T H E M E

# technology

# 1

# Appropriate Technology

## Preparation

## Language development

### a

**Match the words in column A with their meanings in column B.**

| | A | B |
|---|---|---|
| 6 | i. technology | 1. nourishment |
| 8 | ii. appropriate | 2. obtaining juices by pressing, crushing, boiling |
| 9 | iii. exploitation | 3. dry outer covering of grain, seeds, etc |
| 10 | iv. indigenous | 4. unfit to eat |
| 11 | v. innovative | 5. thick, sticky, solid mass |
| 7 | vi. porridge | 6. scientific knowledge needed for industry |
| 5 | vii. coagulum | 7. soft food made by boiling a cereal in water or milk |
| 3 | viii. husk | 8. suitable |
| 1 | ix. nutrition | 9. using, usually unfairly, for one's own benefit |
| 2 | x. extraction | 10. living or growing in a place where originally from |
| 4 | xi. inedible | 11. having the quality of introducing new things, making changes |

**Look at the following examples of the use of 'self' to form compound words:**

**self + reliant=self-reliant**

**self + sufficient=self-sufficient**

b

**Suggest three more expressions beginning with self and write three sentences using them.**

c

**Complete the following passage with the prepositions to, of, by, between and with.**

Appropriate technology is technology that is developed to cater ....to..... the basic needs ..of..... people with low spending power. It is not low or primitive technology. Also, it is not concerned ....to.... only small-scale technology. Appropriate technology lies somewhere ..between traditional and modern technology. It is particularly easy to operate and can be maintained even ..with.. less skilled persons. The special feature ..of..... this technology is that it can be applied .....to..... a variety ..of..... rural needs.

## Oral practice

**Look at this definition.**

'Appropriate technology is that technology which is affordable within the resources available, is culturally acceptable and is environmentally harmless.'

**Discuss the definition with your partner and define the following. Try to use the formal language of the definition you have just read.**

i. high technology

ii. traditional technology

iii. laser technology

## Writing skills development

**Write a paragraph on appropriate technology, developing the points below.**

i. low capital investment per unit of output

ii. small-scale operation

iii. use of local materials wherever possible

iv. high adaptability to local skills and labour

v. ease of understanding and maintenance by the user without a high level of education

vi. unpolluting and benign to the physical environment

vii. use of natural and renewable energy sources such as wind, power, solar energy, water power, pedal power and biogas.

# part 1

## Listening

### Different types of technology

**a**

**Work in small groups and try to answer these questions.**

i. What is technology?

ii. Classify the different types of technology. Offer examples.

iii. What are the features of the different types of technology?

**b**

**Listen to a brief talk about technology and take notes on the different types of technology.**

## Reading

### Pedal power

**Read the first two paragraphs of a text on pedal power below. Then arrange the twelve sentences which follow in sequence to write the next four paragraphs of the text.**

Many people in India expend their muscle power every day to provide themselves with the basic necessities of life. An example is the widespread use of the bicycle. It should be noted that the power produced by a human being cannot match that produced by the internal combustion engine and electric motor. But due to the shortage of fuels and undependable electric supply, an innovative use of human energy may have to be considered seriously.

The advent of the internal combustion engine and electric motor ended the use of pedal power in small-scale industries and in agricultural processing. Even though India has abundant human power and over 40 million bicycles are used for transportation, pedal power potential has not been fully realised in small-scale agricultural activities.

1 The first type is a stationary one, in which bicycle parts like the frame, crank, chain and freewheel are used to produce a rotating motion.

2 The second type of pedal power device is a modified bicycle which can be used both as a vehicle for transportation and a prime mover.

3 This modified bicycle is called a dual-purpose bicycle.

4 There are two types of pedal power devices in existence today.

5 This rotary motion can be used to operate machines such as threshers, winnowers, pumps, woodworking lathes and metal lathes.

6 It is in fact a versatile mechanism which can be used for transportation as well as power production.

7 The dual-purpose bicycle can be used to power small-scale agricultural implements and equipment used in rural industries.

8 The dual-purpose bicycle has a permanent attachment and a modified broad stand cum carrier.

9 Some examples are paddy threshers, winnowers, groundnut shell removers, small water-pumps and grinders.

10 Thus the technologists who advocate appropriate technology are confident that the exploitation of pedal power for various uses will make many self-reliant and self-sufficient as far as their energy needs are concerned.

11 It can also be used to power a drill, a woodworking lathe, a metal lathe and a circular saw.

12 The use of the dual-purpose bicycle will also help technologists provide employment to the unemployed and unskilled, and decrease their dependence on outside power sources.

**If you find the text difficult, search for key words and phrases that refer to**

**A a pedal power device (first)**

**B another kind of pedal power device (second)**

**C uses of the dual-purpose bicycle**

**D conclusion**

# Reading

## A bicycle-operated domestic pump

### a

**Skim through the passage and suggest suitable headings for the four paragraphs.**

### b

**Read the text below and find out the meanings of the words underlined from the context.**

### A

The Centre for Water Resources, College of Engineering, took up an appropriate technology project in 1976 and completed it in 1978. This project is a practical project specially designed to suit rural conditions in India. Since the villages in India face acute power shortages, it was hoped that this project, when implemented, would prove a boon to the rural masses.

### B

In this project the principles of using stationary pedal power to pump water for domestic and field uses are used. The pump used is an ordinary reciprocating type. This device consists of a permanent stand made of G.I. sheet (with pipes welded to its bottom) which is hammered into the earth close to the pump at a pre-calculated distance. The front wheel of the cycle is kept immovable by securing it to a stand or some other fixture. Thus the bicycle is held rigid.

### C

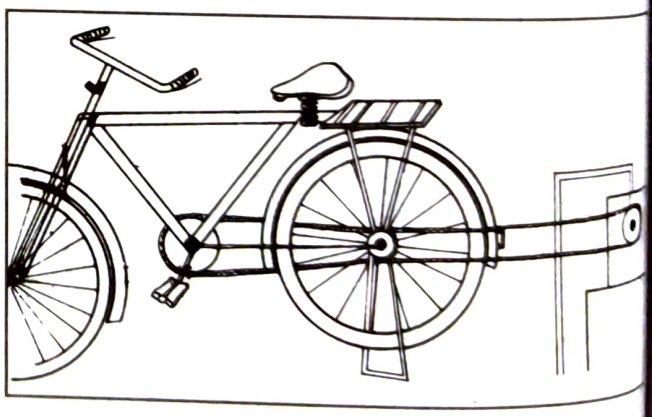
To pump water, all that one has to do is to sit on the bicycle seat and pedal. The drive is transmitted from the front sprocket to the rear wheel which now acts as a flywheel and transmits the power through the second chain to the pump. As the pump is a positive displacement one, water can be pumped out even at low speeds. Also, no priming is necessary. After use, the clip is released and the chain is opened. Then the bicycle can be lifted from the permanent stand and used as a normal two-wheeler.

