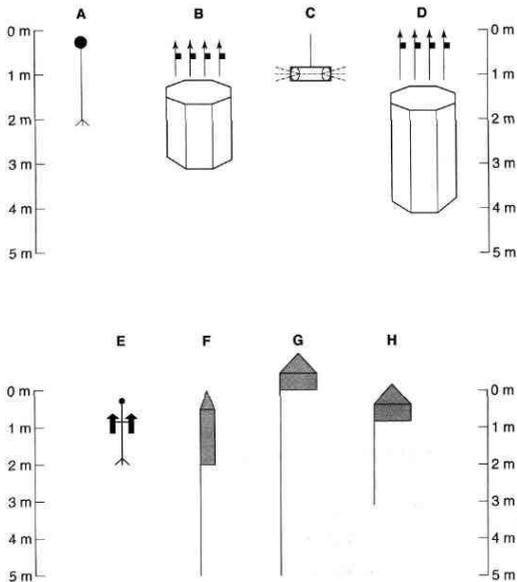
Questions 11-14

Look at the drawings of different projectiles below, **A-H**, and the names of types of projectiles given in the passage, **Questions 11-14**. Match each name with one drawing.

Write the appropriate letters **A-H** in boxes 11-14 on your answer sheet.

<p><i>Example</i> The Greek 'pigeon of Archytas'</p>	<p>Answer C</p>
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- 11 The Chinese 'basket of fire'
- 12 The Arab 'egg which moves and burns'
- 13 The Indian rocket
- 14 The British barrage rocket



READING PASSAGE 2

You should spend about 20 minutes on Questions 15-28 which are based on Reading Passage 2 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.

Test 1

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 2?

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.

Test 1

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.

READING PASSAGE 3

You should spend about 20 minutes on **Questions 29-40** which are based on Reading Passage 3 on the following pages.

Questions 29-33

Reading Passage 3 has seven paragraphs **A-G**.

Choose the most suitable headings for paragraphs **C-G** from the list of headings below.

Write the appropriate numbers *i-x* in boxes 29-33 on your answer sheet.

List of Headings	
i	The Crick and Watson approach to research
ii	Antidotes to bacterial infection
iii	The testing of hypotheses
iv	Explaining the inductive method
v	Anticipating results before data is collected
vi	How research is done and how it is reported
vii	The role of hypotheses in scientific research
viii	Deducing the consequences of hypotheses
ix	Karl Popper's claim that the scientific method is hypothetico-deductive
x	The unbiased researcher

<i>Example</i> Paragraph A	
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	Answer ix
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- 29 Paragraph C
30 Paragraph D
31 Paragraph E
32 Paragraph F
33 Paragraph G

THE SCIENTIFIC METHOD

- A 'Hypotheses,' said Medawar in 1964, 'are imaginative and inspirational in character'; they are 'adventures of the mind'. He was arguing in favour of the position taken by Karl Popper in *The Logic of Scientific Discovery* (1972, 3rd edition) that the nature of scientific method is hypothetico-deductive and not, as is generally believed, inductive.
- B It is essential that you, as an intending researcher, understand the difference between these two interpretations of the research process so that you do not become discouraged or begin to suffer from a feeling of 'cheating' or not going about it the right way.
- C The myth of scientific method is that it is inductive: that the formulation of scientific theory starts with the basic, raw evidence of the senses - simple, unbiased, unprejudiced observation. Out of these sensory data - commonly referred to as 'facts' — generalisations will form. The myth is that from a disorderly array of factual information an orderly, relevant theory will somehow emerge. However, the starting point of induction is an impossible one.
- D There is no such thing as an unbiased observation. Every act of observation we make is a function of what we have seen or otherwise experienced in the past. All scientific work of an experimental or exploratory nature starts

with some expectation about the outcome. This expectation is a hypothesis. Hypotheses provide the initiative and incentive for the inquiry and influence the method. It is in the light of an expectation that some observations are held to be relevant and some irrelevant, that one methodology is chosen and others discarded, that some experiments are conducted and others are not. Where is, your naive, pure and objective researcher now?

- E Hypotheses arise by guesswork, or by inspiration, but having been formulated they can and must be tested rigorously, using the appropriate methodology. If the predictions you make as a result of deducing certain consequences from your hypothesis are not shown to be correct then you discard or modify your hypothesis. If the predictions turn out to be correct then your hypothesis has been supported and may be retained until such time as some further test shows it not to be correct. Once you have arrived at your hypothesis, which is a product of your imagination, you then proceed to a strictly logical and rigorous process, based upon deductive argument — hence the term 'hypothetico-deductive'.

- F** So don't worry if you have some idea of what your results will tell you before you even begin to collect data; there are no scientists in existence who really wait until they have all the evidence in front of them before they try to work out what it might possibly mean. The closest we ever get to this situation is when something happens by accident; but even then the researcher has to formulate a hypothesis to be tested before being sure that, for example, a mould might prove to be a successful antidote to bacterial infection.
- G** The myth of scientific method is not only that it is inductive (which we have seen is incorrect) but also that the hypothetico-deductive method proceeds in a step-by-step, inevitable fashion. The hypothetico-deductive method describes the *logical* approach to much research work, but it does not describe the *psychological* behaviour that brings it about. This is much more holistic — involving guesses, reworkings, corrections, blind alleys and above all inspiration, in the deductive as well as the hypothetic component — than is immediately apparent from reading the final thesis or published papers. These have been, quite properly, organised into a more serial, logical order so that the worth of the *output* may be evaluated independently of the behavioural processes by which it was obtained. It is the difference, for example between the academic papers with which Crick and Watson demonstrated the structure of the DNA molecule and the fascinating book *The Double Helix* in which Watson (1968) described how they did it. From this point of view, 'scientific method' may more usefully be thought of as a way of *writing up* research rather than as a way of carrying it out.

Test 1

Questions 34 and 35

In which **TWO** paragraphs in Reading Passage 3 does the writer give advice **directly** to the reader?

Write the **TWO** appropriate letters (**A—G**) in boxes 34 and 35 on your answer sheet.

Questions 36-39

Do the following statements reflect the opinions of the writer in Reading Passage 3?

In boxes 36-39 on your answer sheet write

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

- 36 Popper says that the scientific method is hypothetico-deductive.
- 37 If a prediction based on a hypothesis is fulfilled, then the hypothesis is confirmed as true.
- 38 Many people carry out research in a mistaken way.
- 39 The 'scientific method' is more a way of describing research than a way of doing it.

Question 40

Choose the appropriate letter **A-D** and write it in box 40 on your answer sheet.

Which of the following statements best describes the writer's main purpose in Reading Passage 3?

- A** to advise Ph.D students not to cheat while carrying out research
- B** to encourage Ph.D students to work by guesswork and inspiration
- C** to explain to Ph.D students the logic which the scientific research paper follows
- D** to help Ph.D students by explaining different conceptions of the research process

READING

READING PASSAGE 1

You should spend about 20 minutes on **Questions 1-13** which are based on Reading Passage 1 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 pats² in the cow pasture. The beetles immediately disappear beneath the pats digging and tunnelling 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 tunnelling 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 tonnes 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

Test 2

Questions 1-5

Do the following statements reflect the claims of the writer in Reading Passage 1?

In boxes 1-5 on your answer sheet write

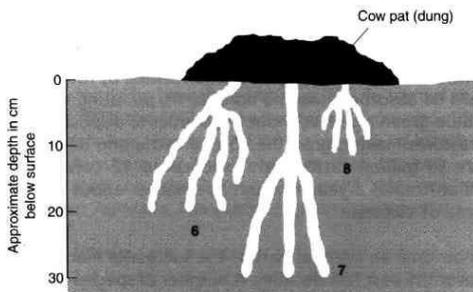
- YES** if the statement reflects the claims of the writer
NO if the statement contradicts the claims of the writer
NOT GIVEN if it is impossible to say what the writer thinks about this

- 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.



