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# UNIT 11 WRITING DEFINITIONS AND DESCRIPTIONS

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## Structure

- 11.0 Objectives
- 11.1 Introduction
- 11.2 Parts of a definition
- 11.3 Types of definitions
- 11.4 Extended definitions
- 11.5 General Vs specific descriptions
- 11.6 Physical descriptions
- 11.7 Descriptions of functions
- 11.8 Let Us Sum Up
- 11.9 Suggested Reading
- 11.10 Self check questions
- 11.11 Answers to in-text activities
- 11.12 Answers to self-check exercises

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## 11.0 OBJECTIVES

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After reading this unit, you should be able to:

- write simple definitions;
- distinguish between formal and nonformal definitions;
- identify the methods used for extended definitions;
- write a physical description of an object and the relationship of its different parts;
- write functions/descriptions of objects and their various parts.

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## 11.1 INTRODUCTION

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As students you would be familiar with the terms 'definitions' and 'descriptions' since these two are often used in textbooks and question papers. The technique of writing definitions and descriptions is basic to any expository writing.

**Definition:** In its broadest sense a definition is a statement giving the meaning of a word or term. However, in EST - i.e English for Science and Technology definitions are used as rhetorical devices to clarify the meaning of a term in a compact and straightforward manner.

**Description:** The line demarcating definitions and descriptions is blurred. An expanded definition is in fact a short description. Definitions limit the meaning of a term and is more focussed. Descriptions provide more information than definitions. According to Oxford University Dictionary (seventh edition) description is "a spoken or written representation of a person, object or event. When we describe, we generally state the size, shape and/or colour of things/persons we describe. In EST the watchwords are clarity, precision and objectivity. Hence while describing the shape, size, colour, as well as dimension, weight, material volume or texture of an object, we have to take great care to choose words which will carry clear and precise meaning.

Apart from the descriptions of these physical characteristics, functions and uses of the object as well as its components are also an important aspect of description in scientific writing.

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## 11.2 PARTS OF A DEFINITION

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Let us now look at a simple definition "A generator is a machine which converts mechanical energy into an electrical one"

What is the term defined here? The term defined is 'generator'. When we define, we give information the class (C) to which the term (T) belongs and how it differs (Differentia-D) from other members of the class. Now let us examine the above definitions and find out the term, the class and the differentiating quality of the term.

Term = generator  
Class = machine  
Differentia = converts mechanical energy into an electrical one.

### In text activity-1

Here are some more definitions. Identify its parts and fill in the grid given below;

1. Demography is the science of population growth and its structure
2. Instruments of measuring temperatures are called thermometers
3. Chemistry may be defined as the branch of science which deals with the composition and behaviour of substances.

Term	Class	Differentia
1.		
2.		
3.		

### Language Constructions

Let us now look at the language construction while writing definitions. A simple definition generally has the following components.

*Term+verb+class+ 'wh' word+differentia*

eg. An ammeter is an instrument which is used to measure electric currents.

Many times in EST, definitions are written without 'wh' words. The above definition can be thus rewritten as:

'An ammeter is an instrument for measuring electric currents' You would have also noticed that at times definitions can be made explicit by using words like "may be/is defined".

In most of the examples given above the terms (T) to be defined are mentioned at the beginning of the sentence. But look at the definition, "Instruments for measuring temperatures are called thermometers". Here the term is placed at the end.

## In text activity-2

Rewrite the definition of Chemistry, placing the term at the end.

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## 11.3 TYPES OF DEFINITIONS

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Definitions may be divided into *formal* and *non-formal* based on the information provided and the level of precision achieved. The formal definitions gives us the three pieces of information, *the term, the class and the differences/characteristics*.

In non-formal definitions the kinds of information given are:

1. *the name of the term*
2. *another word or phrase having the approximate meaning of the term or giving an outstanding characteristic of the term.*

Most of the definitions we come across in EST are formal ones. Since non-formal definitions do not give complete/precise information, we have to keep two points in mind:

- i. as far as possible use a formal definition
- ii. when a non-formal definition is used follow it up with the description of other essential information.