### D

The cost involved is very low compared to the cost of a conventional motor for domestic use. The pumping test proved to be a success. An average person can easily pedal for two hours continuously without his or her experiencing much fatigue. This is thus good exercise and will also prove to be a boon to small farmers and domestic users.

i. List the tools and equipment needed to make a bicycle operate a domestic pump.

ii. Look at the diagram of a pedal-powered pump below. Label the parts.



# Discussion

## Pedal power in Indian villages

**Discuss in pairs how pedal power can help people in Indian villages. Be ready to report your views when the teacher asks you to.**

members

# part 2

## Language focus

### Cement from rice husk

**Complete the following text with suitable verbs in the passive form. Choose, if necessary, from this list of verbs.**

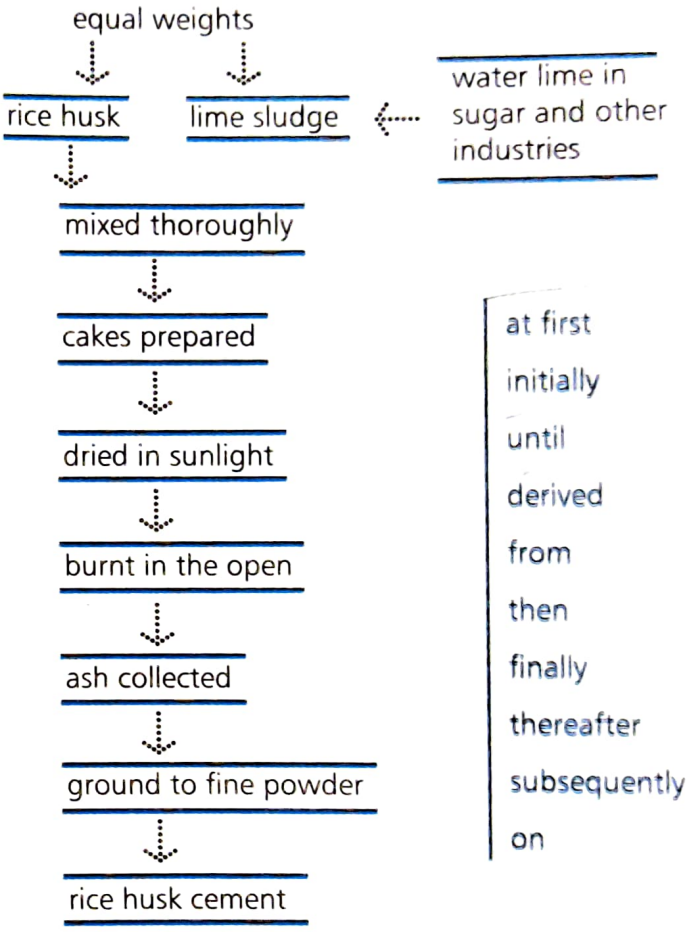
| mix | produce | burn | obtain | use |
|---|---|---|---|---|

Rice husk .....obtained.. from rice mills.
It .....obtained..... in such a large quantity produced.
that its disposal sometimes becomes a problem.
Most of it .....used..... as fuel and livestock litter.
When it is difficult to store, it is burnt... .
When rice husk ..is...burnt..... in the open or
under controlled temperature in a furnace, it
leaves a residue in the form of a highly reactive ash.
This ash when it ....mixed.... with lime, acquires
cement-like properties and has the potential to
replace portland cement either fully or partially
in certain construction works. Scientists at the
G.B. Pant University of Agriculture and Technology
have developed cement from rice husk.
The cement produced from rice husk .....mixed.....
with sand to prepare mortar which can ..be..used
for plastering purposes, for laying bricks and stone
masonry or for the construction of small houses in
rural areas. The rice husk cement has a compressive
strength of 30 kg/sq cm which is very low
compared with that of portland cement. Rice husk
cement cannot, therefore, be..use..... for reinforced
concrete constructions.

## Writing

### Cement from rice husk

**The following flowchart presents the process of producing rice husk cement. Write a paragraph describing the various stages in the process of converting rice husk into cement. Use the flowchart and some of the words and phrases listed below for the description.**




## Reading

### Find your feet

**a**

Go through the text below quickly and suggest headings for the paragraphs in the passage.

**b**

Read the passage in detail and answer the questions that follow it.

# Cassava leaves as a source of protein

Nagib Nassar

Cassava is a major staple food in Brazil and tropical countries. Its leaves are an all-year product. They are, however, so far under-researched and under-utilised. Accordingly large tonnages of these leaves are currently discarded as wastes after harvesting the roots. Since green vegetables have been recognised as the cheapest source of protein, researchers in the University of Brazil thought of evaluating its content in cassava leaves.

Leaf samples were harvested from local or genetically improved cassava varieties and interspecific hybrids too. Samples of fully expanded leaves were analysed. About 100 gm each of cassava leaf were sundried for 2–3 days with constant turning over to avert fungal growth. It was then analysed for protein content.

It was found that cassava has high potential as cheap source of alternative protein for human and animal. It may be used to enhance the protein value of low-nitrogen traditional staples such as flours from cereals and tubers including cassava flour itself. Because of the simplicity of this technology involved in leaf protein, its incorporation for local food production will be the most practical for a highly sustainable strategy.

The high protein content and nutritive value of cassava leaves are well documented by analysis. If cassava cultivars with low HCN content and high protein were selected it could offer a valuable source in the less developed regions of Brazil and other countries. The leaves contain high protein, as much as 32%. So they are excellent candidates to use in enriching root flour or in being consumed directly.

To increase the potentiality of cassava leaf as a protein source, a strategy for the cultivation of cassava aims towards leaf production in generous quantities. The plant density could be increased and harvested more frequently. With adequate irrigation and fertilisation, cassava plants can withstand defoliation for several years. Considering that the minimum of protein content in cassava is 21%, from one hectare of cassava, it is possible to obtain 140 kg of protein.

In view of the predicted world shortage of cereal grains, cassava leaves are a potential source of protein for livestock raising in the tropics. Because of competing needs for the expanding human population and the diminishing food producing capacity of the earth's surface, it is argued that the major priority is to develop livestock feeding systems which do not depend on cereal grains.
Cassava leaves are considered as a good source of supplementary protein too. They can be used for preparing dishes of cassava leaves adding variety to the diet as well as nutrients.

Therefore it has been concluded that the leaves of cassava are a considerable source of protein. They may alleviate nutrition deficiency in developing countries of the tropics and sub tropics. Cassava cultivars which are used for cooking purposes are good candidates to have their leaves enriched. For these reasons, using cassava leaves as a source of protein serves well for a highly sustainable strategy.