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 1 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	11
South African ball roller		12	13		

READING PASSAGE 2

You should spend about 20 minutes on **Questions 14-28** which are based on Reading Passage 2 on the following pages.

Questions 14-18

Reading Passage 2 has six sections **A-F**.

Choose the most suitable headings for sections **A-D** and **F** from the list of headings below.

Write the appropriate numbers **i-ix** in boxes 14-18 on your answer sheet.

List of Headings	
i	The probable effects of the new international trade agreement
ii	The environmental impact of modern farming
iii	Farming and soil erosion
iv	The effects of government policy in rich countries
v	Governments and management of the environment
vi	The effects of government policy in poor countries
vii	Farming and food output
viii	The effects of government policy on food output
ix	The new prospects for world trade

14 Section **A**

15 Section **B**

16 Section **C**

17 Section **D**

<i>Example</i> Paragraph E

Answer vi

18 Section **F**

Section A

The role of governments in environmental management is difficult but inescapable. Sometimes, the state tries to manage the resources it owns, and does so badly. Often, however, governments act in an even more harmful way. They actually subsidise the exploitation and consumption of natural resources. A whole range of policies, from farm-price support to protection for coal-mining, do environmental damage and (often) make no economic sense. Scrapping them offers a two-fold bonus: a cleaner environment and a more efficient economy. Growth and environmentalism can actually go hand in hand, if politicians have the courage to confront the vested interest that subsidies create.

Section B

No activity affects more of the earth's surface than farming. It shapes a third of the planet's land area, not counting Antarctica, and the proportion is rising. World food output per head has risen by 4 per cent between the 1970s and 1980s mainly as a result of increases in yields from land already in cultivation, but also because more land has been brought under the plough. Higher yields have been achieved by increased irrigation, better crop breeding, and a doubling in the use of pesticides and chemical fertilisers in the 1970s and 1980s.

Section C

All these activities may have damaging environmental impacts. For example, land clearing for agriculture is the largest single cause of deforestation; chemical fertilisers and pesticides may contaminate water supplies; more intensive farming and the abandonment of fallow periods tend to exacerbate soil erosion; and the spread of mono-culture and use of high-yielding varieties of crops have been accompanied by the disappearance of old varieties of food plants which might have provided some insurance against pests or diseases in future. Soil erosion threatens the productivity of land in both rich and poor countries. The United States, where the most careful measurements have been done, discovered in 1982 that about one-fifth of its farmland is losing topsoil at a rate likely to diminish the soil's productivity. The country subsequently embarked upon a program to convert 11 per cent of its cropped land to meadow or forest. Topsoil in India and China is vanishing much faster than in America.

Section D

Government policies have frequently compounded the environmental damage that farming can cause. In the rich countries, subsidies for growing crops and price supports for farm output drive up the price of land. The annual value of these subsidies is immense: about \$250 billion, or more than all World Bank lending in the 1980s. To increase the output of crops per acre, a farmer's easiest option is to use more of the most readily available inputs: fertilisers and pesticides. Fertiliser use doubled in Denmark in the period 1960-1985 and increased in The Netherlands by 150 per cent. The quantity of pesticides applied has risen too; by 69 per cent in 1975-1984 in Denmark, for example, with a rise of 115 per cent in the frequency of application in the three years from 1981.

In the late 1980s and early 1990s some efforts were made to reduce farm subsidies. The most dramatic example was that of New Zealand, which scrapped most farm support in 1984. A study of the environmental effects, conducted in 1993, found that the end of fer-

fertiliser subsidies had been followed by a fall in fertiliser use (a fall compounded by the decline in world commodity prices, which cut farm incomes). The removal of subsidies also stopped land-clearing and over-stocking, which in the past had been the principal causes of erosion. Farms began to diversify. The one kind of subsidy whose removal appeared to have been bad for the environment was the subsidy to manage soil erosion,

In less enlightened countries, and in the European Union, the trend has been to reduce rather than eliminate subsidies, and to introduce new payments to encourage farmers to treat their land in environmentally friendlier ways, or to leave it fallow. It may sound strange but such payments need to be higher than the existing incentives for farmers to grow food crops. Farmers, however, dislike being paid to do nothing. In several countries they have become interested in the possibility of using fuel produced from crop residues either as a replacement for petrol (as ethanol) or as fuel for power stations (as biomass). Such fuels produce far less carbon dioxide than coal or oil, and absorb carbon dioxide as they grow. They are therefore less likely to contribute to the greenhouse effect. But they die rarely competitive with fossil fuels unless subsidised - and growing them does no less environmental harm than other crops.

Section E

In poor countries, governments aggravate other sorts of damage. Subsidies for pesticides and artificial fertilisers encourage farmers to use greater quantities than are needed to get the highest economic crop yield. A study by the International Rice Research Institute of pesticide use by farmers in South East Asia found that, with pest-resistant varieties of rice, even moderate applications of pesticide frequently cost farmers more than they saved. Such waste puts farmers on a chemical treadmill: bugs and weeds become resistant to poisons, so next year's poisons must be more lethal. One cost is to human health. Every year some 10,000 people die from pesticide poisoning, almost all of them in the developing countries, and another 400,000 become seriously ill. As for artificial fertilisers, their use world-wide increased by 40 per cent per unit of farmed land between the mid 1970s and late 1980s, mostly in the developing countries. Overuse of fertilisers may cause farmers to stop rotating crops or leaving their land fallow. That, in turn, may make soil erosion worse.

Section F

A result of the Uruguay Round of world trade negotiations is likely to be a reduction of 36 per cent in the average levels of farm subsidies paid by the rich countries in 1986-1990. Some of the world's food production will move from Western Europe to regions where subsidies are lower or non-existent, such as the former communist countries and parts of the developing world. Some environmentalists worry about this outcome. It will undoubtedly mean more pressure to convert natural habitat into farmland. But it will also have many desirable environmental effects. The intensity of farming in the rich world should decline, and the use of chemical inputs will diminish. Crops are more likely to be grown in the environments to which they are naturally suited. And more farmers in poor countries will have the money and the incentive to manage their land in ways that are sustainable in the long run. That is important. To feed an increasingly hungry world, farmers need every incentive to use their soil and water effectively and efficiently.

Questions 19-22

Complete the table below using the information in sections **B** and **C** of Reading Passage 2.

Choose your answers **A-G** from the box below the table and write them in boxes 19-22 on your answer sheet.

Agricultural practice	Environmental damage that may result
• 19	• Deforestation
• 20	• Degraded water supply
• More intensive farming	• 21
• Expansion of monoculture	• 22

- | |
|---|
| <p>A Abandonment of fallow period</p> <p>B Disappearance of old plant varieties</p> <p>C Increased use of chemical inputs</p> <p>D Increased irrigation</p> <p>E Insurance against pests and diseases</p> <p>F Soil erosion</p> <p>G Clearing land for cultivation</p> |
|---|

Test 2

Questions 23-27

Choose the appropriate letters **A-D** and write them in boxes 23-27 on your answer sheet.