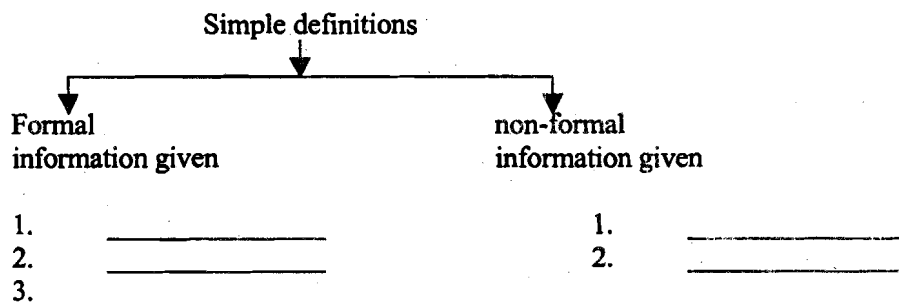
Here are two definitions of arachnid.

**Formal** : Arachnid is an invertebrate animal having eight legs at equal interval from the central body.

**Non-formal** : Arachnid is an invertebrate animal.

The first definition gives the precise information regarding the class and its distinguishing characteristics. The second one tells us only about the class, since 'invertebrate animal' itself is a general class. By giving information regarding the number of legs the animal has, it is differentiated further from other insects which have six legs or many legs.

## In text activity-3



## In text activity-4

Given below are a few definitions. Decide whether they are formal (F) or non-formal (NF).

1. Chloroplasts are plastids which contain chlorophyll ( )
2. Man is an animal ( )
3. An anemometer is a meteorological instrument that is used to measure the speed of the wind ( )
4. A car is a four-wheeled vehicle ( )

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## 11.4 EXTENDED OR EXPANDED DEFINITIONS

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Sometimes it is difficult to define terms in a single sentence. It may have to be expanded. Definitions are expanded by using methods like, *comparison and contrast*, *analogy*, *example*, and *derivation*.

Read the following expanded definitions and then we will find out the method used:

1. A diesel is similar in design to a conventional engine except that it is more heavily constructed to withstand extremely high compression. The high compression allows the diesel to operate on a much cheaper grade of fuel than the type of fuel used in a conventional engine.
2. An ecosystem is similar to a computer or any other mechanical device that has many intricate and related parts. If even the smallest component breaks down the machine will not function properly. So also the ecosystem is damaged by problems caused by humans.

(Adapted from: Technical writing : Principles and Forms by Deborah C. Andrews and Margaret D. Blicke, Macmillan publishing company (1982) P. 136)

In the first definition the diesel engine is compared with the conventional one and the diesel engines distinguishing features are brought out. Here the method used is comparison and contrast.

In the second definition also there is comparison. But ecosystem is defined by using the analogy of a machine (like computers).

You will come across this type of expanded definitions in technical or scientific writing.

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## 11.5 GENERAL vs SCIENTIFIC DESCRIPTIONS

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Read the two texts given below. Both deal with human eyes and give detailed description of the subject. The first one is from a literary text and the second is from a Ecology text. As is evident, these two texts have different purposes and they are targeted at different readers. In literary or creative writing the writer gives us a subjective and impressionistic point of view. Factual information is not important here. On the other hand, in scientific writings, the writer has to choose words and sentences carefully so as to give correct information without creating any ambiguity in readers.

**Text 1**

What I first noticed about her, was her eyes. Those large almond shaped eyes had an unusual colour, the swirl of rainbow violet and earthy brown. They flickered like goldfish searching for someone and rested on me for a second, enough to give me an overwhelming desire to protect the owner of those luminous eyes. When she looked down, her eye-lashes made two dark crescents on her chiselled cheeks. When she looked up again there were traces of tears in her eyes and I noticed that her eyes were much rounder than what I thought earlier. I also realised that the colour of her eyes had turned an intense blue.

**Text 2**

The eye ball is about an inch in diameter and has an opaque white outer cover called sclerotic; the front portion the cornea is transparent. Behind the cornea is a diaphragm called iris with an opening called pupil. Behind the pupil is the crystalline lens made of jelly like substance, the back surface being more curved than the front. The second layer, the choroid is a richly vascularised, thin dark membrane. The inner most of the three layers is the retina which is extremely thin. Opposite to the lens and at the centre of the retina is the yellow spot which is a depression. At the point where the optic nerves enter the eye is the blind spot.