*Source:*

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*Departamento de Genética e Morfologia and*
*Departamento de Nutrição respectively*
*Universidade de Brasília, Brasília, Brazil*


ASHOK
ASHOK
ASHOK
ASHOK.
ASHOK.
ASHOK
ASHOK

## c

**Why does cassava have high potential as protein sources? What is the evidence for the same?**

## d

**Make** notes from the text using the following outline:

Plan/Aim
Material and method
Findings
Conclusion

# Follow-up

## Language check

**Complete the following text, with suitable words.**

Appropriate technology is a kind of ....low..... cost technology. It has relevance to the ...rural... background of people. It arises from local ....area.... and uses local ...resources..., both human and material. Its benefits go to the ..common.. community. Rice-threshers operated by ..pedal.... power and gobar ..biogal..... plants are two good examples of appropriate technology.

(economic)

## Comprehension check

### a

**Arrange in order the following steps of the process of working the bicycle-operated domestic pump.**

- The rear wheel now acts as a flywheel.
- Water is pumped out even at low speeds.
- The drive is transmitted from the front sprocket to the rear wheel.
- After use the clip is released and the chain is opened.
- A person sits on the bicycle seat and pedals.
- The rear wheel transmits the power through the second chain to the pump.

**Now look at the third paragraph of the text on page 112 and check the correctness of your answer.**

### b

**Read the text 'A bicycle-operated domestic pump' on page 112 again and answer the following questions.**

i. Guess the meanings of the words underlined in the text.
ii. List the advantages of the pump.
iii. What do you understand by the expression 'stationary pedal power'?

## Writing skills development

**Develop the following hints into a paragraph to describe a paddy-husk-combustor-cum-heat-exchanger.**

paddy husk – considered waste – storage problem – disposal problem – its commercial use now for drying paddy in rice mills possible – a paddy-husk-combustor-cum-heat-exchanger developed for this purpose – device – vertical cylindrical combustor – heat exchanger mounted over it – main principle of its working – husk fed into the exchanger – delivered to dryer through ducts – parboiled paddy in the dryer – dried by this means

# 1

# PRINTING

## Preparation


## Language development

**When we describe a number of actions occurring one after another, we use words that indicate the sequence (sequence words). Here are some examples.**

| | | |
|---|---|---|
| **first** | **second (or secondly)** | **then** |
| **next** | **after that** | **finally** |

**a** 4 3 2 6 7 1 5

**Rewrite the sentences in the following paragraph in the correct order. Use appropriate sequence words.**

i. .....First..... , the roller on the machine is inked, and ..then..... , the roller is rotated either by hand or by means of an automatic device.

ii. .....Next..... corrections are carried out on the stencil paper.

iii. .....After that..... the stencil paper is placed in position on the duplicating machine.

iv. If you want to make many copies of a document or a letter, you can make use of a duplicating machine.

v. .....Secondly....., the stencil paper is removed from the machine and stored for future use.

vi. This is done by painting the correcting fluid on the mistakes, allowing the fluid to dry, and .....next..... typing the correct words over the paint.

vii. .....finally.....the letter should be typed on stencil paper, setting the typewriter to the stencil-cutting position.

b

**i. Learn the meanings of these words. You will find them later in the text on page 120.**

| A | B |
|---|---|
| ◗ type | reading-matter, as distinct from illustrations |
| ◗ offset | a process of printing from a flat surface in which the impression is first received by a rubber-surfaced cylinder, from which it is transferred to the paper |
| ◗ intaglio | engraving an incised figure or design in stone and similar substances |
| ◗ letterpress | a rectangular block usually of metal or wood, having its face so shaped as to produce, in printing, a letter, figure or other character |
| ◗ lithography | the art or process of putting writing or designs on stone with a greasy substance, and of producing printed impressions from this |
| ◗ layout | the make-up of a page, a book, newspaper, etc. |
| ◗ inventory | an itemised list of goods in one place |
| ◗ enterprise | the ability to attempt something new, difficult or important |
| ◗ obsolescence | a state of being out of date and no longer useful |
| ◗ translucent | allowing light to pass through |

**ii. Complete the following text with appropriate words from column A.**

Although there is evidence to show that some form of printing was known in ancient times, it was printing by movable .....type..... that constituted a turning point in the development of printing. The invention of printing as we know it today is ascribed to the .....inventory..... of Johann Gutenberg (1400–1468) of Strasbourg. Another invention made in the early years of the nineteenth century was .....lithography.....This method makes use of the principle of repulsion between grease and water. A further advance in litho printing was made with the introduction of .....offset..... litho printing. In this method the impression on the litho plate is transferred to a rubber roller and then printed on paper. Whereas in lithography the printing plate is flat and in .....letterpress..... the type stands cut in relief, in .....intaglio..... printing the image to be printed appears as hollows recessed beneath the surface.

## Oral practice

**Work with your partner and fill in the first column of the chart below with as many examples of printed matter as you can think of. Then fill in the second and third columns against each example in the first.**

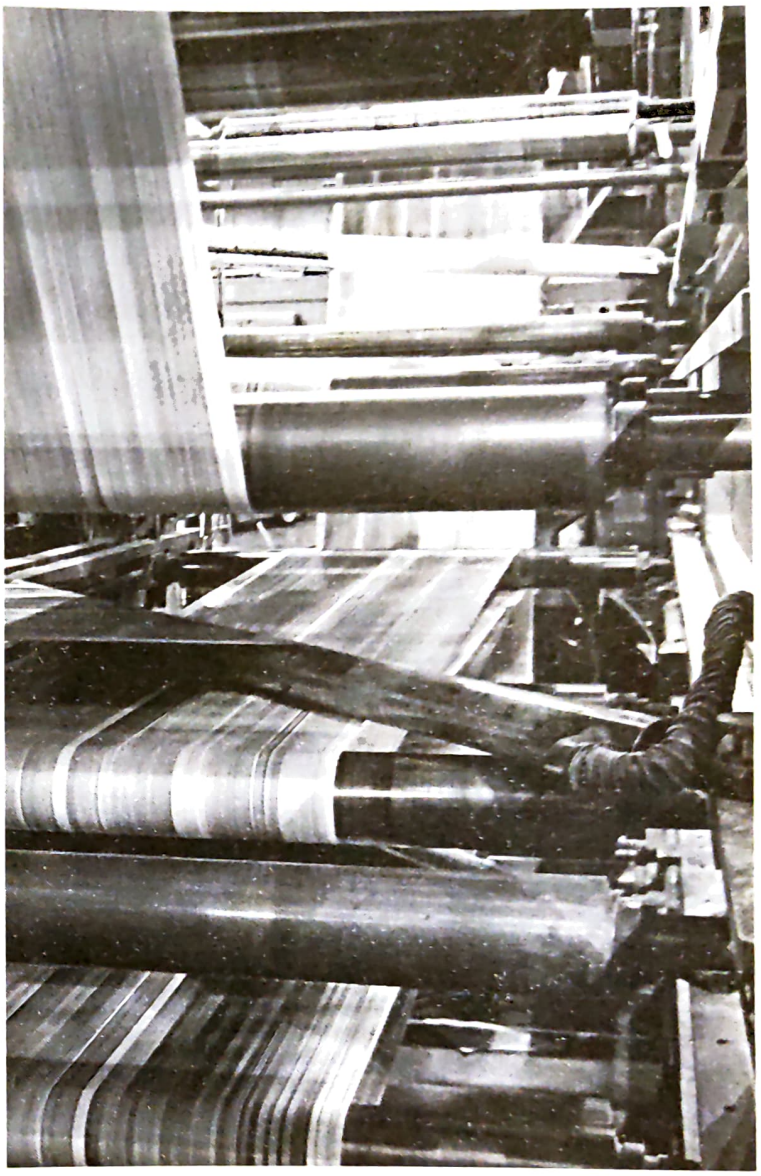
| examples of printed matter | purpose served | whether of permanent semi-permanent or temporary value |
|---|---|---|
| a. handbill | to make an announcement | temporary |
| b. | | |
| c. | | |
| d. | | |
| e. | | |
| f. | | |
| g. | | |