- 23 Research completed in 1982 found that in the United States soil erosion
A reduced the productivity of farmland by 20 per cent.
B was almost as severe as in India and China.
C was causing significant damage to 20 per cent of farmland.
D could be reduced by converting cultivated land to meadow or forest.
- 24 By the mid-1980s, farmers in Denmark
A used 50 per cent less fertiliser than Dutch farmers.
B used twice as much fertiliser as they had in 1960.
C applied fertiliser much more frequently than in 1960.
D more than doubled the amount of pesticide they used in just 3 years.
- 25 Which one of the following increased in New Zealand after 1984?
A farm incomes
B use of fertiliser
C over-stocking
D farm diversification
- 26 The writer refers to some rich countries as being 'less enlightened' than New Zealand because
A they disapprove of paying farmers for *not* cultivating the land.
B their new fuel crops are as harmful as the ones they have replaced.
C their policies do not recognise the long-term benefit of ending subsidies.
D they have not encouraged their farmers to follow environmentally friendly practices.
- 27 The writer believes that the Uruguay Round agreements on trade will
A encourage more sustainable farming practices in the long term.
B do more harm than good to the international environment.
C increase pressure to cultivate land in the rich countries.
D be more beneficial to rich than to poor countries.

Question 28

From the list below choose the most suitable title for Reading Passage 2.

Write the appropriate letter A-E in box 28 on your answer sheet.

- A Environmental management
B Increasing the world's food supply
C Soil erosion
D Fertilisers and pesticides - the way forward
E Farm subsidies

READING PASSAGE 3

You should spend about 20 minutes on **Questions 29—40** which are based on Reading Passage 3 below.

THE CONCEPT OF ROLE THEORY

Role set

Any individual in any situation occupies a role in relation to other people. The particular individual with whom one is concerned in the analysis of any situation is usually given the name of *focal person*. He has the *focal role* and can be regarded as sitting in the middle of a group of people, with whom he interacts in some way in that situation. This group of people is called his *role set*. For instance, in the family situation, an individual's role set might be shown as in *Figure 6*.

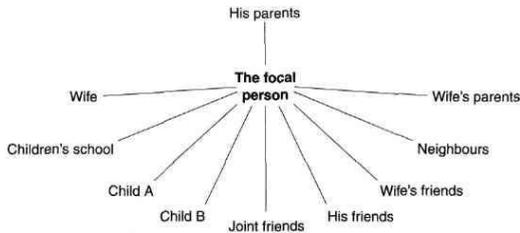


Figure 6

The role set should include all those with whom the individual has more than trivial interactions.

Role definition

The definition of any individual's role in any situation will be a combination of the *role expectations* that the members of the role set have of the focal role. These expectations are often occupationally denned, sometimes even legally so. The role definitions of lawyers and doctors are fairly clearly defined both in legal and in cultural terms. The role definitions of, say, a film star or bank manager, are also fairly clearly defined in cultural terms, too clearly perhaps.

Individuals often find it hard to escape from the role that cultural traditions have defined for them. Not only with doctors or lawyers is the required role behaviour so constrained that if you are in that role for long it eventually becomes part of *you*, part of your personality. Hence, there is *some* likelihood that all accountants *will* be alike or that all blondes are similar - they are forced that way by the expectations of their role.

Test 2

It is often important that you make it clear what your particular role is at a given time. The means of doing this are called, rather obviously, *role signs*. The simplest of role signs is a uniform. The number of stripes on your arm or pips on your shoulder is a very precise role definition which allows you to do certain very prescribed things in certain situations. Imagine yourself questioning a stranger on a dark street at midnight without wearing the role signs of a policeman!

In social circumstances, dress has often been used as a role sign to indicate the nature and degree of formality of any gathering and occasionally the social status of people present. The current trend towards blurring these role signs in dress is probably democratic, but it also makes some people very insecure. Without role signs, who is to know who has what role?

Place is another role sign. Managers often behave very differently outside the office and in it, even to the same person. They use a change of location to indicate a change in role from, say, boss to friend. Indeed, if you wish to change your roles you must find some outward sign that you are doing so or you won't be permitted to change - the subordinate will continue to hear you as his boss no matter how hard you try to be his friend. In very significant cases of role change, e.g. from a soldier in the ranks to officer, from bachelor to married man, the change of role has to have a very obvious *sign*, hence *rituals*. It is interesting to observe, for instance, some decline in the emphasis given to marriage rituals. This could be taken as an indication that there is no longer such a big change in role from single to married person, and therefore no need for a public change in sign.

In organisations, office signs and furniture are often used as role signs. These and other perquisites of status are often frowned upon, but they may serve a purpose as a kind of uniform in a democratic society; roles without signs often lead to confused or differing expectations of the role of the focal person.

Role ambiguity

Role ambiguity results when there is some uncertainty in the minds, either of the focal person or of the members of his role set, as to precisely what his role is at any given time. One of the crucial expectations that shape the role definition is that of the individual, the focal person himself. If his occupation of the role is unclear, or if it differs from that of the others in the role set, there will be a degree of role ambiguity. Is this bad? Not necessarily, for the ability to shape one's own role is one of the freedoms that many people desire, but the ambiguity may lead to role stress which will be discussed later on. The virtue of job descriptions is that they lessen this role ambiguity.

Unfortunately, job descriptions are seldom complete role definitions, except at the lower end of the scale. At middle and higher management levels, they are often a list of formal jobs and duties that say little about the more subtle and informal expectations of the role. The result is therefore to give the individual an uncomfortable feeling that there are things left unsaid, i.e. to *heighten* the sense of role ambiguity.

Looking at role ambiguity from the other side, from the point of view of the members of the role set, lack of clarity in the role of the focal person can cause insecurity, lack of confidence, irritation and even anger among members of his role set. One list of the roles of a manager identified the following: executive, planner, policy maker, expert, controller of rewards and punishments, counsellor, friend, teacher. If it is not clear, through role signs of one sort or another, which role is currently the operational one, the other party may not react in the appropriate way — we may, in fact, hear quite another message if the focal person speaks to us, for example, as a teacher and we hear her as an executive.

Questions 29-35

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

In boxes 29-35 on your answer sheet write

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

- 29 It would be a good idea to specify the role definitions of soldiers more clearly.
- 30 Accountants may be similar to one another because they have the same type of job.
- 31 It is probably a good idea to keep dress as a role sign even nowadays.
- 32 The decline in emphasis on marriage rituals should be reversed.
- 33 Today furniture operates as a role sign in the same way as dress has always done.
- 34 It is a good idea to remove role ambiguity.
- 35 Job descriptions eliminate role ambiguity for managers.

Test 2

Questions 36-39

Choose **ONE OR TWO WORDS** from Reading Passage 3 for each answer.

Write your answers in boxes 36-39 on your answer sheet.

- 36 A new headmaster of a school who enlarges his office and puts in expensive carpeting is using the office as a ...
- 37 The graduation ceremony in many universities is an important...
- 38 The wig which judges wear in UK courts is a ...
- 39 The parents of students in a school are part of the headmaster's ...

Question 40

Choose the appropriate letter **A-D** and write it in box 40 on your answer sheet.

This text is taken from

- A** a guide for new managers in a company.
- B** a textbook analysis of behaviour in organisations.
- C** a critical study of the importance of role signs in modern society.
- D** a newspaper article about role changes.

READING

READING PASSAGE 1

You should spend about 20 minutes on **Questions 1—12** which are based on Reading Passage 1 below.

THE DEPARTMENT OF ETHNOGRAPHY

The Department of Ethnography was created as a separate department within the British Museum in 1946, after 140 years of gradual development from the original Department of Antiquities. It is concerned with the people of Africa, the Americas, Asia, the Pacific and parts of Europe. While this includes complex kingdoms, as in Africa, and ancient empires, such as those of the Americas, the primary focus of attention in the twentieth century has been on small-scale societies. Through its collections, the Department's specific interest is to document how objects are created and used, and to understand their importance and significance to those who produce them. Such objects can include both the extraordinary and the mundane, the beautiful and the banal.