Both the texts describe eyes but in two different ways. Let us examine the first text. Here the writer is not bothered about giving the factual, part-by-part description of eyes. He gives us some idea about the size and the colour. We get a general idea that her eyes are large but even that, we are not completely sure of, as he goes on changing his impression. Initially colour of the eyes was described as a mixture of (rainbow?) violet and (earthy) brown later on he says that they were 'intense' blue. Now what is meant by 'intense' blue? Is it deep blue or just blue with intense feeling? There will also be confusion among readers, regarding the shape of the eyes. It was initially described as large and 'almond' shaped but towards the end of the paragraph he describes them as 'rounder'. Since the writer was more concerned about the impression that these eyes made on him, his physical descriptions are 'coloured' by his subjective experience.

The second text, as you can easily make out, is an adapted version from a textbook of biology. It gives a physical description of the cross section of human eye. It is a very objective, neutral description of various parts of the human eye. It starts with the outermost layer which forms into cornea in the front. Since most of the important parts are in the front, other parts are described, from outer to inner. This is followed by the description of the other two layers and some important parts in the innermost layer.

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## 11.6 PHYSICAL DESCRIPTIONS

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*In physical description, physical characteristics such as the shape, colour, size, dimensions, weight, material texture and volume are generally described.* Different parts or components of an object are described and their interrelationships are also described. Let us go back to Text-2 on the human eye. The first sentence gives us a fairly accurate size of the human eye i.e. about an inch in diameter. The shape is also implied since the measurement is in diameter. Also a diagram (which is not included here) giving the cross section of the eye is generally given. Important parts of the eye are described and their relations are also explained. For example, the spatial relationship of the parts are described using words like 'behind', 'front', 'inner most'.

The location of iris is described as "behind the cornea". Since it is not a detailed description only some important information has been given.

### In text activity-5

Read text 2 and write down the descriptive words/phrases used for these parts. Also give the spatial relationship of the parts to other parts, wherever given.

Term	descriptive words	spatial term
sclerotic choroid lens yellow spot	opaque white	outer corn

### General and Specific Descriptions

*In science and technology we come across physical description ranging from general to specific. In general description physical characteristics are described using general spatial terms such as 'below', 'near', 'at the centre', 'opposite' etc are used. In specific description, understandably, more specific spatial terms like "Imm long", "1/4"thickness", "at an angle of 20°" etc. are used.*

### In text activity-6

Read the following two texts. Underline the spatial terms. Then decide to which category it belongs to: general or specific.

<p><b>Text 1</b></p> <p>"....surrounding the cathode and well spaced from it is the anode or plate ... Between the cathode and anode and usually quite close to the cathode is a wire screen..."</p> <p><b>Text 2</b></p> <p>"...consists essentially of an observation chamber built with a pair of optically plane metallic discs A and B 20 cm in diameter and 1.6 cm apart,, held together by insulating rods of glass or elonite so that they are perfectly parallel to each other.</p>
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How specific or general should the description be depends on many factors such as:

- i. Is the specification vital to the description of the object?
- ii. What is the level to which it is pitched? For example,, is it meant for general readers or for specialists; is it for school students or for post graduates?
- iii. Where is the paragraph placed? If it is an introductory paragraph general terms are used and later a more detailed description using specific terms are given in subsequent paragraphs.
- iv. What is the nature of the subject? In most of the descriptions in physical sciences, great precision and accuracy is demanded. Hence the description has to be specific. In other sciences, rigorous specifications may not be necessary.

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## 11.7 DESCRIPTIONS OF FUNCTIONS

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Physical description in scientific writings is usually accompanied by description of functions. Many of the definitions in scientific writings stress functions. Take for

example the definition of **generator**. "A generator is a machine which converts mechanical energy into electrical energy" The function of the generator is given here.

Given below is a short description of a buttercup flower. It is in the form of a structural-functional description.

The flower of the buttercup consists of 4 rings of structures.

1. **Sepals:** There are typically five small green sepals lying outside the petals. Their main function is to enclose the more delicate structures within which the flower is in bud.
2. **Petals:** These are the five characteristic bright yellow structures. They serve to attract insects to the flower by reason of their colour.
3. **Stamens:** They are the male sexual organs and produce the pollen grains. The stamens are numerous and maybe seen within the petals as small yellow-headed structures.
4. **Carpels:** Right in the centre of the flower, borne on very short stalks are numerous small green structures. These are the carpels and are the female sex organs. Each carpel consists of three parts. At the free extremity is a small sticky structure, stigma to which pollen grains adhere. Below to this is a short narrow rod the style. At the base is a large, swollen bulls, the ovary of which contains a single unripe seed.

