

26 Graphs

Tuning-in

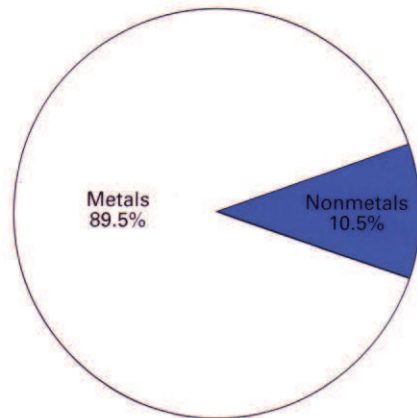
In engineering, graphs and charts are a common way of giving information. They allow a great deal of data to be presented easily in visual form.

Task 1

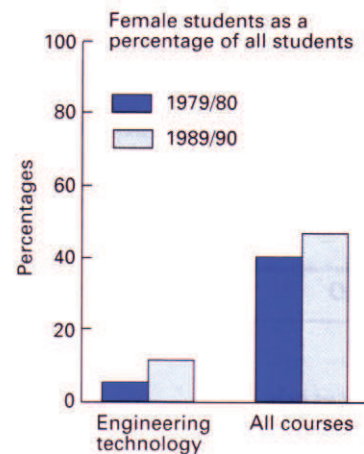
Label the following graphic displays with the correct term from this list:

graph pie chart
bar chart bar chart (column chart)

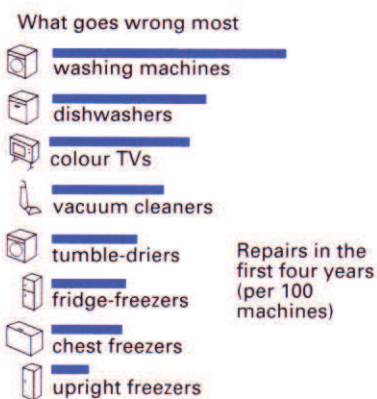
a



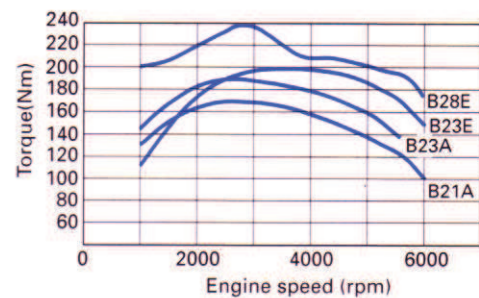
b



c



d



Task 2

Study the graph opposite which shows typical daily load curves for a power station. Answer these questions about the graph for weekdays.

- 1 When is the peak load?
- 2 When is there least demand?
- 3 When is the load 65% of capacity?
- 4 What is the load at 1 p.m.?

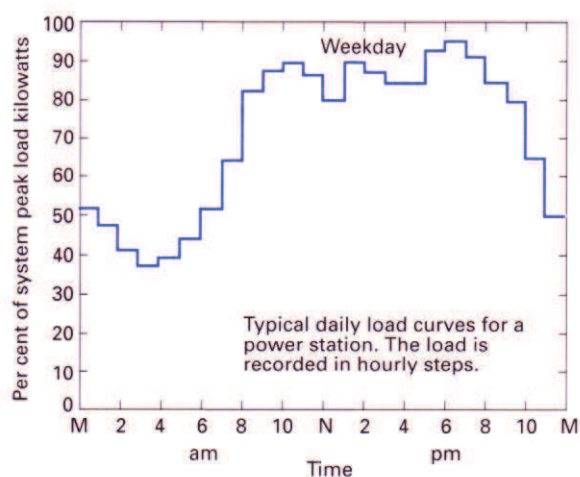


Fig. 1

Describe changes in load for these periods:

- 5 Between 6 a.m. and 10 a.m.
- 6 Between 7 p.m. and midnight.
- 7 Between 3 p.m. and 5 p.m.

Language study *Describing graphs*

Look at the period 6 a.m. to 10 a.m. We can describe the change in load in two ways:

- 1 *The load rises.*
- 2 *There is a rise in load.*

We can make our description more accurate like this:

- 3 *The load rises sharply.*
- 4 *There is a sharp rise in load.*

Study this table of verbs and related nouns of change. The past form of irregular verbs is given in brackets.

Direction	Verb	Noun
Up	climb	
	go up (went up)	
	increase	increase
	rise (rose)	rise
Down	decline	decline
	decrease	decrease
	dip	dip
	drop	drop
	fall (fell)	fall
	go down (went down)	
Level	not change	no change
	remain constant	

These adjectives and adverbs are used to describe the rate of change:

Adjective	Adverb
slight	slightly
gradual	gradually
steady	steadily
steep	steeply
sharp	sharply
sudden	suddenly
fast	fast

Task 3

Study this graph which shows the load at weekends.