The collections of the Department of Ethnography include approximately 300,000 artefacts, of which about half are the product of the present century. The Department has a vital role to play in providing information on non-Western cultures to visitors and scholars. To this end, the collecting emphasis has often been less on individual objects than on groups of material which allow the display of a broad range of a society's cultural expressions.



Much of the more recent collecting was carried out in the field, sometimes by Museum staff working on general anthropological projects in collaboration with a wide variety of national governments and other institutions. The material collected includes great technical series - for instance, of textiles from Bolivia, Guatemala, Indonesia and areas of West Africa - or of artefact types such as boats. The latter include working examples of coracles from India, reed boats from Lake Titicaca in the Andes, kayaks from the Arctic, and dug-out canoes from several countries. The field assemblages, such as those from the Sudan, Madagascar and Yemen, include a whole range of material culture representative of one people. This might cover the necessities of life of an African herdsman or an Arabian farmer, ritual objects, or even on occasion important art. Again, a series of acquisitions might

represent a decade's fieldwork documenting social experience as expressed in the varieties of clothing and jewellery styles, tents and camel trappings from various Middle Eastern countries, or in the developing preferences in personal adornment and dress from Papua New Guinea. Particularly interesting are a series of collections which continue to document the evolution of ceremony and of material forms for which the Department already possesses early (if not the earliest) collections formed after the first contact with Europeans.

The importance of these acquisitions extends beyond the objects themselves. They come to the Museum with documentation of the social context, ideally including photographic records. Such acquisitions have multiple purposes. Most significantly they document for future change. Most people think of the cultures represented in the collection in terms of the absence of advanced technology. In fact, traditional practices draw on a continuing wealth of technological ingenuity. Limited resources and ecological constraints are often overcome by personal skills that would be regarded as exceptional in the West. Of growing interest is the way in which much of what we might see as disposable is, elsewhere, recycled and reused.

With the Independence of much of Asia and Africa after 1945, it was assumed that economic progress would rapidly lead to the disappearance or assimilation of many small-scale societies. Therefore, it was felt that the Museum should acquire materials representing people whose art or material culture, ritual or political structures were on the point of irrevocable change. This attitude altered with the realisation that marginal communities can survive and

adapt in spite of partial integration into a notoriously fickle world economy. Since the seventeenth century, with the advent of trading companies exporting manufactured textiles to North America and Asia, the importation of cheap goods has often contributed to the destruction of local skills and indigenous markets. On the one hand modern imported goods may be used in an everyday setting, while on the other hand other traditional objects may still be required for ritually significant events. Within this context trade and exchange attitudes are inverted. What are utilitarian objects to a Westerner may be prized objects in other cultures - when transformed by local ingenuity - principally for aesthetic value. In the same way, the West imports goods from other peoples and in certain circumstances categorises them as 'art'.

Collections act as an ever-expanding database, not merely for scholars and anthropologists, but for people involved in a whole range of educational and artistic purposes. These include schools and universities as well as colleges of art and design. The provision of information about non-Western aesthetics and techniques, not just for designers and artists but for all visitors, is a growing responsibility for a Department whose own context is an increasingly multicultural European society.

Test 3

Questions 1-6

Do the following statements agree with the information given in Reading Passage 1?

In boxes 1-6 on your answer sheet write

- TRUE** if the statement is true according to the passage
FALSE if the statement is false according to the passage
NOT GIVEN if the information is not given in the passage

<i>Example</i>	
The Department of Ethnography replaced the Department of Antiquities at the British Museum.	Answer FALSE

- 1 The twentieth-century collections come mainly from mainstream societies such as the US and Europe.
- 2 The Department of Ethnography focuses mainly on modern societies.
- 3 The Department concentrates on collecting single unrelated objects of great value.
- 4 The textile collection of the Department of Ethnography is the largest in the world.
- 5 Traditional societies are highly inventive in terms of technology.
- 6 Many small-scale societies have survived and adapted in spite of predictions to the contrary.

Questions 7-12

Some of the exhibits at the Department of Ethnography are listed below (Questions 7-12).

The writer gives these exhibits as examples of different collection types.

Match each exhibit with the collection type with which it is associated in Reading Passage 1.

Write the appropriate letters in boxes 7-12 on your answer sheet.

NB You may use any collection type more than once.

Collection Types	
AT	Artefact Types
EC	Evolution of Ceremony
FA	Field Assemblages
SE	Social Experience
TS	Technical Series

<i>Example</i>	Answer
Boats	AT

- 7 Bolivian textiles
- 8 Indian coracles
- 9 airport art
- 10 Arctic kayaks
- 11 necessities of life of an Arabian farmer
- 12 tents from the Middle East

READING PASSAGE 2

You should spend about 20 minutes on **Questions 13-25** which are based on Reading Passage 2 on the following pages.

Questions 13-15

Reading Passage 2 has six sections **A-F**.

Choose the most suitable headings for sections **A**, **B** and **D** from the list of headings below.

Write the appropriate numbers **i-vii** in boxes 13-15 on your answer sheet.

List of Headings	
i	Amazonia as unable to sustain complex societies
ii	The role of recent technology in ecological research in Amazonia
iii	The hostility of the indigenous population to North American influences
iv	Recent evidence
v	Early research among the Indian Amazons
vi	The influence of prehistoric inhabitants on Amazonian natural history
vii	The great difficulty of changing local attitudes and practices

13 Section **A**

14 Section **B**

<i>Example</i> Paragraph C

Answer iv

15 Section **D**

Secrets of the Forest

- A** In 1942 Allan R Holmberg, a doctoral student in anthropology from Yale University, USA, ventured deep into the jungle of Bolivian Amazonia and searched out an isolated band of Siriono Indians. The Siriono, Holmberg later wrote, led a "strikingly backward" existence. Their villages were little more than clusters of thatched huts. Life itself was a perpetual and punishing search for food: some families grew *manioc* and other starchy crops in small garden plots cleared from the forest, while other members of the tribe scoured the country for small game and promising fish holes. When local resources became depleted, the tribe moved on. As for technology, Holmberg noted, the Siriono "may be classified among the most handicapped peoples of the world". Other than bows, arrows and crude digging sticks, the only tools the Siriono seemed to possess were "two machetes worn to the size of pocket-knives".
- B** Although the lives of the Siriono have changed in the intervening decades, the image of them as Stone Age relics has endured. Indeed, in many respects the Siriono epitomize the popular conception of life in Amazonia. To casual observers, as well as to influential natural scientists and regional planners, the luxuriant forests of Amazonia seem ageless, unconquerable, a habitat totally hostile to human civilization. The apparent simplicity of Indian ways of life has been judged an evolutionary adaptation to forest ecology, living proof that Amazonia could not - and cannot - sustain a more complex society. Archaeological traces of far more elaborate cultures have been dismissed as the ruins of invaders from outside the region, abandoned to decay in the uncompromising tropical environment.
- C** The popular conception of Amazonia and its native residents would be enormously consequential if it were true. But the human history of Amazonia in the past 11,000 years betrays that view as myth. Evidence gathered in recent years from anthropology and archaeology indicates that the region has supported a series of indigenous cultures for eleven thousand years; an extensive network of complex societies - some with populations perhaps as large as 100,000 - thrived there for more than 1,000 years before the arrival of Europeans. (Indeed, some contemporary tribes, including the Siriono, still live among the earthworks of earlier cultures.) Far from being evolutionarily retarded, prehistoric Amazonian people developed technologies and cultures that were advanced for their time. If the lives of Indians today seem "primitive", the appearance is not the result of some environmental adaptation or ecological barrier; rather it is a comparatively recent adaptation to centuries of economic and political pressure. Investigators who argue otherwise have unwittingly projected the present onto the past.
- D** The evidence for a revised view of Amazonia will take many people by surprise. Ecologists have assumed that tropical ecosystems were shaped entirely by natural forces and they have

Test 3

focused their research on habitats they believe have escaped human influence. But as the University of Florida ecologist, Peter Feinsinger, has noted, an approach that leaves people out of the equation is no longer tenable. The archaeological evidence shows that the natural history of Amazonia is to a surprising extent tied to the activities of its prehistoric inhabitants.