[Adapted from: *Essentials of Biology - W F Wheeler Hienemann (1964)*]

The description starts from the outermost part of the flower namely the sepals. The first sentences gives us the information regarding the number (five), the size (small), the colour (green) and their location (lying outside the petals). The second sentence tells us the main function of sepals i.e. "to enclose the more delicate structures within while the flower is in bud".

### In text activity-7

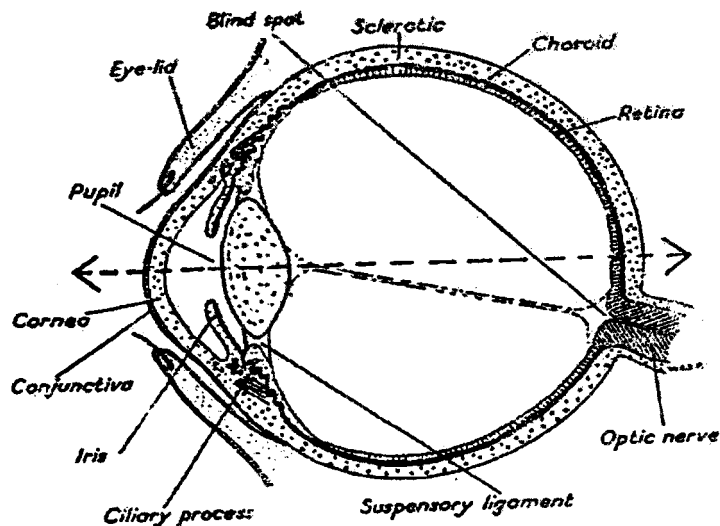
Read the passage on the flower and fill in the grid.

Parts	Functions
1. petals	
2. stamere	
3. carpels	

You are already familiar with the different parts of the human eye. Here is a more detailed description of the eye. Different parts of the human eye are described and the functions of some of these parts are also given.

**Eye** The two eyes in man, set close together, provide him with binocular vision. The eye consists essentially of three concentric spheres, as is clearly shown in Fig. 1, representing a vertical section through the eye. The outermost layer is the sclerotic. It forms an attachment for the eye muscles, helps to give the eye shape and protects the more delicate inner parts of the eye. It is white and thick-walled, except in the front, where about a sixth of the total surface is transparent for the admission of light. This region is termed the *cornea*. It is important to realize that the cornea is protectively covered by a continuation of the epidermis of the skin of the face. It is perfectly transparent and termed the *conjunctiva*. The same skin it reflected to line the eye-lids over the edges of which it passes on the face.

The opaque portion of the sclerotic coat is lined by a richly vascularized, thin, dark membrane—the **choroid**. It stops the light reflecting, and passing out of the eye. Just behind the rim of the cornea this choroid layer is raised into a number of ridges, or *ciliary processes*, forming a sort of frill, which surrounds the lens. In the front portion



of the choroid coat is an aperture - the *pupil* - through which the lens is visible. Immediately surrounding this aperture is a pigmented disc - the *iris* - giving the characteristic blue, grey, brown, etc. colour to the eye. It regulates the amount of light entering the eye. In weak light the iris contracts and the pupil enlarges, allowing more light to enter eye, but in strong light the iris expands, thus making the pupil smaller. This is an automatic, or reflex, action. When the eye is focused on near objects, as when we read the **print** in a book, the **pupil** automatically gets smaller.

The innermost of the three layers is the **retina**. It is extremely thin, and consists of nerve-cells and cells sensitive to light. These latter are of two sorts, known respectively as *rods* and *cones*. The cones are said to be responsible for colour-perception, and for 'seeing' when the light is strong, i.e. in daylight, since the rods are bleached in strong light. They contain a substance called *visual purple*, and to make this purple it is necessary to have vitamin A (found in carrots, etc.). Certain purely nocturnal (night) animals have, as we would expect, only rods and no cones in their retinæ. In man's eye there are more rods towards the edge of the eye, so that we use this area of the retina more in the twilight. Immediately opposite the lens is the *yellow spot* (or *macula lutea*), in the centre of which is a depression. In this depression there are no rods at all, only cones. When we read print in a book the rays of light are focused on to this spot. It is the most light-sensitive part of the eye. To the nasal side of and a little below this yellow spot lies the region of exit of the optic nerve, as well as of the blood-vessels supplying the eye. It is insensitive to light, because there are no rods or cones, but only the nerve fibres, and is known as the *blind spot*.