# Reading skills development

**Given below are the title and the first paragraph of a piece of text. Look at the title first and try to predict what the text could be about. Then read the text.**

## PRINTING ON ITS WAY OUT?

For those of us who harbour the rankling fear that the printed word is on its way out and that the electronic age is about to take over the world of books, a visit to the children's section of a public library is a great source of satisfaction.



## Part 1

# Reading

### Traditional printing methods

**a**

**In pairs discuss**

i. what you know about the history of printing.

ii. what you know about printing processes, old and new.

**b**

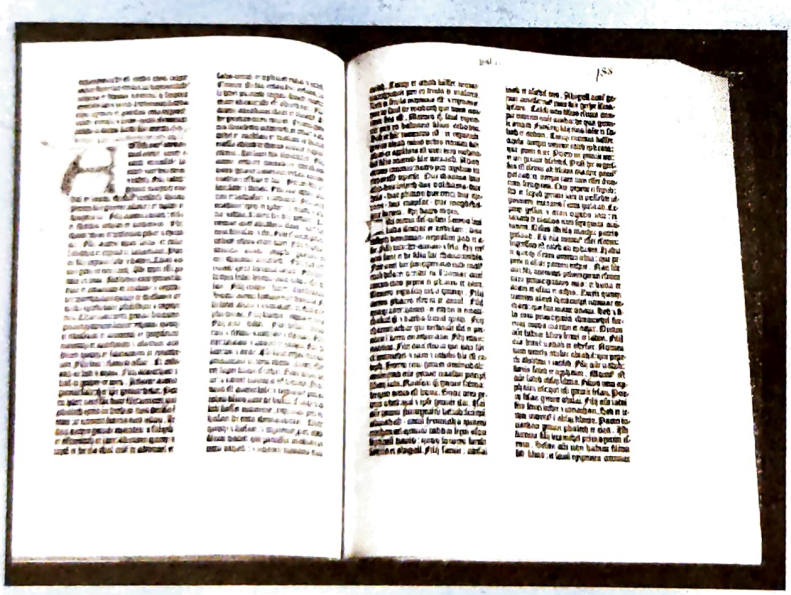
**Look at the following flowchart which describes the process of lithography in the nineteenth century.**

image drawn on a metal plate using a greasy substance → non-printing areas of the plate wetted → application of greasy printing ink to the plate, where it sticks to the greasy image → image printed on paper

**Now read the text on the next page, Traditional Printing Methods, and check whether the information in the text about lithography in the nineteenth century is adequately represented by the flowchart given.**

# Traditional Printing Methods

Although there is evidence to show that some form of printing was known in ancient times, it was printing by movable type that constituted a turning point in the development of printing. The invention of printing as we know it today is ascribed to Johann Gutenberg (1440–1468) of Strasbourg. In 1456 the Gutenberg Bible, the first major printed book, appeared; it had more than 600 leaves, with two columns of 42 lines each.



Typefoundry too developed side by side. The type was made by pouring molten type metal, generally an alloy of tin and lead, into a mould. Typesetting was done by hand and the types were wedged together in a tray. Ink was spread on the type and then the paper was pressed against the types. This continued to be the basic method of printing till the present day. Mechanisation began in the early years of the nineteenth century, when Friedrich Konig built a printing machine. In the early machines, the types moved first under a roller which inked them and then under a cylinder which carried the paper to be printed on.

Another invention made in the early years of the nineteenth century was lithography. This method makes use of the principle of repulsion between grease and water. In simple terms, the process consists of drawing the image to be printed on a metal plate using a greasy substance. Then the plate is wetted. The grease on the plate repels the water and consequently only the non-printing areas become wet. When greasy printing ink is applied to the plate, it sticks to the greasy image but not to the non-printing areas. From this plate, the image can be printed on paper. In photolithography the printing stone is coated with a light-sensitive substance and then exposed to light through a paper negative of the matter to be printed. By washing with turpentine or with acid, an image, either flat or etched, can be produced on the plate for normal printing.

A further advance in litho printing was made with the introduction of offset lithoprinting—in this method, the impression on the litho plate is offset or transferred to a rubber roller and then printed on paper. For this reason, the image on the offset litho plate is the right way round, and not a mirror image as in letterpress printing.

Whereas in lithography the printing plate is flat and in letterpress the type stands cut in relief, in gravure or intaglio printing the image to be printed appears as hollows recessed beneath the surface. The lower part of the cylinder carrying the image rolls is a reservoir of ink and as it comes out, a steel blade (the doctor blade) wipes the cylinder leaving ink only in the hollows. The printing is then done on paper. If you look at the printed matter produced by gravure through a magnifying glass, you will find that the image is made up of a large number of dots. The dots will vary in size and density to produce darker or lighter areas on paper.

C

Based on the information provided by the text, draw similar flow charts showing the following processes:

i. **printing by movable type**

ii. **photolithography or gravure printing.**

## Listening

### Paper for printing

You will now listen to a talk on paper used for printing in different contexts. Listen carefully and make notes using the following chart.

| type of paper | property | use |
|---|---|---|
| | | |

Using the notes you have made write a paragraph comparing the different types of printing

.....

.....

.....

.....

.....

.....

.....

.....

.....