- E** The realization comes none too soon. In June 1992 political and environmental leaders from across the world met in Rio de Janeiro to discuss how developing countries can advance their economies without destroying their natural resources. The challenge is especially difficult in Amazonia. Because the tropical forest has been depicted as ecologically unfit for large-scale human occupation, some environmentalists have opposed development of any kind. Ironically, one major casualty of that extreme position has been the environment itself. While policy makers struggle to define and implement appropriate legislation, development of the most destructive kind has continued apace over vast areas.
- F** The other major casualty of the "naturalism" of environmental scientists has been the indigenous Amazonians, whose habits of hunting, fishing, and slash-and-burn cultivation often have been represented as harmful to the habitat. In the clash between environmentalists and developers, the Indians, whose presence is in fact crucial to the survival of the forest, have suffered the most. The new understanding of the pre-history of Amazonia, however, points toward a middle ground. Archaeology makes clear that with judicious management selected parts of the region could support more people than anyone thought before. The long-buried past, it seems, offers hope for the future.

Questions 16-21

Do the following statements agree with the views of the writer in Reading Passage 2?

In boxes 16–21 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

<i>Example</i>	The prehistoric inhabitants of Amazonia were relatively backward in technological terms.	Answer NO
----------------	--	---------------------

- 16 The reason for the simplicity of the Indian way of life is that Amazonia has always been unable to support a more complex society.
- 17 There is a crucial popular misconception about the human history of Amazonia.
- 18 There are lessons to be learned from similar ecosystems in other parts of the world.
- 19 Most ecologists were aware that the areas of Amazonia they were working in had been shaped by human settlement.
- 20 The indigenous Amazonian Indians are necessary to the well-being of the forest.
- 21 It would be possible for certain parts of Amazonia to support a higher population.

Questions 22-25

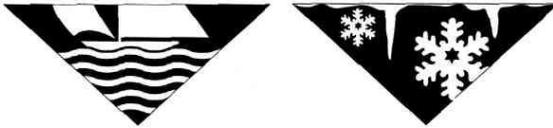
Choose the appropriate letters **A-D** and write them in boxes 22-25 on your answer sheet.

- 22 In 1942 the US anthropology student concluded that the Siriono
- A were unusually aggressive and cruel.
 - B had had their way of life destroyed by invaders.
 - C were an extremely primitive society.
 - D had only recently made permanent settlements.
- 23 The author believes recent discoveries of the remains of complex societies in Amazonia
- A are evidence of early indigenous communities.
 - B are the remains of settlements by invaders.
 - C are the ruins of communities established since the European invasions.
 - D show the region has only relatively recently been covered by forest.
- 24 The assumption that the tropical ecosystem of Amazonia has been created solely by natural forces
- A has often been questioned by ecologists in the past.
 - B has been shown to be incorrect by recent research.
 - C was made by Peter Feinsinger and other ecologists.
 - D has led to some fruitful discoveries.
- 25 The application of our new insights into the Amazonian past would
- A warn us against allowing any development at all.
 - B cause further suffering to the Indian communities.
 - C change present policies on development in the region.
 - D reduce the amount of hunting, fishing, and 'slash-and-burn'.

READING PASSAGE 3

You should spend about 20 minutes on **Questions 26-40** which are based on Reading Passage 3 below

HIGHS & LOWS



Hormone levels - and hence our moods - may be affected by the weather. Gloomy weather can cause depression, but sunshine appears to raise the spirits. In Britain, for example, the dull weather of winter drastically cuts down the amount of sunlight that is experienced which strongly affects some people. They become so depressed and lacking in energy that their work and social life are affected. This condition has been given the name SAD (Seasonal Affective Disorder). Sufferers can fight back by making the most of any sunlight in winter and by spending a few hours each day under special, full-spectrum lamps. These provide more ultraviolet and blue-green light than ordinary fluorescent and tungsten lights. Some Russian scientists claim that children learn better after being exposed to ultraviolet light. In warm countries, hours of work are often arranged so that workers can take a break, or even a siesta, during the hottest part of the day. Scientists are working to discover the links between the weather and human beings' moods and performance.

It is generally believed that tempers grow shorter in hot, muggy weather. There is no

doubt that 'crimes against the person' rise in the summer, when the weather is hotter and fall in the winter when the weather is colder. Research in the United States has shown a relationship between temperature and street riots. The frequency of riots rises dramatically as the weather gets warmer, hitting a peak around 27-30°C. But is this effect really due to a mood change caused by the heat? Some scientists argue that trouble starts more often in hot weather merely because there are more people in the street when the weather is good.

Psychologists have also studied how being cold affects performance. Researchers compared divers working in icy cold water at 5°C with others in water at 20°C (about swimming pool temperature). The colder water made the divers worse at simple arithmetic and other mental tasks. But significantly, their performance was impaired as soon as they were put into the cold water - before their bodies had time to cool down. This suggests that the low temperature did not slow down mental functioning directly, but the feeling of cold distracted the divers from their tasks.

Test 3

Psychologists have conducted studies showing that people become less sceptical and more optimistic when the weather is sunny. However, this apparently does not just depend on the temperature. An American psychologist studied customers in a temperature-controlled restaurant. They gave bigger tips when the sun was shining and smaller tips when it wasn't, even though the temperature in the restaurant was the same. A link between weather and mood is made believable by the evidence for a connection between behaviour and the length of the daylight hours. This in turn might involve the level of a hormone called melatonin, produced in the pineal gland in the brain. The amount of melatonin falls with greater exposure to daylight. Research shows that melatonin plays an important part in the seasonal behaviour of certain animals. For example, food consumption of stags increases during the winter, reaching a peak in February/ March. It falls again to a low point in May, then rises to a peak in September, before dropping to another minimum in November. These changes seem to be triggered by varying melatonin levels.

In the laboratory, hamsters put on more weight when the nights are getting shorter and their melatonin levels are falling. On the other hand, if they are given injections of melatonin, they will stop eating altogether. It seems that time cues provided by the changing lengths of day and night trigger changes in animals' behaviour - changes that are needed to cope with the cycle of the seasons. People's moods too, have been shown to react to the length of the daylight hours. Sceptics might say that longer exposure to sunshine puts people in a better mood

because they associate it with the happy feelings of holidays and freedom from responsibility. However, the belief that rain and murky weather make people more unhappy is borne out by a study in Belgium, which showed that a telephone counselling service gets more telephone calls from people with suicidal feelings when it rains.

When there is a thunderstorm brewing, some people complain of the air being 'heavy' and of feeling irritable, moody and on edge. They may be reacting to the fact that the air can become slightly positively charged when large thunderclouds are generating the intense electrical fields that cause lightning flashes. The positive charge increases the levels of serotonin (a chemical involved in sending signals in the nervous system). High levels of serotonin in certain areas of the nervous system make people more active and reactive and, possibly, more aggressive. When certain winds are blowing, such as the Mistral in southern France and the Föhn in southern Germany, mood can be affected - and the number of traffic accidents rises. It may be significant that the concentration of positively charged particles is greater than normal in these winds. In the United Kingdom, 400,000 ionizers are sold every year. These small machines raise the number of negative ions in the air in a room. Many people claim they feel better in negatively charged air.