The **lens** is a biconvex, transparent structure, consisting of separate layers. It is about 8 mm in diameter and, with the suspensory ligament which attaches it securely all round its margin to the ciliary processes, divides the cavity of the eye into two compartments. The front compartment is filled with *aqueous humour*, which is continually leaking out and being replaced. It feeds the eye-cells and helps to give shape to the eye. The back compartment contains *vitreous humour*, which is jelly-like. It helps to focus rays of light, feeds the eye-cells and gives shape to the eye.

This text is a fairly long one,, the type you generally come across in your studies. One of the skills you have to develop is to read through long passages to get some specific information.



Read the text and match the parts with their functions.

<b>Parts</b>	<b>Functions</b>
1. Sclerotic layer ( )	a. stops the light reflecting.
2. choroid layer ( )	b. regulates the light entering the eye.
3. Iris ( )	c. responsible for colour perception.
4. cones ( )	d. responsible for hearing.
	e. helps to give the eye its shape and protects it.

## 11.8 LET US SUM UP

Defining and describing are two important techniques that are used in scientific writings. *Definitions can be an entity by itself or can be part of a descriptive passage. When writing a definition, which stands by itself without any support from other descriptions then it has to be in the form of a formal definition incorporating as such information and specifications as possible.* When a definition is a part of a description then it is usually placed at the beginning of the paragraph. In such cases the definition need not be very formal,, since other information regarding the term is going to be given in the descriptive section.

Descriptions in EST are of three types: *physical description, function description and procedural/process descriptions.* In this unit the first two are discussed. In scientific writing physical description is invariably mixed with function description.

## 11.9 SUGGESTED READING

1. Trimble, Louis,, English for Science and Technology - A discourse approach, Cambridge University Press, 1985.

## 11.10 SELF CHECK QUESTIONS

- I. The passage given below abounds in definitions. Pick out those definitions and write them down. While writing the definition follow the format discussed earlier. You may have to remove unnecessary information.

Light may be defined as the external physical agency by which the eye receives the sensation of sight. A body will be visible to the eye only when the light transmitted from it reaches the eye. Light itself, however, is invisible. A body like the sun, which emits light of its own accord is said to be self-luminous. A body which does not of itself emit light, but is seen only by means of light which it receives from a luminous is said to be non-luminous. Most objects in this world are non-luminous. A substance through which light can pass is said to be transparent eg. Glass,, water etc. Substances which obstruct the passage of light through them are said to be opaque. Substances which allow the passage of light through them but through which objects cannot be seen are said to be translucent eg. Ground glass, oiled paper.

- II Rewrite the following non-formal definitions into formal, using relevant information given in the box.

1. A Bunsen burner is a small laboratory burner

(use 'wh' word)

2. An electrophorus generates electricity.

(without 'wh' word)

3. An electron microscope uses electrons

(use is defined as ....)

- |    |   |
|----|---|
| a. | an instrument - used to generate static electricity.  |
| b. | a psychoanalytical technique - in which hypnosis is used to elicit unconscious information. |
| c. | consists of a vertical tube connected to a gas source.                                      |
| d. | that uses electrons rather than visible light to produce magnified images.                  |

- III. Here is an expanded definition. What is the method used for expansion?

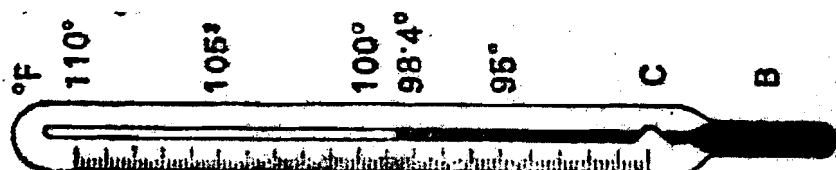
**Inertia.** We often come across the phenomenon of inertia. A running man cannot stop suddenly, he keeps running by inertia for sometime. If you switch off the car engine without applying the brake, the car will not stop atnce, but will roll on for sometime.

- IV. Here is an extract from a physics textbook, describing a clinical thermometer. There are fire paragraphs and a diagram. After going through these five paragraphs you have to give a physical description of a clinical thermometer. You have to describe the size, shape, material and more important, its various parts and how they are related. With regard to the size and shape not much is given, but there is a diagram which will help you to describe it.