**Note:** Use expressions of comparison such as 'whereas', 'while', 'but', 'on the contrary', 'in contrast to' etc.

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## Writing

### Inkjet or laser printer?

a

**Talk to your partner and list a few of the advantages and disadvantages of an inkjet in comparison with a laser printer.**

b

**Imagine that your firm requires a printer for printing documents. You are responsible for choosing the appropriate printer. Write a paragraph explaining which kind of printer you would choose to buy—an inkjet or a laser printer. Use the list prepared, if necessary.**

# Part 2

## Reading

### Excellence in adversity

a

**Discuss with your partner if the reading habit among children today is on the decline. Also discuss the factors supporting your conclusions.**

b

**Read the first paragraph of the following text and answer the question which follows it. Then read the second paragraph and similarly answer the question following it. Now read the rest of the text and then answer the questions at the end of it.**

## Excellence in adversity

*Ashok Mitra*

A quiet, diminutive man, P.K. Ghosh, spelled a different universe. He was a literature buff[1]. Fairly late in life, he chose to set up a printing press, the money for which was provided by relatives. It was a printing press of the ordinary mould, and yet with a difference.

**You have just read the first paragraph of the text. What do you expect the text to be about?**

At the time he interested himself in the printing business, the letterpress was the staple[2] means of typesetting. Ghosh's Eastend Press catered, by choice, exclusively to printing in English. For Ghosh, printing was as much a mission as a profession. He would insist on advancing the cause of quality and quality alone. He revolutionised letterpress printing in the country. The relatives who had originally financed him had meanwhile suffered financial vicissitudes[3]. He, therefore, was not able to arrange the resources necessary for crossing over to either linotype or offset printing. What was a constraint[4] P.K. Ghosh turned into an advantage. He picked his types with meticulous care, visiting smithies and forgemen in remote Calcutta slums, spending hours with them, advising and exchanging information and suggestions. Beautiful type-sets were the result. That was his way out since funds were limited; moreover, imports were difficult because of foreign exchange restrictions.

But the search for quality types was only the beginning. He would economise on other raw materials too, he would improvise[5] on equipment, he would himself labour for long hours inside the dingy printing press arena, soiling his hands, encouraging his workers to do better and still better. That was however only one aspect of his missionary zeal. He would choose the manuscripts

he would agree to print with great discrimination. Run-of-the-mill publishers he would politely turn away. He would also refuse to accept indifferent texts which established publishers would sometimes like to palm off on him...

P.K. Ghosh was no ordinary printer. He kept abreast of the latest developments in printing technology. He might have been bound by the bondage of the letterpress, but he knew everything about the nuances[6] of editing and production. He was, at the same time, an editor, an adviser and a scholar rolled into one. He would not flinch from admonishing the author of a manuscript if the style happened to be slipshod or verbose.

The Eastend Press was a small concern and Ghosh would agree to print only a limited number of works every year. The business was not money-spinning in any sense, but it satisfied his love for quality.

P.K. Ghosh did not make money; he still had a sense of fulfilment. As the years rolled, he watched the printing technology pass him by, even as the book fairs did. He knew the days of the Eastend Press were numbered. It did not however diminish his quota of satisfaction. At least in a little corner of this odd, haggard society of ours, he had established quality; quality was the only thing he dealt with. Not just the computer revolution in printing technology, but a family tragedy too wore him down in recent years. In early December, this man, Prabhat Kumar Ghosh,died in his Calcutta house quietly, as quietly as he had lived.

***(Source: The Telegraph)***

***1 buff:*** *a buff is someone who is very knowledgeable about a subject.*
***2 staple:*** *main, the most used.*
***3 vicissitudes:*** *misfortunes.*
***4 constraint:*** *problem; a condition that prevents one from doing something.*
***5 improvise:*** *change or modify as a way of being able to use something which could otherwise not be used.*
***6 nuances:*** *finer aspects.*

1. What was the one major cause for Ghosh staying with letterpress?
2. Why does the writer call his approach 'missionary zeal'?
3. In what ways was P.K. Ghosh 'no ordinary printer'?
4. If you were allowed only three words to describe P.K. Ghosh, what would they be?

## Writing

Imagine that you are the President of the Association of Small Newspapers in India. Write a letter to the Government of India stating the problems faced by small newspapers in India and suggest ways in which the Government of India could help in the matter. If necessary, discuss the issue with your partner before writing.

**Learner Awareness**

You have learnt to practise the art of predicting the gist of a text as well as the organisation of its parts. This ability helps you read a text with confidence and ease.

# Follow-up

## Comprehension check

**Guess the meaning of the words underlined in the following passage from their context.**

Delhi is one of the few cities of the world that can boast of being both and ancient and modern.

A cultural mosaic and a confluence of different religions, it is also an ever-expanding modern city. There are many places of historical interest in and around Delhi. Apart from being the capital of India, the city is also the nerve-centre of Indian publishing.

It is in recognition of its expanding role in the field of publishing that UNESCO had declared Delhi as the World Book Capital for the year 2003–2004. The Government of India has designated the National Book Trust as the nodal agency for the implementation of the programmes envisaged under the declaration. These include a series of book fairs and exhibitions in India and overseas.

There cannot be a more befitting finale to the World Book Capital celebrations than the organisation of the New Delhi World Book Fair, a mega event in Indian publishing. The New Delhi World Book Fair is the largest book event in the Afro-Asian region organised biennially by the National Book Trust, India.

The publishing scenario in contemporary India is a conceptually exciting, linguistically rich and quantitatively diverse phenomenon. India is perhaps the only country in the world which publishes books in 24 languages. It ranks third in the publication of English books immediately after the USA and the UK. More than 70,000 new titles are published every year out of which 20,000 are in English.

Indian books have earned worldwide respect and commercial acceptability both for their content and quality of production. Their price, too, is reader friendly. Apart from offering a glimpse of the multilingual publishing industry in India, the New Delhi World Book Fair serves to establish fruitful communication between publishers, booksellers, book disributors and librarians on the one hand and professionals, intellectuals and academicians on the other.