Questions 26-28

Choose the appropriate letters **A—D** and write them in boxes 26—28 on your answer sheet.

- 26 Why did the divers perform less well in colder conditions?
- A They were less able to concentrate.
 - B Their body temperature fell too quickly.
 - C Their mental functions were immediately affected by the cold.
 - D They were used to swimming pool conditions.
- 27 The number of daylight hours
- A affects the performance of workers in restaurants.
 - B influences animal feeding habits.
 - C makes animals like hamsters more active.
 - D prepares humans for having greater leisure time.
- 28 Human irritability may be influenced by
- A how nervous and aggressive people are.
 - B reaction to certain weather phenomena.
 - C the number of ions being generated by machines.
 - D the attitude of people to thunderstorms.

Questions 29-34

Do the following statements agree with the information in Reading Passage 3?

In boxes 29-34 on your answer sheet write

TRUE if the statement is true according to the passage
FALSE if the statement is false according to the passage
NOT GIVEN if the information is not given in the passage

- 29 Seasonal Affective Disorder is disrupting children's education in Russia.
- 30 Serotonin is an essential cause of human aggression.
- 31 Scientific evidence links 'happy associations with weather' to human mood.
- 32 A link between depression and the time of year has been established.
- 33 Melatonin levels increase at certain times of the year.
- 34 Positively charged ions can influence eating habits.

Questions 35-37

According to the text which **THREE** of the following conditions have been scientifically proved to have a psychological effect on humans?

Choose **THREE** letters **A—G** and write them in boxes 35—37 on your answer sheet.

- A** lack of negative ions
- B** rainy weather
- C** food consumption
- D** high serotonin levels
- E** sunny weather
- F** freedom from worry
- G** lack of counselling facilities

Questions 38-40

Complete each of the following statements with the best ending from the box below.

Write the appropriate letters **A-G** in boxes 38—40 on your answer sheet.

- 38 It has been established that social tension increases significantly in the United States during ...
- 39 Research has shown that a hamster's bodyweight increases according to its exposure to
- 40 Animals cope with changing weather and food availability because they are influenced by...

- | |
|---|
| <ul style="list-style-type: none">A daylightB hot weatherC melatoninD moderate temperaturesE poor co-ordinationF time cuesG impaired performance |
|---|

READING

READING PASSAGE 1

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



Part One

- A** Air pollution is increasingly becoming the focus of government and citizen concern around the globe. From Mexico City and New York, to Singapore and Tokyo, new solutions to this old problem are being proposed, Mailed and implemtenred with ever increasing speed. It is feared that unless pollution reduction measures are able to keep pace with the continued pressures of urban growth, air quality in many of the world's major cities will deteriorate beyond reason.
- B** Acrion is being taken along several fronts: through new legislation, improved enforcement and innovative technology. In Los Angeles, state regulations are forcing manufacturers to try to sell ever cleaner cars: their first of the cleanest, titled "Zero Emission Vehicles", hove to be available soon, since they are intended to make up 2 per cent of sales in 1997. Local authorities in London are campaigning to be allowed to enforce anti-pollution lows themselves; at present only rhe police have the power to do so, but they tend to be busy elsewhere. In Singapore, renting out toad space to users is the way of the future.
- C** When Dritain's Royal Automobile Club monitored rhe exhausts of 60,000 vehicles, it found that 12 per cent of them produced more than half the total pollution. Older cars were the worst offenders; though a sizeable number of quire new cars were also identified as *gross polluters*, they were simply badly tuned. California has developed a scheme to get these gross polluters off rhe streets: they offer a flat \$700 for any old, run-down vehicle driven in by its owner. The aim is to remove rhe heaviesr-polluring, most decrepit vehicles from rhe roads.
- D** As part of a European Union environmental programme, a London council is resting an infra-red specrrrometer from rhe University of Denver in Colorado. It gauges the pollution from a passing vehicle - more useful than the annual stationary rest that is the British standard today - by bouncing a beam through the exhaust and measuring what gets blocked. The councils next step may be to link the system to a computerised video camera able to read number plates automatically.
- E** The effort to clean up cars may do little to cut pollution if nothing is done about the tendency to drive them more. Los Angeles has some of the world's cleanest cars - far better than those of Europe - but the total number of miles those cars drive continues to grow. One solution is car-pooling, an

arrangement in which a number of people who share the same destination share the use of one car. However, the average number of people in a car on the freeway in Los Angeles, which is 1.0, has been falling steadily. Increasing it would be an effective way of reducing emissions as well as easing congestion. The trouble is, Los Angelenos seem to like being alone in their cars.

- F Singapore has for a while had a scheme that forces drivers to buy a badge if they wish to visit a certain part of the city. Electronic innovations make possible increasing sophistication: rates can vary according to road conditions, time of day and so on. Singapore is advancing in this direction, with a city-wide network of transmitters to collect information and charge drivers as they pass certain points. Such road-pricing, however, can be controversial. When the local government in Cambridge, England, considered introducing Singaporean techniques, it faced vocal and ultimately successful opposition.

Part Two

The scope of the problem facing the world's cities is immense. In 1992, the United Nations Environmental Programme and the World Health Organisation (WHO) concluded that all of a sample of twenty megacities - places likely to have more than ten million inhabitants in the year 2000 - already exceeded the level the WHO deems healthy in at least one major pollutant. Two-thirds of them exceeded the guidelines for two, seven for three or more.

Of the six pollutants monitored by the WHO - carbon dioxide, nitrogen dioxide, ozone, sulphur dioxide, lead and particulate matter - it is this last category that is attracting the most attention from health researchers. PM10, a sub-category of particulate matter measuring ten-millionths of a metre across, has been implicated in thousands of deaths a year in Britain alone. Research being conducted in two counties of Southern California is reaching similarly disturbing conclusions concerning this little-understood pollutant.

A world-wide rise in allergies, particularly asthma, over the past four decades is now said to be linked with increased air pollution. The lungs and brains of children who grow up in polluted air offer further evidence of its destructive power. The old and ill, however, are the most vulnerable to the acute effects of heavily polluted stagnant air. It can actually hasten death, as it did in December 1991 when a cloud of exhaust fumes lingered over the city of London for over a week.

The United Nations has estimated that in the year 2000 there will be twenty-four mega-cities and a further eighty-five cities of more than three million people. The pressure on public officials, corporations and urban citizens to reverse established trends in air pollution is likely to grow in proportion with the growth of cities themselves. Progress is being made. The question, though, remains the same: 'Will change happen quickly enough?'

Test 4

Questions 1-5

Look at the following solutions (Questions 1-5) and locations.

Match each solution with one location.

Write the appropriate locations in boxes 1-5 on your answer sheet.

NB You may use any location more than once.

SOLUTIONS

- 1 Manufacturers must sell cleaner cars.
- 2 Authorities want to have power to enforce anti-pollution laws.
- 3 Drivers will be charged according to the roads they use.
- 4 Moving vehicles will be monitored for their exhaust emissions.
- 5 Commuters are encouraged to share their vehicles with others.

LOCATIONS

Singapore
Tokyo
London
New York
Mexico City
Cambridge
Los Angeles

Questions 6-10

Do the following statements reflect the claims of the writer in Reading Passage 1?

In boxes 6-10 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

- 6 According to British research, a mere twelve per cent of vehicles tested produced over fifty per cent of total pollution produced by the sample group.
- 7 It is currently possible to measure the pollution coming from individual vehicles whilst they are moving.
- 8 Residents of Los Angeles are now tending to reduce the yearly distances they travel by car.
- 9 Car-pooling has steadily become more popular in Los Angeles in recent years.
- 10 Charging drivers for entering certain parts of the city has been successfully done in Cambridge, England.