### Clinical Thermometer

This is a short range mercury thermometer used by doctors for recording the temperature of the human body. As the human body temperature varies in a short range, the thermometer has the marking from 95 F to 110 F. The normal temperature of a healthy person which is 98.4 F, is indicated by a red arrow on the scale.

These days clinical thermometers are also being marked in C from 35 to 43 C. The normal temperature of a healthy person is 36.9 C.



The above diagram shows a clinical thermometer. It has a bulb B of very thin glass attached with a capillary of very fine bore. The bulb is long and thin instead of spherical; this helps the mercury in the bulb to acquire the patient's temperature more quickly. There is a *constriction* C in the stem just above the bulb B. Mercury passes through the constriction easily when the bulb is placed either below the tongue or in the arm pit for recording temperature. After some time when the thermometer is removed, the constriction prevents the expanded mercury in the stem from falling back into the bulb and thus the temperature is read without hurry. When the thermometer is to be used again, it is given a jerk so that mercury passes through the constriction and goes into the bulb.

The mercury thread and the scale are made easily visible by making the front part of the thermometer prismatic in shape, which gives a magnified image of the thread on the scale when viewed at a proper angle.

5. Information regarding a washing machine is given under three titles: 1. specifications 2. machine layout 3. the control panel,, taken from a user manual. You have to write a description of the washing machine.

**Points to be kept in mind**

1. Your readers are the general public.
2. The description has to be in three paragraphs.

**Paragraph-1**

- simple definitions
- physical description (from specification and machine layout) small dimensions- machine weight - water capacity - type - sheet metal body - castors.

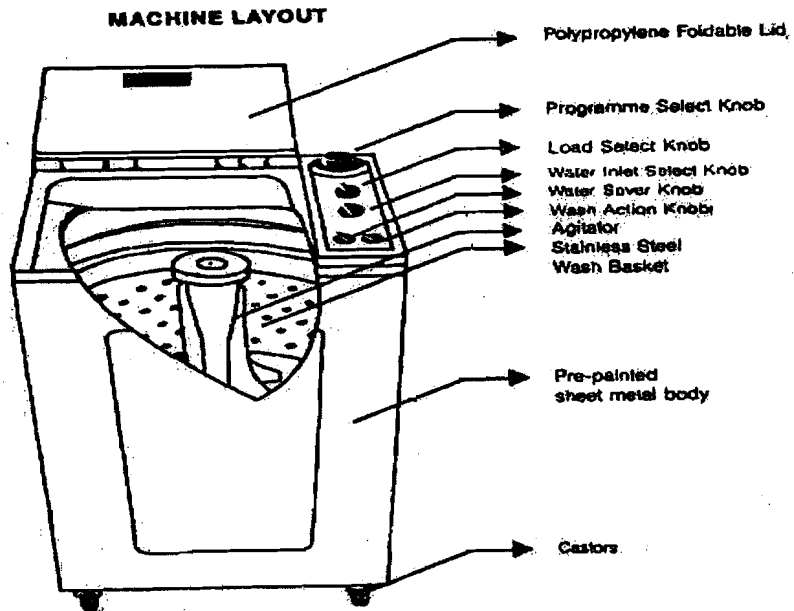
**SPECIFICATIONS**

Type	: Fully automatic top loading type with agitator and stainless steel basket.
Wash Capacity	: 5 Kg. dry weight of clothes.
Overall Dimensions	: Width 585 mm. Height 975 mm. Breadth 565 mm.
Machine Weight	: 42 Kg. approx.
Water Consumption	: 50 litres at low level. 130 litres at high level.
Spin Speed	: 740 rpm.
Agitation Rate	: Normal Wash 65 strokes per minute. Gentle Wash 45 strokes per minute.
Motor	: Reversible, Single phase, 1/4 HP, 1400 rpm.
Voltage	: Performs in the wide operating range of 170V-250V.
Power Supply	: Grounded AC, 240V, 5A, 50Hz

**Inter Water Pressure** : 0.2 Kg/Cm<sup>2</sup> to 10 Kg/Cm<sup>2</sup>

**Motor Power Rating** : 400W

**Indicators** : Machine On Indicator to show working mode.  
Buzzer to indicate completion of wash cycle.



## **THE CONTROL PANEL**

### **PROGRAMME SELECT KNOB**

Gives you options of various wash programmes and helps you choose the appropriate settings for washing your clothes based on fabric type and dirt content. For appropriate setting of the *Programme Select knob*.