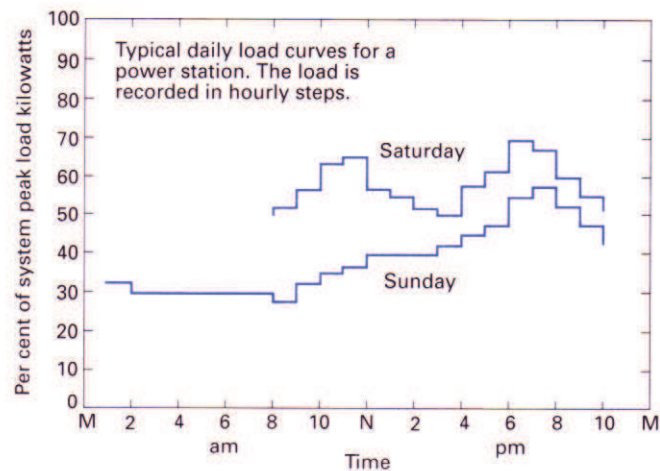


Fig. 2

Write sentences to describe the load during these periods.

- 1 Saturday, 8 a.m. to noon.
- 2 Saturday, 6 p.m. to 10 p.m.
- 3 Saturday, noon to 5 p.m.
- 4 Saturday, noon to 1 p.m.
- 5 Sunday, 2 a.m. to 8 a.m.
- 6 Sunday, 8 a.m. to 9 a.m.
- 7 Sunday, noon to 3 p.m.
- 8 Sunday, 5 p.m. to 10 p.m.

Task 4

Look at Fig. 1 and Fig. 2. Make comparisons of these periods. For example:

Sunday, 4 a.m. to 8 a.m./weekdays at the same time.

On Sunday the load remains constant between 4 a.m. and 8 a.m. but on weekdays it rises sharply.

- 1 Sunday, noon to 3 p.m./Saturday at the same time.
- 2 Weekdays, 10 p.m. to 11 p.m./Saturday at the same time.
- 3 Saturday peak load/Sunday peak load.
- 4 Sunday, noon to 1 p.m./the rest of the week at the same time.

Word study *Common verbs in engineering*

Study this list of common verbs in engineering which you have studied in this book. They all have the sense of 'make something happen'.

lower	make low
raise	make high
heat	make hot
release	make free
compress	make smaller volume
reduce	make smaller
increase	make larger

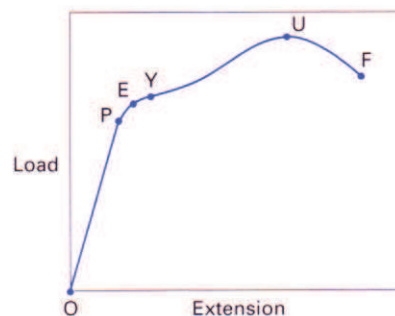
Task 5

Fill in the blanks in these sentences with suitable verbs from the list above.

- 1 When thermoplastics are _____, they soften.
- 2 If a gas is _____, it heats up.
- 3 Refrigeration preserves food by _____ its temperature.
- 4 A heater _____ the temperature of the water.
- 5 The rising piston _____ the fuel mixture.
- 6 Designers try to _____ the weight of a structure.
- 7 When the push button is _____, the valve spring pushes up the spool.
- 8 Pumping fluid into the main cylinder gradually _____ the jack.
- 9 Aerodynamic design _____ wind resistance.
- 10 The motor starts up slowly, then gradually _____ speed.
- 11 At intermediate substations, power is _____ to 11 kV for light industry.
- 12 When the child _____ the handle, the seat swings back under the weight.

Writing *Describing a graph*

An important mechanical test of a metal is the tensile test to destruction. Increasing loads are applied to a specimen of the metal until it breaks. For a mild steel specimen, a graph of load against extension looks like this:



Task 6

The following sentences describe the most important stages of the test. With the help of the graph:

- put the stages in the correct sequence to form a text describing the graph.
- fill in the missing references (O, P, E, Y, U, F)

- a** From _____ to _____ the specimen extends in direct proportion to the load applied.
- b** This rapid extension continues until point _____, the maximum load, is reached.
- c** From _____ there is a rapid increase in length for each increase in load.
- d** At _____ the specimen finally fractures.
- e** After _____ the specimen lengthens further but the load falls.
- f** Soon after P the material reaches its elastic limit, marked on the graph as point _____.

Task 7

Add this extra information to your text.

- a** Up to the elastic limit, the steel will regain its original length when the load is removed.
- b** Up to U there is no change in the cross-section of the steel.
- c** After the elastic limit, the steel will not regain its original length.
- d** After U the specimen undergoes 'waisting'.
- e** Y is the yield point.

Task 8

Refer to each of these figures at an appropriate place in your text. Use expressions such as these:

As shown in Figure A.

See Figure A.

(Figure A)