Questions 11-13

Choose the appropriate letters A—D and write them in boxes 11-13 on your answer sheet.

- 11 How many pollutants currently exceed WHO guidelines in all megacities studied?
 - A one
 - B two
 - C three
 - D seven
- 12 Which pollutant is currently the subject of urgent research?
 - A nitrogen dioxide
 - B ozone
 - C lead
 - D particulate matter
- 13 Which of the following groups of people are the most severely affected by intense air pollution?
 - A allergy sufferers
 - B children
 - C the old and ill
 - D asthma sufferers

READING PASSAGE 2

You should spend about 20 minutes on **Questions 14-27** which are based on Reading Passage 2 below.

✓OTES FOR WOMEN



The suffragette movement, which campaigned for votes for women in the early twentieth century, is most commonly associated with the Pankhurst family and militant acts of varying degrees of violence. The Museum of London has drawn on its archive collection to convey a fresh picture with its exhibition

The Purple, White and Green: Suffragettes in London 1906-88

14.

The name is a reference to the colour scheme that the Women's Social and Political Union (WSPU) created to give the movement a uniform, nationwide image. By doing so, it became one of the first groups to project a corporate identity, and it is this advanced marketing strategy, along with the other organisational and commercial achievements of the WSPU, to which the exhibition is devoted.

Formed in 1903 by the political campaigner Mrs Emmeline Pankhurst and her daughters Christabel and Sylvia, the WSPU began an educated campaign to put women's suffrage on the political agenda. New Zealand, Australia and parts of the United States had already enfranchised women, and growing numbers of their British counterparts wanted the same opportunity.

With their slogan 'Deeds not words', and the introduction of the colour scheme, the WSPU soon brought the movement

the cohesion and focus it had previously lacked. Membership grew rapidly as women deserted the many other, less directed, groups and joined it. By 1906 the WSPU headquarters, called the Women's Press Shop, had been established in Charing Cross Road and in spite of limited communications (no radio or television, and minimal use of the telephone) the message had spread around the country, with members and branch officers stretching to as far as Scotland.

The newspapers produced by the WSPU, first *Votes for Women* and later *The Suffragette*, played a vital role in this communication. Both were sold throughout the country and proved an invaluable way of informing members of meetings, marches, fund-raising events and the latest news and views on the movement.

Equally importantly for a rising political group, the newspaper returned a profit. This was partly because

advertising space was bought in the paper by large department stores such as Selfridges, and jewellers such as Mappin & Webb. These two, together with other like-minded commercial enterprises sympathetic to the cause, had quickly identified a direct way to reach a huge market of women, many with money to spend.

The creation of the colour scheme provided another money-making opportunity which the WSPU was quick to exploit. The group began to sell playing cards, board games, Christmas and greeting cards, and countless other goods, all in the purple, white and green colours. In 1906 such merchandising of a corporate identity was a new marketing concept.

But the paper and merchandising activities alone did not provide sufficient funds for the WSPU to meet organisational costs, so numerous other fund-raising activities combined to fill the coffers of the 'war chest'. The most notable of these was the Woman's Exhibition, which took place in 1909 in a Knightsbridge ice-skating rink, and in 10 days raised the equivalent of £250,000 today.

The Museum of London's exhibition is largely visual, with a huge number of items on show. Against a quiet

background hum of street sounds, copies of *The Suffragette*, campaign banners and photographs are all on display, together with one of Mrs Pankhurst's shoes and a number of purple, white and green trinkets.

Photographs depict vivid scenes of a suffragette's life: WSPU members on a self-proclaimed 'monster' march, wearing their official uniforms of a white frock decorated with purple, white and green accessories; women selling *The Suffragette* at street corners, or chalking up pavements with details of a forthcoming meeting.

Windows display postcards and greeting cards designed by women artists for the movement, and the quality of the artwork indicates the wealth of resources the WSPU could call on from its talented members.

Visitors can watch a short film made up of old newsreels and cinema material which clearly reveals the political mood of the day towards the suffragettes. The programme begins with a short film devised by the 'antis' - those opposed to women having the vote - depicting a suffragette as a fierce harridan bullying her poor, abused husband. Original newsreel footage shows the suffragette Emily Wilding Davison throwing

herself under King George V's horse at a famous race-

Although the exhibition officially charts the years 1906 to 1914, graphic display boards outlining the bills of enfranchisement of 1918 and 1928, which gave the adult female populace of Britain the vote, show what was achieved. It demonstrates how advanced the suffragettes were in their thinking, in the marketing of their campaign, and in their work as shrewd and skilful image-builders. It also conveys a sense of the energy and ability the suffragettes brought to their fight for freedom and equality. And it illustrates the intelligence employed by women who were at that time deemed by several politicians to have 'brains too small to know how to vote'.

Questions 14 and 15

Choose the appropriate letters **A-D** and write them in boxes 14 and 15 on your answer sheet.

- 14 What is the main aspect of the suffragette movement's work to which the exhibition at the Museum of London is devoted?
- A the role of the Pankhurst family in the suffrage movement
 - B the violence of the movement's political campaign
 - C the success of the movement's corporate image
 - D the movement's co-operation with suffrage groups overseas
- 15 Why was the WSPU more successful than other suffrage groups?
- A Its leaders were much better educated.
 - B It received funding from movements abroad.
 - C It had access to new technology.
 - D It had a clear purpose and direction.

Question 16

Choose **TWO** letters **A-E** and write them in box 16 on your answer sheet.

In which **TWO** of the following years were laws passed allowing British women to vote?

- A 1906
- B 1909
- C 1914
- D 1918
- E 1928

Questions 17-19

Complete the notes below.

Choose **NO MORE THAN THREE WORDS** from Reading Passage 2 for each answer.

Write your answers in boxes 17-19 on your answer sheet.

Three ways in which the WSPU raised money: <ul style="list-style-type: none">• the newspapers: mainly through selling ... 17...• merchandising activities: selling a large variety of goods produced in their ...18...• additional fund-raising activities: for example, ...19...
--

Questions 20-26

Do the following statements reflect the situation as described by the writer in Reading Passage 2?

In boxes 20-26 on your answer sheet write

- YES** if the statement reflects the situation as described by the writer
NO if the statement contradicts the writer
NOT GIVEN if it is impossible to know what the situation is from the passage

<i>Example</i>	Answer
The WSPU was founded in 1906 by Emmeline Pankhurst	NO

- 20** In 1903 women in Australia were still not allowed to vote.
21 The main organs of communication for the WSPU were its two newspapers.
22 The work of the WSPU was mainly confined to London and the south.
23 The WSPU's newspapers were mainly devoted to society news and gossip.
24 The Woman's Exhibition in 1909 met with great opposition from Parliament.
25 The Museum of London exhibition includes some of the goods sold by the movement.
26 The opponents of the suffragettes made films opposing the movement.

Question 27

Choose the appropriate letter **A-D** and write it in box 27 on your answer sheet.

The writer of the article finds the exhibition to be

- A** misleading.
B exceptional.
C disappointing.
D informative.

READING PASSAGE 3

You should spend about 20 minutes on **Questions 28-40** which are based on Reading Passage 3 below.

Measuring Organisational Performance

There is clear-cut evidence that, for a period of at least one year, supervision which increases the direct pressure for productivity can achieve significant increases in production. However, such short-term increases are obtained only at a substantial and serious cost to the organisation.

To what extent can a manager make an impressive earnings record over a short period of one to three years by exploiting the company's investment in the human organisation in his plant or division? To what extent will the quality of his organisation suffer if he does so? The following is a description of an important study conducted by the Institute for Social Research designed to answer these questions.