### **LOAD SELECT KNOB**

Helps you use water economically depending on the quantity of clothes you want to wash.

### **WATER INLET SELECT KNOB**

This feature helps you to select tap/warm/hot water for wash. this knob has 3 positions, setting the switch on.

**HOT** Connects only supply from your water heater to the machine, shutting off-normal tap water supply.

**TAP** Connects only the tap water supply. Shutting off the hot water supply.

**MIX** Connects both hot and tap water supplies to obtain warm water for the wash.

### **WATER SAVER KNOB**

This feature enables you to rescue the same detergent water for a second wash. When the *Water Saver* is on "Save", detergent water will not be drained out of the machine,

allowing you to reuse it. When it is on "Normal", the detergent water will automatically be drained out of the machine during the course of the cycle.

### WASH ACTION KNOB

This feature helps you in selecting the wash action depending upon the type of fabric set the wash a action knob to "Gentle" position when you wash your light and delicate fabrics.

### MACHINE ON INDICATOR

The *Machine On Indicator* glows red to indicate that the machine is in the working mode. It will continue to glow even when the machine completes the wash programme,, until the *Programme Select Knob* is pushed in.

#### Paragraph-2

(from the control panel) different parts and their functions.

#### Paragraph-3 (from specifications)

The required information given in the specifications (from water consumption to motor power). Include whichever information you feel is important.  
(since suggestions are already given, no answer is given for this question)

## 11.11 ANSWERS TO IN-TEXT ACTIVITIES

### In text activity-1

Term	Class	Differentia
1. Demography	Science	population growth and structure
2. Thermometere	instruments	measuring temperatures
3. Chemistry	science	composition and behaviour of substances

### In text activity-2

The branch of science which deals with the composition and behaviour of substances is called chemistry.

### In text activity-3

Formal definition (information given)		Non-formal definition (information given)	
1.	Term to be defined	1.	the term to be defined
2.	Class to which it belongs	2.	another word or phrase having the approximate meaning or giving an outstanding characteristic
3.	Differentiating characteristics		

### In text activity-4

1. F    2. NF    3. F    4. NF

**In text activity-5**

Term	descriptive words	spatial terms
choroid	richly vascularised thin dark membrane	the second layer
lens	chrySTALLINE, made of jelly like substance the back more curved than the front	behind the pupil
yellow spot	depression	opposite to the lens, at the centre of the retina.

**In text activity-6**

Passage 1

Spatial terms: surrounding, well spaced from it, between, quite close

Description: General

Passage 2

Spatial terms: 20cm in diameter, 1.6 cm apart, held together,, perfectly parallel.

Description: specific

**In text activity-7**

Parts	Functions
1. petals	attracts insects
2. stamens	male sex organs (reproductive function)
3. carpels	female sex organs (reproductive function)

**In text activity-8**

1. (e)
2. (a)
3. (b)
4. (c)

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**11.12 ANSWERS TO SELF CHECK QUESTIONS**

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1 Suggested answers Definitions:

1. Light may be defined as the external physical agency by which the eye receives the sensation of sight.
2. A self-luminous body is a body which emits light of its own accord.
3. A non-lluminous body is a body which does not of itself emit light.
4. A transparent substance is a substance through which light can pass.
5. Opaque substances are substances which obstruct the passage of light through them.
6. Translucent substances are substances which allow the passage of light through them but through which objects cannot be seen.

**II.**

1. A Bunsen burner is a small laboratory burner which consists of a vertical tube connected to a gas source.
2. An electrophorus is an instrument used to generate static electricity.
3. An electron microscope is defined as a microscope which uses electrons rather than visible light to produce magnified images.

**III.**

The method used is expansion through examples.

**IV**

A clinical thermometer is about 4 long. It has a bulb of very thin glass attached with a capillary of very fine bore. The bulb is long and thin instead of spherical. On the stem the thermometer has markings from 95 F to 110 F. The normal temperature which is 98.4F is indicated by a red arrow on the scale. There is a constriction in the stem just above the bulb. The bulb is filled with mercury. The front part of the thermometer is prismatic in shape.