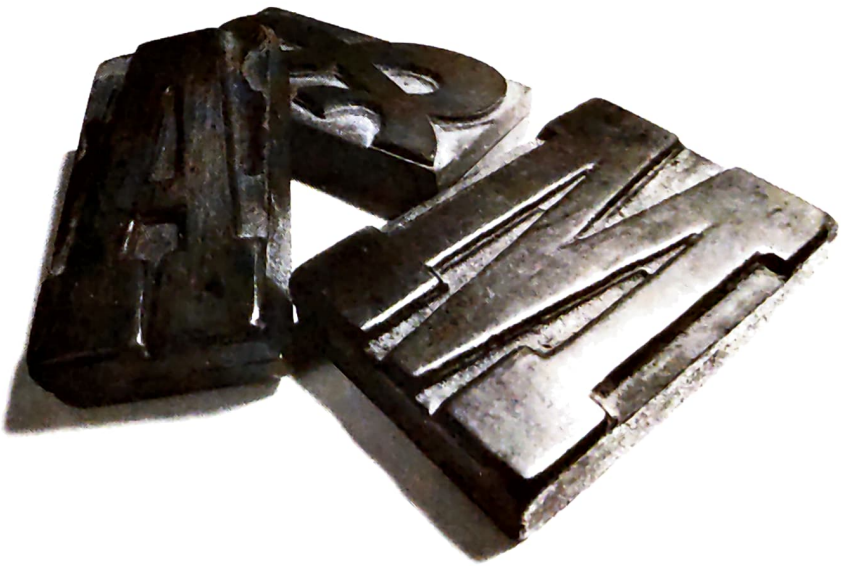
## Language check

**Complete the following passage with appropriate words.**

Newspaper printing and publishing in the United States had undergone a complete ..advent change in the past twenty years, first by the ..advent of electronic and computer typesetting, and .....later..... by the changeover from letterpress to offset lithography. More .....than..... 80 per cent of all daily .....news papers..... in America are now printed by offset.

Both electronic processes and computers have greatly advanced printing ....offset/press.

**Now check your answers with your partner's.**



# 3

# Evaluating Technology

## Language development

### Preparation

**Work out the meanings of the words in italics in the following texts from their context. Consult a partner, if necessary.**

**A**

The community-type hybrid solar cooker consists of a wooden box with a steel tray inside. The tray is painted black and covered with glass sheets which accounts for the quick heat trap. The black paint as well as the insulation prevent the heat from escaping. The *cumulative* heat built up inside the wooden box *accelerates* the cooking of food substances kept in the aluminium utensils.

**B**

This unit can be used for cooking a large quantity of food (e.g. for noon-meal schemes in schools). Conventional fuel is saved by 40 per cent. The disadvantage is that even though three or four items of food can be cooked *simultaneously*, depending upon the size of the box, the cooking has to be done in the open. This project proved to be economically *viable* after several experiments.

C

The import of technology at *prohibitive* cost has the disadvantage of widening the gap between the rich and the poor, imposing *alien* cultural trends and patterns of consumption on the local public, *perpetuating* technological dependence on others and *discarding* traditional technology.

## Reading skills development

**Below are the first sentences of four paragraphs. Read them and then try to guess what the rest of each paragraph is likely to be about.**

i. Most people imagine that technology can only bring happiness and prosperity to the people.

ii. What has been said about technology in general so far is also true of Indian technology.

iii. Modern technology has become very much an integral part of our existence.

iv. There was once a town in the heart of America where all life seemed to be in harmony with its surroundings.

**Check your answers with your partner's.**

## Oral practice

**Technology has conferred a number of benefits on humankind. At the same time, it has created some problems, too. Discuss these with your partner and make two lists, one of benefits and another of problems resulting from technology.**

## Writing skills development

**Use your lists to write a paragraph either on the benefits of technology or on the problems created by it.**

# Part 1

## Discussion

### Solar energy

Today solar energy is seriously considered as an alternative to energy from oil. Discuss this issue with a partner. Note down the points you discuss. Now compare the features of solar energy with those of energy from oil. The following questions will help you to make the comparison.

a. Will this form of energy run out? That is, will it be used up, and not be available in the future?

b. Is a regular supply of this form of energy possible? (Hint: Think of winter, and of cloudy days.)

c. Are transport and distribution costs high?

d. Can the energy be stored and used when required?

**Now here are some more facts about solar energy. Discuss them with your partner and decide whether they are advantages or drawbacks.**

The photovoltaic cell can directly convert solar energy into electricity.

Photovoltaic technology is expensive.

Some large international corporations are turning solar energy into a high-tech industry.

Solar energy can be used to supplement fossil fuels and thus save them for peak periods of demand.

## Reading

**Solar cookers**

a

**By looking at the title of the text, try to guess what the text is likely to deal with.**

b

**Read the text and check whether your guess is correct.**

c

**Answer the questions that follow the text.**

### Solar Cookers

Residential and commercial cooking and hot water in rural areas of developing countries are supplied primarily by direct combustion of biomass – in the form of wood, crop wastes, dung and charcoal. In recent decades, the decline in forest resources in many countries called attention to more efficient household use of biomass, as well as solar cookers. Driven by public programmes, household demand and declining resources, markets for more efficient biomass stoves and solar cookers are found in Asia and Africa. Markets for more efficient biomass stoves and solar cookers in Asia and Africa are driven by public programmes, household demand and declining resources.

Since 1980, many public programmes have disseminated close to 220 million new, efficient biomass cooking stoves. However, surveys suggest that only one third of the stoves in the Indian programme are still being used, and reveal that many stoves did not save energy, broke down and were poorly constructed.

This adoption of technology has proved easier for reducing charcoal consumption (as opposed to wood), and for urban markets to save purchased fuel (as opposed to saving collected fuel).

Solar hot water for residential and commercial use is cost-effective in many regions. China's solar hot water industry mushroomed in the 1990s, with up to 10 million households served. Other major markets include Egypt, India and Turkey.

There are social benefits from lighting, TV and radio powered by solar home systems, minigrids and biogas, and even some economic benefits from reduced kerosene and candle use. Use of biogas for cooking and improved biomass stoves may also reduce expenditure on fuel and wood, in terms of either time or money. Solar home systems, minigrids and biogas do offer a number of solar and economic benefits for rural areas in developing countries.

Applications of renewable energy that provide income generation and social benefits, such as clean drinking water, cottage industry, and improved agricultural productivity, will appeal to increasing segments of rural populations.

The affordability of rural household systems such as solar home systems and biogas digesters has received much attention. Many argue that households can afford to substitute solar home systems for candles and kerosene lighting if the monthly costs for each are comparable.

*(Source: From the paper 'Renewable energy markets in developing countries' by Eric Martinot, Akanksha Chaurey, Debra Lew, José Roberto Moreira and Njeri Wamukonya, in* Annual Review of Energy and the Environment, *Vol. 27 [2002], pp. 309–48.)*

1. **What is the usual source of energy for cooking and heating in rural areas of developing countries?**
2. **How does the adoption of solar cooking save on expenses?**
3. **What do you think is meant by 'direct consumption of biomass'?**
4. **Why do you think applications of renewable energy will appeal to rural populations?**
5. **Does consumption of biomass affect forest resources? How?**

part 2

## Reading

### A fable for tomorrow

# Silent Spring

There was once a town in the heart of America where all life seemed to live in harmony with its surroundings. The town lay in the midst of a checkerboard of prosperous farms, with fields of grain and hillsides of orchards where, in spring, white clouds of bloom drifted above the green fields. In autumn, oak and maple and birch set up a blaze of colour that flamed and flickered across a backdrop of pines. Then foxes barked in the hills and deer silently crossed the fields, half-hidden in the mists of the fall mornings.