The study covered 500 clerical employees in four parallel divisions. Each division was organised in exactly the same way, used the same technology, did exactly the same kind of work, and had employees of comparable aptitudes.

Productivity in all four of the divisions depended on the number of clerks involved. The work entailed the processing of accounts and generating of invoices. Although the volume of work was considerable, the nature of the business was such that it could only be processed as it came along. Consequently, the only way in which productivity could be increased was to change the size of the workgroup.

The four divisions were assigned to two experimental programmes on a random basis. Each programme was assigned at random a division that had been historically high in productivity and a division that had been below average in productivity. No attempt was made to place a division in the programme that would best fit its habitual methods of supervision used by the manager, assistant managers, supervisors and assistant supervisors.

The experiment at the clerical level lasted for one year. Beforehand, several months were devoted to planning, and there was also a training period of approximately six months. Productivity was measured continuously and computed weekly throughout the year. The attitudes of employees and supervisory staff towards their work were measured just before and after the period.

Turning now to the heart of the study, in two divisions an attempt was made to change the supervision so that the decision levels were pushed *down* and detailed supervision of the workers reduced. More general supervision of the clerks and their supervisors was introduced. In addition, the managers, assistant managers, supervisors and assistant supervisors of these two divisions were trained in group methods of leadership, which they endeavoured to use as much as their skill would permit during the experimental year. For easy reference, the experimental changes in these two divisions will be labelled the 'participative programme'.

In the other two divisions, by contrast, the programme called for modifying the supervision so as to increase the closeness of supervision and move the decision levels *upwards*. This will be labelled the 'hierarchically controlled programme'. These changes were accomplished by a further extension of the scientific management approach. For example, one of the major changes made was to have the jobs timed and to have standard times computed. This showed that these divisions were overstaffed by about 30%. The general manager then ordered the managers of these two divisions to cut staff by 25%. This was done by transfers without replacing the persons who left; no one was to be dismissed.

Results of the Experiment

Changes in Productivity

Figure 1 shows the changes in salary costs per unit of work, which reflect the change in productivity that occurred in the divisions. As will be observed, the hierarchically controlled programmes increased productivity by about 25%. This was a result of the direct orders from the general manager to reduce staff by that amount. Direct pressure produced a substantial increase in production.

A significant increase in productivity of 20% was also achieved in the participative programme, but this was not as great

an increase as in the hierarchically controlled programme. To bring about this improvement, the clerks themselves participated in the decision to reduce the size of the work group. (They were aware of course that productivity increases were sought by management in conducting these experiments.) Obviously, deciding to reduce the size of a work group by eliminating some of its members is probably one of the most difficult decisions for a work group to make. Yet the clerks made it. In fact, one division in the participative programme increased its productivity by about the same amount as each of the two divisions in the hierarchically controlled programme. The other participative division, which historically had been the poorest of all the divisions, did not do so well and increased productivity by only 15%.

Changes in Attitudes

Although both programmes had similar effects on productivity, they had significantly different results in other respects. The productivity increases in the hierarchically controlled programme were accompanied by shifts in an adverse direction in such factors as loyalty, attitudes, interest, and involvement in the work. But just the opposite was true in the participative programme.

For example, Figure 2 shows that when more general supervision and increased participation were provided, the employees' feeling of responsibility to see that the work got done increased. Again, when the supervisor was away, they kept on working. In the hierarchically controlled programme, however, the feeling of responsibility decreased, and when the supervisor was absent, work tended to stop.

As Figure 3 shows, the employees in the participative programme at the end of the year felt that their manager and assistant manager were 'closer to them' than at the beginning of the year. The opposite was true in the hierarchical programme. Moreover, as Figure 4 shows, employees in the participative programme felt that their supervisors were more likely to 'pull' for them, or for the company and them, and not be solely interested in the company, while in the hierarchically controlled programme, the opposite trend occurred.

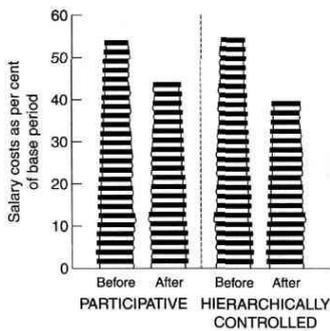


FIGURE 1

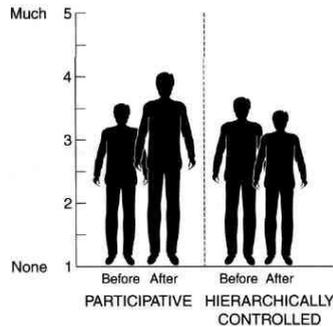


FIGURE 2

Test 4

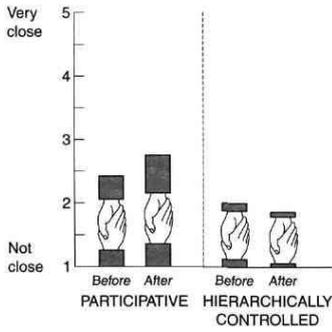


FIGURE 3

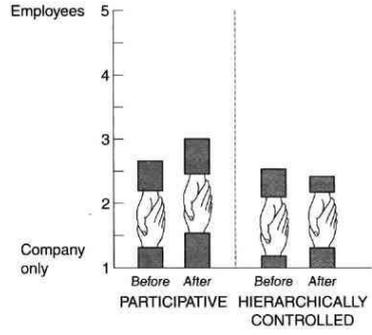


FIGURE 4

Questions 28-30

Choose the appropriate letters **A-D** and write them in boxes 28-30 on your answer sheet.

- 28** The experiment was designed to
- A** establish whether increased productivity should be sought at any cost.
 - B** show that four divisions could use the same technology.
 - C** perfect a system for processing accounts.
 - D** exploit the human organisation of a company in order to increase profits.
- 29** The four divisions
- A** each employed a staff of 500 clerks.
 - B** each had equal levels of productivity.
 - C** had identical patterns of organisation.
 - D** were randomly chosen for the experiment.
- 30** Before the experiment
- A** the four divisions were carefully selected to suit a specific programme.
 - B** each division was told to reduce its level of productivity.
 - C** the staff involved spent a number of months preparing for the study.
 - D** the employees were questioned about their feelings towards the study.

Questions 31-36

Complete the summary below. Choose **ONE** word from Reading Passage 3 for each answer.

Write your answers in boxes 31-36 on your answer sheet.

This experiment involved an organisation comprising four divisions, which were divided into two programmes: the hierarchically controlled programme and the participative programme. For a period of one year a different method of ... **31** ... was used in each programme. Throughout this time ... **32** ... was calculated on a weekly basis. During the course of the experiment the following changes were made in an attempt to improve performance.

In the participative programme:

- supervision of all workers was ... **33** ...
- supervisory staff were given training in ... **34** ...

In the hierarchically controlled programme:

- supervision of all workers was increased.
- work groups were found to be ... **35** ... by 30%.
- the work force was ... **36** ... by 25%.

Test 4

Questions 37-40

Look at Figures 1, 2, 3 and 4 in Reading Passage 3.

Choose the most appropriate label, **A—I**, for each Figure from the box below.

Write your answers in boxes 37-40 on your answer sheet.

- | | |
|----------|---|
| A | Employees' interest in the company |
| B | Cost increases for the company |
| C | Changes in productivity |
| D | Employees' feelings of responsibility towards completion of work |
| E | Changes in productivity when supervisor was absent |
| F | Employees' opinion as to extent of personal support from management |
| G | Employees feel closer to their supervisors |
| H | Employees' feelings towards increased supervision |
| I | Supervisors' opinion as to closeness of work group |

- 37 Fig 1.....
- 38 Fig2.....
- 39 Fig 3.....
- 40 Fig 4.....