Along the roads, laurel, laburnum and alder, great ferns and wildflowers delighted the traveller's eye through much of the year. Even in winter the roadsides were places of beauty, where countless birds came to feed on the berries and on the seed heads of dried weeds rising above the snow. The countryside was, in fact, famous for the abundance and variety of its bird life, and when the flood of migrants was pouring in through spring and fall, people travelled from great distances to observe them. Others came to fish in the streams which flowed clear and cold out of the hills and contained shady pools where trout lay. So it had been from the days many years ago when the first settlers raised their houses, sank their wells and built their barns.

Then a strange blight crept over the area and everything began to change. Some evil spell had settled on the community: mysterious maladies swept the flocks of chickens; the cattle and sheep sickened and died. Everywhere there was a shadow of death. The farmers spoke of much illness among their families. In the town the doctors had become more and more puzzled by new kinds of sickness appearing among their patients. There had been several sudden and unexplained deaths, not only among adults but even among children, who would be stricken suddenly while at play and die within a few hours.

There was a strange stillness. The birds, for example—where had they gone? Many people spoke of them, puzzled and disturbed. The feeding stations in the backyards were deserted. The few birds seen anywhere were moribund; they trembled violently and could not fly. It was a spring without voices. The mornings that once throbbed with the dawn chorus of robins, catbirds, doves, jays, wrens, and scores of other bird voices, was now without sound; only silence lay over the fields and woods and marsh.

On the farms the hens brooded, but no chicks hatched. The farmers complained that they were unable to raise any pigs—the litters were small and the young survived only a few days. The apple trees were coming into bloom but no bees droned among the blossoms, so there was no pollination and there would be no fruit.

The roadsides, once so attractive, were now lined with browned and withered vegetation as though swept by fire. These, too, were silent, deserted by all living things. Even the streams were now lifeless. Anglers no longer visited them, for all the fish had died.

In the gutters under the eaves and between the shingles of the roofs, a white granular powder still showed a few patches; some weeks before it had fallen like snow upon the roofs and the lawns, the

fields and streams. No witchcraft, no enemy action had silenced the rebirth of new life in this stricken world. The people had done it themselves.

This town does not actually exist, but it might easily have a thousand counterparts in America or elsewhere in the world. I know of no community that has experienced all the misfortunes I describe. Yet every one of these disasters has actually happened somewhere, and many real communities have already suffered a substantial number of them.

A grim spectre has crept upon us almost unnoticed, and this imagined tragedy may easily become a stark reality we shall all know.

*(Source: Rachel Carson,* Silent Spring, *1962)*

**After reading the essay, *Silent Spring*, answer the following questions.**

**a**

**The author's main purpose in writing this fable is;**

- to entertain readers,
- to present important information,
- to warn us about something.

**b**

**Look at the way the fable is organised. Can you divide the text into three parts? Identify the places where the author moves from one part to the next.**

**c**

**Which paragraph describes the colours of spring? Which paragraph describes the sounds of spring?**

**d**

**Guess the meanings of the following phrases. Take the help of another student, if necessary.**

- checkerboard of farms
- white clouds of bloom
- backdrop of pines
- mists of the fall morning

**e**

**What happened to**

- the birds?
- the farmer's relatives?
- the town's children?
- the apple blossom?

**f**

**The words 'science' and 'technology' are not used in the fable. Find a place in the fable where the author seems to refer indirectly to science and technology.**

**g**

**Find the phrases used by the author (in paragraphs 3, 8 and 9) to describe the 'tragedy'.**

**h**

**How does the author argue that these are not imaginary sufferings?**

**i**

**Read the first sentence of the fable again. How does it describe life in the early days in America? Rewrite the sentence, using some of the same words with necessary modifications, to describe life in the same town after the tragedy.**

## Language focus

### Policy on technology

**The Government of India has issued a technology policy statement in which the aims of India's technology policy have been spelt out. Some of these aims are listed below. Make seven sentences beginning with 'India's technology policy tries to. . . , and putting together three appropriate items, one from each of the three columns on the next page.**

**India's technology policy tries to ...**

| A | B | C |
|---|---|---|
| provide gainful and satisfying employment to all strata of society | particularly | improve the quality of the habitat. |
| ensure maximum development | | those with export potential. |
| develop technologies which are internationally competitive | with | in order to make full utilisation of by-products. |
| ensure the correct mix between mass production technologies | | emphasis on the employment of those who find it difficult to get jobs. |
| reduce demands on energy | and | production by the masses. |
| ensure harmony with the environment | | minimum capital outlay. |
| recycle waste material | | energy from non-renewable sources. |

## Reading

### Goodbye pictures, hello Pixels

**Read the following passage and answer the questions that follow:**

### GOODBYE PICTURES, HELLO PIXELS

Three weeks ago, the world's largest office products company, Staples, launched a new 'Copy and Print Online' service in the United States. Customers can now use the Web-based facility to create a document, brochure, business card, invitation or whatever, save it as a PDF file and email it to Staples.

Here, designers will redo the job in a professional manner and send proof copies back to the customer by return mail. If the design is approved of, the material is printed and shipped by courier, to reach the customer the next morning. This job is fuelled by a digital print management server called 'Fiery' and a software tool called 'Digital StoreFront'—both offered by EFI, a California-based global leader in the emerging niche of commercial print management print solutions.

## Indigenous efforts

Large parts of the Fiery server and almost the whole of the StoreFront software, were crafted by Indian engineers at EFI's Bangalore-based development centre.

In a change almost as significant as the transition from manual to automated typesetting and from flat bed to offset, the commercial printing industry is today in the throes of a profound and fundamental change from an analogue to a digital domain.

The IPEX 2006, the global showcase of the printing business, which concluded in Birmingham, U.K., on 11th April, was an interesting barometer of change within industry. Jostling with the big names of offset printing were dozens of new players who till recently were better known for their computer-related consumer products, of which printers were but a small part.

Now they were jostling for attention with a new premise: it is time to go digital all the way! Hardcore analogue-era printer players too, were at pains to highlight offerings which allowed corporate customers to continue profitably operating legacy offset machinery, even while harnessing the undeniable advantages in adapting to a digital work flow regime.

The market today sees a clear segmentation. For large print runs—like newspapers and multi-million copy paper-backed books—offset still makes the best sense.

For smaller print runs, even high quality colour work, digital printers have to be seriously considered. And this was across the full spectrum of applications: books and magazine format publications are now served by high speed machines which scan, print, cut and bind all at one go. It is called VDP or Variable Data Printing.

## Small magazines

It allows a small or medium-run magazine to print advertisements localized to the mailing address of every subscriber —and thanks to the speed of digital systems this can be done at near-offset printing speeds. Digital print process management can be leveraged even when the actual printer is not a digital machine: work flow tools like Fiery are available from third party vendors like EFI, who offer server-based solutions that promise to computerise the entire process from pre-press and have the added advantage of being Web-enabled.

## Embedded features

Fiery is also licensed by many new generation digital printer makers who embed the work flow monitoring features into their hardware. How will the printing industry in India, react to these digital options? Major centres of job printing like Jammu and Sivakasi are seeing a slow but perceptible lurch towards a digital work regime. Emerging pre-press centres like Mumbai and Bangalore are leading the way—out of sheer market compulsions.

If Indian players are to compete in the global arena, leverage their lower human resource and production cost structures, they have to adapt to international document exchange practices and standards—which means going digital at every stage of the process.

## Reinventing themselves

Tomorrow's printers cannot be just providers; they will have to reinvent themselves as digital graphics partners of their customers, interacting at every stage of the process from the routine to the creative, collaborating everywhere in the work flow and jointly creating the end product.

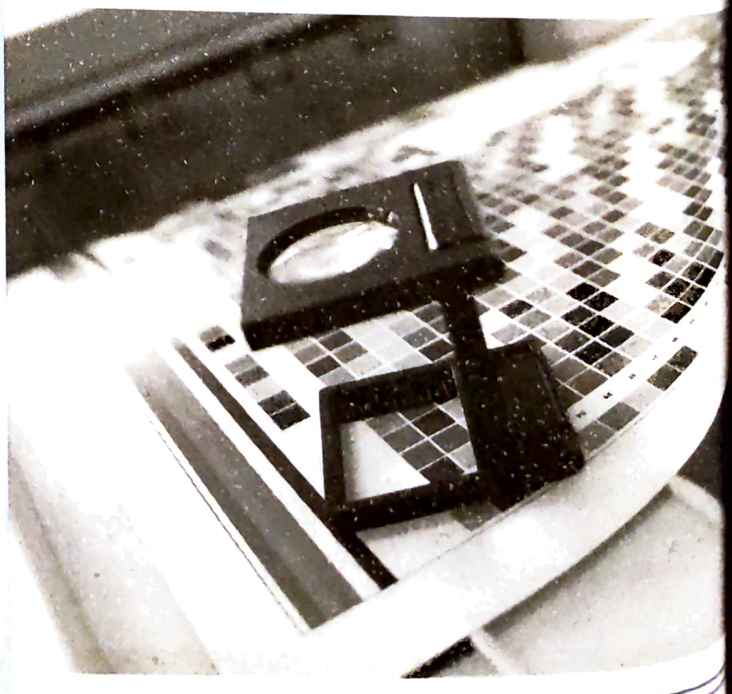
There is no amber sign along this route: go digital—or die.

*(Source: Anand Parthasarathy,* The Hindu, *13 April 2006)*

**a. What is the advantage of the new 'Print and copy online' service?**

**b. How is IPEX 2006, the global showcase of the printing business, which concluded in Birmingham, U.K., on 11th April 2006, an indication of the new changes in the industry?**

**c. How do you think Indian players can compete in the global arena? What are the criteria required for this?**



# Follow-up

## Writing

### An Indian village a hundred years from now

**It is sometime towards the end of the 21st century. Imagine you are living in an Indian village. Write a paragraph describing what the village looks like under the impact of technology over the years.**

## Reading

### Mass production or production by the masses?

**a**

**Look at the title of the text and try to guess what the text is likely to deal with.**

**b**

**Read the paragraph below and answer the question that follows.**

As Gandhi said, the poor of the world cannot be helped by mass production, only by production by the masses. The system of mass production, based on sophisticated, highly capital-intensive, high energy-input dependent, and human labour-saving technology, presupposes that you are already rich, for a great deal of capital investment is needed to establish one single workplace. The system of production by the masses mobilises the priceless resources which are possessed by all human beings, their clever brains and skilful hands, and supports them with first-class tools. The technology of mass production is inherently violent, ecologically damaging, and self-defeating in terms of non-renewable resources, and stultifying for the human person. The technology of production by the masses, making use of the best of modern knowledge and experience, is conducive to decentralisation, compatible with the laws of ecology, gentle in its use of scarce resources, and designed to serve the human person instead of making him or her the servant of human machines. I have named it intermediate technology to signify that it is vastly superior to the primitive technology of bygone ages but at the same time much simpler, cheaper and freer than the super-technology of the rich. One can also call it self-help technology, or democratic or people's technology—a technology to which everybody can gain admittance and which is not reserved to those already rich and powerful.

***(E.R. Schumacher,* Small is Beautiful, *1973)***

**Using the information contained in the text, complete the following sentences to bring out the differences between the two types of technologies.**

a. Mass production requires a heavy investment of capital, *but* ..... .

b. ..... production by the masses, *on the other hand,* mass production uses sophisticated machines and instruments.

c. *Whereas* mass production makes use of labour-saving technology, ..... .

d. *While* production by the masses ..... ..... upsets the ecological balance.

e. ..... the servant of machines, ..... *in contrast,* ..... .

f. In mass production technology, non-renewable resources ..... . In Gandhian technology, ..... .

g. Intermediate technology is ..... primitive technology. *At the same time,* it is ..... mass production technology.

h. *Whereas* mass production technology is reserved ....., people's technology ..... .

## Comprehension check

**Read the text 'Mass production or production by the masses?' again and say which of the following statements are true and which are false. Correct the false statements.**

1 Production by the masses is production of goods on a large scale, employing sophisticated technology.
2 Mass production is highly capital-intensive.
3 Production by the masses makes use of human resources, employing intermediate technology.
4 Mass production is the technology of the poor.
5 Production by the masses is not reserved only for the rich and the powerful.
6 The technology of production by the masses is harmful to ecology.

## Language check

**Complete the following passage with appropriate words.**

Technology is a mixed package; it has its benefits and its ..... . Technology is the ..... derived from the application of knowledge. This power has been sought to be utilised to improve the ..... of living of people all over the world. It cannot be denied that advances in technology have had a tremendously beneficial ..... on food production, health care, housing, education, transport, communication and other important ..... of life. Technology has made human life more comfortable. Turning to the other side of the picture, we find that technology has led to the ..... of the environment. The concentration of human and material resources at a few centres has resulted in large-scale ..... of rural population to urban areas and the consequent ..... of urbanisation and slums.

**Check your answers with your partner's.**